

ภาคผนวก ค

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ใบรับรองผลการวิเคราะห์

## ANALYSIS REPORT

Analysis No. : Lab-S 158/2565  
Job No. : PCL 0721/65  
Report Date : June 20, 2022Customer Name : บริษัท โลเค ทรัสต์ จำกัด  
Address : เลขที่ 417/115 ถนนกาญจนาภิเษก ตำบลคลองสาม อำเภอคลองหลวง จังหวัดนครหลวง 90230  
Sampling Source : ปล่อง Scrubber SC 2101  
GPS. Coordinate : UTM 47N 0661082 E, 0759730 N  
Air Pollution Control System : Steam assisted  
Sampling Time : 10:52 a.m. - 11:44 a.m.  
Sampling Condition : Good  
Sampling Method : U.S. EPA Method  
Sampling By : Mr. Ocha Boonchert  
Analyzed By : Ms. Anothai Suebnueang License No. 7-272-9-7704Fuel Type : ก๊าซ (ธรรมชาติ)  
Sampling Date : June 1, 2022  
Received Date : June 2, 2022  
Analytical Date : June 2, 2022  
Sample ID No. : 116/06/65

Item	Description	Unit	Method of Analysis	Result	Standard	
					1	2
1.	Stack Height	m	Measuring Tape	16.00	-	-
2.	Stack Diameter	m	Measuring Tape	0.60	-	-
3.	Temperature in Stack	°C	US. EPA Method 2	658.00	-	-
4.	Pressure Stack	mm.Hg	US. EPA Method 2	756.74	-	-
5.	Air Velocity	m/s	US. EPA Method 2	7.15	-	-
6.	Flow Rate	m³/s	US. EPA Method 2	2.02	-	-
7.	Oxygen Rate	%	US. EPA Method 3	7.70	-	-
8.	Carbon dioxide Rate	%	US. EPA Method 3	7.83	-	-
9.	Moisture Rate	%	US. EPA Method 4	5.59	-	-
10.	Percent of Isokinetic Rate	%	US. EPA Method 5	100.36	-	-
11.	Particulate <sup>1)</sup>	mg/m³	Isokinetic Sampling, Gravimetric Method	10.66	≤200	≤25
12.	Emission rate of Particulate	g/s	Calculate	0.02153	-	≤0.027
13.	Sulfur dioxide <sup>2)</sup>	ppm	Absorption Sampling, Barium-Thoron Titrimetric Method	<1.3	≤50	≤5
14.	Emission rate of Sulfur dioxide	g/s	Calculate	<0.00688	-	≤0.014
15.	Oxide of Nitrogen as Nitrogen dioxide <sup>3)</sup>	ppm	Absorption Sampling, Phenoldisulfonic Acid Method	27.61	≤200	≤50
16.	Emission rate of NO <sub>2</sub> as NO <sub>x</sub>	g/s	Calculate	0.10419	-	≤0.121

Remark : 1. <sup>1)</sup> ปล่อยสารพิษออกสู่ภายนอก เป็น ค่าเฉลี่ยค่าปริมาณสารพิษในอากาศที่บริเวณรอยต่อปล่องฯ พ.ศ. 2549 (ฉบับที่ 31 พ.ร.บ. พ.ศ. 2549)  
2. <sup>2)</sup> มาตรฐานค่าความเข้มข้นของก๊าซพิษและมลพิษทางอากาศ (IAQ) ของบริษัท โลเค ทรัสต์ จำกัด  
3. <sup>3)</sup> ค่าเฉลี่ยค่าปริมาณสารพิษ 1 ชั่วโมงค่า และค่าเฉลี่ย 25 นาทีค่าเฉลี่ย(Mr. Rnus Fakto)  
Lab. Supervisor No. 7-272-9-7699DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL  
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

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## ANALYSIS REPORT

Analysis No. : Lab-S 338/2565  
Job No. : PCL 1461/65  
Report Date : October 28, 2022Customer Name : บริษัท โลเค ทรัสต์ จำกัด  
Address : เลขที่ 417/115 ถนนกาญจนาภิเษก ตำบลคลองสาม อำเภอคลองหลวง จังหวัดนครหลวง 90230  
Sampling Source : ปล่อง Scrubber SC 2101  
GPS. Coordinate : UTM 47N 0661153 E, 0759729 N  
Air Pollution Control System : Wet scrubber  
Sampling Time : 09:30 a.m. - 09:50 a.m.  
Sampling Condition : Good  
Sampling Method : U.S. EPA Method  
Sampling By : Mr. Ocha Boonchert  
Analyzed By : Ms. Anothai SuebnueangFuel Type : Non  
Sampling Date : October 10, 2022  
Received Date : October 11, 2022  
Analytical Date : October 11, 2022  
Sample ID No. : 440/10/65

Item	Description	Unit	Method of Analysis	Result	Standard	
					1	2
1.	Stack Height	m	Measuring Tape	16.00	-	-
2.	Stack Diameter	m	Measuring Tape	0.20	-	-
3.	Temperature in Stack	°C	US. EPA Method 2	32.00	-	-
4.	Pressure Stack	mm.Hg	US. EPA Method 2	759.98	-	-
5.	Air Velocity	m/s	US. EPA Method 2	5.18	-	-
6.	Flow Rate	m³/s	US. EPA Method 2	0.16	-	-
7.	Oxygen Rate	%	US. EPA Method 3	20.90	-	-
8.	Carbon dioxide Rate	%	US. EPA Method 3	<0.10	-	-
9.	Moisture Rate	%	US. EPA Method 4	2.39	-	-
10.	Formaldehyde <sup>1)</sup>	mg/m³	Absorption Sampling, Visible Absorption Spectrophotometric Method	0.075	-	≤10
11.	Emission Rate of Formaldehyde	g/s	Calculate	0.00001	-	≤0.0003

Remark : 1. <sup>1)</sup> ปล่อยสารพิษออกสู่ภายนอก เป็น ค่าเฉลี่ยค่าปริมาณสารพิษในอากาศที่บริเวณรอยต่อปล่องฯ พ.ศ. 2549 (ฉบับที่ 31 พ.ร.บ. พ.ศ. 2549)  
2. <sup>2)</sup> มาตรฐานค่าความเข้มข้นของก๊าซพิษและมลพิษทางอากาศ (IAQ) ของบริษัท โลเค ทรัสต์ จำกัด  
3. <sup>3)</sup> ค่าเฉลี่ยค่าปริมาณสารพิษ 1 ชั่วโมงค่า และค่าเฉลี่ย 25 นาทีค่าเฉลี่ย(Mr. Rnus Fakto)  
Lab. Supervisor No. 7-272-9-7699DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL  
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## ANALYSIS REPORT

Analysis No. : Lab-S 338/2565  
Job No. : PCL 1461/65  
Report Date : October 28, 2022Customer Name : บริษัท โลเค ทรัสต์ จำกัด  
Address : เลขที่ 417/115 ถนนกาญจนาภิเษก ตำบลคลองสาม อำเภอคลองหลวง จังหวัดนครหลวง 90230  
Sampling Source : ปล่อง Scrubber SC 2301  
GPS. Coordinate : UTM 47N 0661106 E, 0759736 N  
Air Pollution Control System : Wet scrubber  
Sampling Time : 09:20 a.m. - 09:40 a.m.  
Sampling Condition : Good  
Sampling Method : U.S. EPA Method  
Sampling By : Mr. Ocha Boonchert  
Analyzed By : Ms. Anothai SuebnueangFuel Type : Non  
Sampling Date : October 10, 2022  
Received Date : October 11, 2022  
Analytical Date : October 11, 2022  
Sample ID No. : 450/10/65

Item	Description	Unit	Method of Analysis	Result	Standard	
					1	2
1.	Stack Height	m	Measuring Tape	16.00	-	-
2.	Stack Diameter	m	Measuring Tape	0.60	-	-
3.	Temperature in Stack	°C	US. EPA Method 2	38.00	-	-
4.	Pressure Stack	mm.Hg	US. EPA Method 2	759.98	-	-
5.	Air Velocity	m/s	US. EPA Method 2	6.88	-	-
6.	Flow Rate	m³/s	US. EPA Method 2	0.86	-	-
7.	Oxygen Rate	%	US. EPA Method 3	20.90	-	-
8.	Carbon dioxide Rate	%	US. EPA Method 3	<0.10	-	-
9.	Moisture Rate	%	US. EPA Method 4	3.25	-	-
10.	Formaldehyde <sup>1)</sup>	mg/m³	Absorption Sampling, Visible Absorption Spectrophotometric Method	0.060	-	≤10
11.	Emission Rate of Formaldehyde	g/s	Calculate	0.00005	-	≤0.0003

Remark : 1. <sup>1)</sup> ปล่อยสารพิษออกสู่ภายนอก เป็น ค่าเฉลี่ยค่าปริมาณสารพิษในอากาศที่บริเวณรอยต่อปล่องฯ พ.ศ. 2549 (ฉบับที่ 31 พ.ร.บ. พ.ศ. 2549)  
2. <sup>2)</sup> มาตรฐานค่าความเข้มข้นของก๊าซพิษและมลพิษทางอากาศ (IAQ) ของบริษัท โลเค ทรัสต์ จำกัด  
3. <sup>3)</sup> ค่าเฉลี่ยค่าปริมาณสารพิษ 1 ชั่วโมงค่า และค่าเฉลี่ย 25 นาทีค่าเฉลี่ย(Mr. Rnus Fakto)  
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## ANALYSIS REPORT

Analysis No. : Lab-S 338/2565  
Job No. : PCL 1461/65  
Report Date : October 28, 2022Customer Name : บริษัท โลเค ทรัสต์ จำกัด  
Address : เลขที่ 417/115 ถนนกาญจนาภิเษก ตำบลคลองสาม อำเภอคลองหลวง จังหวัดนครหลวง 90230  
Sampling Source : ปล่อง Scrubber SC 4021  
GPS. Coordinate : UTM 47N 0661187 E, 0759723 N  
Air Pollution Control System : Wet scrubber  
Sampling Time : 09:05 a.m. - 09:25 a.m.  
Sampling Condition : Good  
Sampling Method : U.S. EPA Method  
Sampling By : Mr. Ocha Boonchert  
Analyzed By : Ms. Anothai SuebnueangFuel Type : Non  
Sampling Date : October 10, 2022  
Received Date : October 11, 2022  
Analytical Date : October 11, 2022  
Sample ID No. : 448/10/65

Item	Description	Unit	Method of Analysis	Result	Standard	
					1	2
1.	Stack Height	m	Measuring Tape	13.20	-	-
2.	Stack Diameter	m	Measuring Tape	0.08	-	-
3.	Temperature in Stack	°C	US. EPA Method 2	29.00	-	-
4.	Pressure Stack	mm.Hg	US. EPA Method 2	759.98	-	-
5.	Air Velocity	m/s	US. EPA Method 2	1.52	-	-
6.	Flow Rate	m³/s	US. EPA Method 2	0.01	-	-
7.	Oxygen Rate	%	US. EPA Method 3	20.90	-	-
8.	Carbon dioxide Rate	%	US. EPA Method 3	<0.10	-	-
9.	Moisture Rate	%	US. EPA Method 4	3.10	-	-
10.	Formaldehyde <sup>1)</sup>	mg/m³	Absorption Sampling, Visible Absorption Spectrophotometric Method	<0.001	-	≤10
11.	Emission Rate of Formaldehyde	g/s	Calculate	<0.0000001	-	≤0.00003

Remark : 1. <sup>1)</sup> ปล่อยสารพิษออกสู่ภายนอก เป็น ค่าเฉลี่ยค่าปริมาณสารพิษในอากาศที่บริเวณรอยต่อปล่องฯ พ.ศ. 2549 (ฉบับที่ 31 พ.ร.บ. พ.ศ. 2549)  
2. <sup>2)</sup> มาตรฐานค่าความเข้มข้นของก๊าซพิษและมลพิษทางอากาศ (IAQ) ของบริษัท โลเค ทรัสต์ จำกัด  
3. <sup>3)</sup> ค่าเฉลี่ยค่าปริมาณสารพิษ 1 ชั่วโมงค่า และค่าเฉลี่ย 25 นาทีค่าเฉลี่ย(Mr. Rnus Fakto)  
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## Analysis / Test Report

Client : AICA Haiyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126646  
Date Received : Nov 26, 2022  
Date Reported : Dec 01, 2022  
Report Number: 2464733-1

Page 1 of 1

Sample Description	Air Quality						
Location	Tafelmuur/ruaanaaius (A1) (GPS 47N 661993, 761327)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Nov 17, 2022 - Nov 24, 2022						
Measurement by	Yongjai Rangsee						
Time	22126646-1 Nov 17, 2022	22126646-2 Nov 18, 2022	22126646-3 Nov 19, 2022	22126646-4 Nov 20, 2022	22126646-5 Nov 21, 2022	22126646-6 Nov 22, 2022	22126646-7 Nov 23, 2022
01:00 PM - 02:00 PM	0.011	0.012	0.016	0.016	0.015	0.016	0.014
02:00 PM - 03:00 PM	0.014	0.015	0.015	0.015	0.014	0.016	0.014
03:00 PM - 04:00 PM	0.013	0.015	0.015	0.015	0.013	0.015	0.016
04:00 PM - 05:00 PM	0.015	0.015	0.015	0.016	0.015	0.016	0.014
05:00 PM - 06:00 PM	0.015	0.016	0.015	0.016	0.012	0.014	0.015
06:00 PM - 07:00 PM	0.013	0.014	0.014	0.015	0.014	0.015	0.013
07:00 PM - 08:00 PM	0.012	0.016	0.015	0.016	0.013	0.015	0.015
08:00 PM - 09:00 PM	0.012	0.011	0.017	0.016	0.012	0.016	0.015
09:00 PM - 10:00 PM	0.014	0.015	0.014	0.016	0.010	0.016	0.010
10:00 PM - 11:00 PM	0.016	0.015	0.012	0.010	0.009	0.012	0.016
11:00 PM - 12:00 AM	0.013	0.014	0.009	0.017	0.008	0.016	0.013
12:00 AM - 01:00 AM	0.012	0.011	0.009	0.016	0.009	0.009	0.009
01:00 AM - 02:00 AM	0.010	0.008	0.009	0.015	0.008	0.009	0.009
02:00 AM - 03:00 AM	0.010	0.007	0.008	0.016	0.008	0.009	0.012
03:00 AM - 04:00 AM	0.011	0.008	0.008	0.016	0.007	0.009	0.009
04:00 AM - 05:00 AM	0.011	0.007	0.007	0.011	0.008	0.008	0.009
05:00 AM - 06:00 AM	0.011	0.007	0.007	0.016	0.009	0.008	0.010
06:00 AM - 07:00 AM	0.011	0.007	0.008	0.011	0.011	0.009	0.018
07:00 AM - 08:00 AM	0.011	0.007	0.010	0.015	0.016	0.010	0.018
08:00 AM - 09:00 AM	0.014	0.010	0.014	0.010	0.014	0.016	0.018
09:00 AM - 10:00 AM	0.014	0.010	0.014	0.014	0.016	0.012	0.013
10:00 AM - 11:00 AM	0.016	0.012	0.015	0.013	0.014	0.014	0.016
11:00 AM - 12:00 PM	0.016	0.013	0.015	0.015	0.015	0.012	0.016
12:00 PM - 01:00 PM	0.016	0.016	0.016	0.016	0.012	0.015	0.012
Average	0.013	0.012	0.012	0.015	0.012	0.013	0.014
1hr - Maximum	0.016	0.016	0.017	0.017	0.016	0.016	0.018
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Sarat Mongkrojant  
Supervisor

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## Analysis / Test Report

Client : AICA Haiyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126646  
Date Received : Nov 26, 2022  
Date Reported : Dec 01, 2022  
Report Number: 2508200-1

Page 1 of 1

Sample Description	Air Quality						
Location	ท่าอากาศยาน (A2) (GPS 47N 660900, 759227)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Nov 17, 2022 - Nov 24, 2022						
Measurement by	Yongjai Rangsee						
Time	22126646-8 Nov 17, 2022	22126646-9 Nov 18, 2022	22126646-10 Nov 19, 2022	22126646-11 Nov 20, 2022	22126646-12 Nov 21, 2022	22126646-13 Nov 22, 2022	22126646-14 Nov 23, 2022
12:00 PM - 01:00 PM	0.002	0.022	0.014	0.006	0.005	0.002	0.002
01:00 PM - 02:00 PM	0.001	0.027	0.014	0.005	0.003	0.002	0.002
02:00 PM - 03:00 PM	<0.001	0.020	0.015	0.004	0.002	0.001	0.002
03:00 PM - 04:00 PM	0.001	0.019	0.007	0.002	0.004	0.001	0.002
04:00 PM - 05:00 PM	<0.001	0.032	0.007	0.002	0.002	<0.001	0.001
05:00 PM - 06:00 PM	0.001	0.026	0.007	0.002	0.004	0.005	0.002
06:00 PM - 07:00 PM	<0.001	0.015	0.007	0.006	0.004	0.006	0.003
07:00 PM - 08:00 PM	0.001	0.019	<0.001	0.009	0.005	0.002	0.016
08:00 PM - 09:00 PM	0.001	0.011	<0.001	0.006	0.004	0.011	0.012
09:00 PM - 10:00 PM	0.001	0.012	0.002	0.008	0.006	0.010	0.010
10:00 PM - 11:00 PM	0.001	0.012	<0.001	0.007	0.008	0.009	0.009
11:00 PM - 12:00 AM	0.001	0.014	<0.001	0.008	0.008	0.023	0.006
12:00 AM - 01:00 AM	<0.001	0.018	<0.001	0.004	0.005	0.013	0.005
01:00 AM - 02:00 AM	<0.001	0.014	0.002	0.004	0.004	0.005	0.002
02:00 AM - 03:00 AM	<0.001	0.012	<0.001	0.005	0.002	0.004	0.002
03:00 AM - 04:00 AM	<0.001	0.009	<0.001	0.003	0.003	0.002	0.001
04:00 AM - 05:00 AM	<0.001	0.009	<0.001	0.006	0.004	0.004	0.002
05:00 AM - 06:00 AM	<0.001	0.009	<0.001	0.010	0.004	0.002	0.001
06:00 AM - 07:00 AM	<0.001	0.008	0.001	0.006	0.007	0.004	0.001
07:00 AM - 08:00 AM	0.001	0.008	0.003	0.011	0.008	0.008	0.002
08:00 AM - 09:00 AM	0.001	0.007	0.003	0.020	0.008	0.009	0.003
09:00 AM - 10:00 AM	0.002	0.007	0.002	0.015	0.005	0.003	0.002
10:00 AM - 11:00 AM	0.004	0.008	0.002	0.004	0.002	0.003	0.001
11:00 AM - 12:00 PM	0.003	0.010	0.003	0.014	0.002	0.006	0.005
Average	0.001	0.015	0.004	0.007	0.005	0.005	0.004
1hr - Maximum	0.004	0.032	0.015	0.020	0.008	0.023	0.016
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Sarat Mongkrojant  
Supervisor

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## Analysis / Test Report

Client : AICA Haiyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126646  
Date Received : Nov 26, 2022  
Date Reported : Dec 01, 2022  
Report Number: 2508201-1

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Sample Description	Air Quality						
Location	ท่าอากาศยานนานาชาติ (A3) (GPS 47N 662212, 759091)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Nov 17, 2022 - Nov 24, 2022						
Measurement by	Yongjai Rangsee						
Time	22126646-15 Nov 17, 2022	22126646-16 Nov 18, 2022	22126646-17 Nov 19, 2022	22126646-18 Nov 20, 2022	22126646-19 Nov 21, 2022	22126646-20 Nov 22, 2022	22126646-21 Nov 23, 2022
11:00 AM - 12:00 PM	<0.001	0.001	0.001	0.002	<0.001	<0.001	<0.001
12:00 PM - 01:00 PM	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
01:00 PM - 02:00 PM	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
02:00 PM - 03:00 PM	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
03:00 PM - 04:00 PM	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
04:00 PM - 05:00 PM	0.001	0.001	0.002	<0.001	<0.001	<0.001	0.001
05:00 PM - 06:00 PM	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
06:00 PM - 07:00 PM	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
07:00 PM - 08:00 PM	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
08:00 PM - 09:00 PM	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
09:00 PM - 10:00 PM	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
10:00 PM - 11:00 PM	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
11:00 PM - 12:00 AM	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
12:00 AM - 01:00 AM	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
01:00 AM - 02:00 AM	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
02:00 AM - 03:00 AM	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
03:00 AM - 04:00 AM	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
04:00 AM - 05:00 AM	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
05:00 AM - 06:00 AM	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
06:00 AM - 07:00 AM	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
07:00 AM - 08:00 AM	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
08:00 AM - 09:00 AM	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
09:00 AM - 10:00 AM	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
10:00 AM - 11:00 AM	<0.001	0.001	0.013	<0.001	<0.001	<0.001	<0.001
Average	0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001
1hr - Maximum	0.001	0.001	0.013	0.002	0.001	<0.001	0.001
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Approved by

Sarat Mongkrojant  
Supervisor

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1204421 (ENG)

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## Analysis / Test Report

Client : AICA Haiyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126646  
Date Received : Nov 26, 2022  
Date Reported : Dec 01, 2022  
Report Number: 2508202-1

Page 1 of 1

Sample Description	Air Quality						
Location	ท่าอากาศยานนานาชาติ (yuthathani) (A4) (GPS 47N 664348, 761591)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Nov 17, 2022 - Nov 24, 2022						
Measurement by	Yongjai Rangsee						
Time	22126646-22 Nov 17, 2022	22126646-23 Nov 18, 2022	22126646-24 Nov 19, 2022	22126646-25 Nov 20, 2022	22126646-26 Nov 21, 2022	22126646-27 Nov 22, 2022	22126646-28 Nov 23, 2022
02:00 PM - 03:00 PM	0.006	0.005	0.005	0.007	0.004	0.004	0.004
03:00 PM - 04:00 PM	0.005	0.004	0.004	0.004	0.005	0.004	0.005
04:00 PM - 05:00 PM	0.004	0.004	0.005	0.004	0.004	0.006	0.007
05:00 PM - 06:00 PM	0.005	0.005	0.006	0.008	0.006	0.004	0.004
06:00 PM - 07:00 PM	0.005	0.006	0.008	0.007	0.006	0.004	0.005
07:00 PM - 08:00 PM	0.005	0.006	0.007	0.005	0.008	0.007	0.005
08:00 PM - 09:00 PM	0.005	0.005	0.005	0.005	0.006	0.007	0.005
09:00 PM - 10:00 PM	0.004	0.005	0.005	0.005	0.005	0.006	0.005
10:00 PM - 11:00 PM	0.005	0.005	0.005	0.005	0.004	0.005	0.005
11:00 PM - 12:00 AM	0.005	0.005	0.005	0.004	0.004	0.004	0.004
12:00 AM - 01:00 AM	0.005	0.006	0.005	0.004	0.004	0.004	0.004
01:00 AM - 02:00 AM	0.005	0.006	0.006	0.004	0.004	0.004	0.004
02:00 AM - 03:00 AM	0.005	0.004	0.006	0.004	0.004	0.003	0.004
03:00 AM - 04:00 AM	0.005	0.004	0.007	0.004	0.003	0.004	0.004
04:00 AM - 05:00 AM	0.004	0.004	0.005	0.004	0.003	0.004	0.003
05:00 AM - 06:00 AM	0.004	0.004	0.005	0.004	0.003	0.003	0.003
06:00 AM - 07:00 AM	0.004	0.004	0.005	0.004	0.003	0.003	0.003
07:00 AM - 08:00 AM	0.004	0.004	0.004	0.004	0.003	0.004	0.003
08:00 AM - 09:00 AM	0.006	0.004	0.004	0.005	0.005	0.004	0.004
09:00 AM - 10:00 AM	0.007	0.011	0.004	0.005	0.005	0.004	0.006
10:00 AM - 11:00 AM	0.006	0.007	0.004	0.004	0.007	0.006	0.005
11:00 AM - 12:00 PM	0.005	0.005	0.005	0.005	0.009	0.007	0.007
12:00 PM - 01:00 PM	0.005	0.006	0.005	0.004	0.006	0.005	0.006
01:00 PM - 02:00 PM	0.006	0.005	0.008	0.005	0.004	0.006	0.005
Average	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1hr - Maximum	0.007	0.011	0.008	0.008	0.009	0.007	0.007
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170





## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507235-1

Page 1 of 1

Sample Number : 22126649-1  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านนาทราย (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 17 - Nov 18, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	60.1	90.9	45.2
12:00 PM - 01:00 PM	58.6	80.9	46.5
01:00 PM - 02:00 PM	52.0	71.3	45.2
02:00 PM - 03:00 PM	53.5	83.9	43.8
03:00 PM - 04:00 PM	56.5	88.2	47.0
04:00 PM - 05:00 PM	56.6	81.1	49.7
05:00 PM - 06:00 PM	59.0	87.9	46.1
06:00 PM - 07:00 PM	51.5	73.8	46.4
07:00 PM - 08:00 PM	51.9	73.8	46.7
08:00 PM - 09:00 PM	49.3	76.8	46.4
09:00 PM - 10:00 PM	51.1	82.2	46.4
10:00 PM - 11:00 PM	53.6	80.9	45.6
11:00 PM - 12:00 AM	62.6	87.2	45.1
12:00 AM - 01:00 AM	48.6	65.3	45.7
01:00 AM - 02:00 AM	44.5	62.4	43.4
02:00 AM - 03:00 AM	55.2	80.9	45.2
03:00 AM - 04:00 AM	50.2	68.8	45.1
04:00 AM - 05:00 AM	54.4	71.4	46.0
05:00 AM - 06:00 AM	58.7	83.5	45.1
06:00 AM - 07:00 AM	58.0	84.1	46.8
07:00 AM - 08:00 AM	54.8	87.0	45.5
08:00 AM - 09:00 AM	53.1	79.2	44.0
09:00 AM - 10:00 AM	64.7	98.3	44.5
10:00 AM - 11:00 AM	52.9	76.3	44.8

Leq Average 24 hrs. (dB(A)) : 57.1  
Lmax (dB(A)) : 98.3  
L90 (dB(A)) : 45.5  
Ldn (dB(A)) : 63.2  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการควบคุมระดับเสียงรบกวนภายใน 15 (น.ก. 2540) สำหรับการวางผังชุมชนเมือง  
2. มาตรฐานการควบคุมระดับเสียงรบกวนภายนอกอาคารและบริเวณโดยรอบชุมชนเมือง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507236-1

Page 1 of 1

Sample Number : 22126649-2  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านนาทราย (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 18 - Nov 19, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	52.1	76.4	46.8
12:00 PM - 01:00 PM	55.2	81.4	48.0
01:00 PM - 02:00 PM	54.6	75.6	47.9
02:00 PM - 03:00 PM	61.5	87.9	47.3
03:00 PM - 04:00 PM	54.6	76.9	48.5
04:00 PM - 05:00 PM	57.1	82.4	49.8
05:00 PM - 06:00 PM	61.5	77.1	49.2
06:00 PM - 07:00 PM	57.6	72.7	50.4
07:00 PM - 08:00 PM	53.1	70.2	47.8
08:00 PM - 09:00 PM	50.9	62.7	47.9
09:00 PM - 10:00 PM	49.0	68.7	47.2
10:00 PM - 11:00 PM	49.1	66.9	47.8
11:00 PM - 12:00 AM	50.2	74.0	48.7
12:00 AM - 01:00 AM	50.8	65.6	49.5
01:00 AM - 02:00 AM	52.9	71.9	49.6
02:00 AM - 03:00 AM	52.1	65.5	50.8
03:00 AM - 04:00 AM	54.8	73.1	50.8
04:00 AM - 05:00 AM	55.7	72.1	49.6
05:00 AM - 06:00 AM	57.2	80.1	48.5
06:00 AM - 07:00 AM	59.2	86.3	48.9
07:00 AM - 08:00 AM	56.1	83.9	48.7
08:00 AM - 09:00 AM	60.8	89.6	48.2
09:00 AM - 10:00 AM	57.9	88.0	45.9
10:00 AM - 11:00 AM	56.2	81.4	47.5

Leq Average 24 hrs. (dB(A)) : 56.5  
Lmax (dB(A)) : 89.6  
L90 (dB(A)) : 48.5  
Ldn (dB(A)) : 61.6  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการควบคุมระดับเสียงรบกวนภายใน 15 (น.ก. 2540) สำหรับการวางผังชุมชนเมือง  
2. มาตรฐานการควบคุมระดับเสียงรบกวนภายนอกอาคารและบริเวณโดยรอบชุมชนเมือง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507237-1

Page 1 of 1

Sample Number : 22126649-3  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านนาทราย (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 19 - Nov 20, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	56.5	79.7	46.9
12:00 PM - 01:00 PM	53.3	78.8	47.9
01:00 PM - 02:00 PM	53.3	78.3	48.4
02:00 PM - 03:00 PM	55.7	73.8	49.8
03:00 PM - 04:00 PM	55.9	79.4	49.6
04:00 PM - 05:00 PM	55.6	79.6	49.0
05:00 PM - 06:00 PM	55.9	81.8	48.9
06:00 PM - 07:00 PM	54.5	74.0	51.1
07:00 PM - 08:00 PM	53.1	76.3	48.3
08:00 PM - 09:00 PM	48.4	64.8	47.0
09:00 PM - 10:00 PM	52.0	78.9	45.9
10:00 PM - 11:00 PM	49.7	74.0	45.4
11:00 PM - 12:00 AM	44.4	64.6	42.5
12:00 AM - 01:00 AM	49.7	73.0	42.8
01:00 AM - 02:00 AM	45.6	66.4	43.7
02:00 AM - 03:00 AM	44.4	69.5	43.0
03:00 AM - 04:00 AM	48.5	70.6	43.4
04:00 AM - 05:00 AM	55.4	73.5	43.2
05:00 AM - 06:00 AM	57.2	78.8	44.1
06:00 AM - 07:00 AM	57.2	83.1	43.4
07:00 AM - 08:00 AM	63.4	92.4	43.1
08:00 AM - 09:00 AM	58.1	86.8	43.7
09:00 AM - 10:00 AM	54.5	79.3	44.5
10:00 AM - 11:00 AM	56.9	83.4	44.3

Leq Average 24 hrs. (dB(A)) : 55.5  
Lmax (dB(A)) : 92.4  
L90 (dB(A)) : 44.3  
Ldn (dB(A)) : 60.0  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการควบคุมระดับเสียงรบกวนภายใน 15 (น.ก. 2540) สำหรับการวางผังชุมชนเมือง  
2. มาตรฐานการควบคุมระดับเสียงรบกวนภายนอกอาคารและบริเวณโดยรอบชุมชนเมือง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507238-1

Page 1 of 1

Sample Number : 22126649-4  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านนาทราย (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 20 - Nov 21, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	55.4	86.7	44.5
12:00 PM - 01:00 PM	52.1	81.3	42.3
01:00 PM - 02:00 PM	50.0	88.1	41.6
02:00 PM - 03:00 PM	56.5	80.1	50.0
03:00 PM - 04:00 PM	54.2	77.3	45.7
04:00 PM - 05:00 PM	57.0	87.1	48.2
05:00 PM - 06:00 PM	54.4	76.3	48.4
06:00 PM - 07:00 PM	59.6	84.2	49.7
07:00 PM - 08:00 PM	50.5	65.9	47.6
08:00 PM - 09:00 PM	49.7	75.6	45.6
09:00 PM - 10:00 PM	53.0	84.3	44.7
10:00 PM - 11:00 PM	48.8	75.5	45.2
11:00 PM - 12:00 AM	47.3	64.8	44.7
12:00 AM - 01:00 AM	48.1	61.5	44.3
01:00 AM - 02:00 AM	50.3	70.2	43.7
02:00 AM - 03:00 AM	48.8	70.4	43.6
03:00 AM - 04:00 AM	48.9	71.3	42.9
04:00 AM - 05:00 AM	54.9	71.6	44.1
05:00 AM - 06:00 AM	56.1	75.7	43.5
06:00 AM - 07:00 AM	54.8	80.9	43.3
07:00 AM - 08:00 AM	54.4	83.0	43.9
08:00 AM - 09:00 AM	62.2	89.8	42.4
09:00 AM - 10:00 AM	52.9	77.9	43.4
10:00 AM - 11:00 AM	60.4	90.1	42.4

Leq Average 24 hrs. (dB(A)) : 55.7  
Lmax (dB(A)) : 90.1  
L90 (dB(A)) : 44.1  
Ldn (dB(A)) : 59.7  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการควบคุมระดับเสียงรบกวนภายใน 15 (น.ก. 2540) สำหรับการวางผังชุมชนเมือง  
2. มาตรฐานการควบคุมระดับเสียงรบกวนภายนอกอาคารและบริเวณโดยรอบชุมชนเมือง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507239-1

Page 1 of 1

Sample Number : 22126649-5  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านสวน (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 21 - Nov 22, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	49.7	72.8	41.5
12:00 PM - 01:00 PM	55.5	83.8	41.6
01:00 PM - 02:00 PM	52.5	77.3	42.2
02:00 PM - 03:00 PM	57.0	78.5	41.2
03:00 PM - 04:00 PM	54.8	83.9	45.2
04:00 PM - 05:00 PM	58.3	89.8	45.8
05:00 PM - 06:00 PM	55.1	77.8	48.8
06:00 PM - 07:00 PM	55.1	86.6	48.7
07:00 PM - 08:00 PM	52.6	75.1	47.9
08:00 PM - 09:00 PM	49.8	70.9	44.9
09:00 PM - 10:00 PM	47.2	61.4	44.8
10:00 PM - 11:00 PM	52.9	74.5	43.8
11:00 PM - 12:00 AM	54.2	78.3	44.0
12:00 AM - 01:00 AM	56.4	83.5	44.0
01:00 AM - 02:00 AM	45.3	68.9	42.7
02:00 AM - 03:00 AM	48.5	73.2	41.1
03:00 AM - 04:00 AM	53.0	73.8	43.6
04:00 AM - 05:00 AM	56.2	73.1	42.8
05:00 AM - 06:00 AM	52.7	73.3	42.4
06:00 AM - 07:00 AM	56.7	89.1	43.3
07:00 AM - 08:00 AM	51.8	82.8	40.9
08:00 AM - 09:00 AM	51.6	74.5	41.3
09:00 AM - 10:00 AM	50.3	70.7	40.7
10:00 AM - 11:00 AM	49.5	72.3	41.0

Leq Average 24 hrs. (dB(A)) : 53.9  
Lmax (dB(A)) : 89.8  
L90 (dB(A)) : 43.1  
Ldn (dB(A)) : 60.4  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
2. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salanteh  
Section Head

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S:\Reports\_Air Noise.rpt (8/10/96)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507240-1

Page 1 of 1

Sample Number : 22126649-6  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านสวน (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 22 - Nov 23, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	58.1	92.9	40.4
12:00 PM - 01:00 PM	55.0	87.8	40.5
01:00 PM - 02:00 PM	50.6	72.6	41.3
02:00 PM - 03:00 PM	56.8	71.5	47.2
03:00 PM - 04:00 PM	56.1	84.1	48.6
04:00 PM - 05:00 PM	53.6	76.0	45.5
05:00 PM - 06:00 PM	51.8	74.8	44.0
06:00 PM - 07:00 PM	51.3	72.1	47.4
07:00 PM - 08:00 PM	59.3	87.7	44.7
08:00 PM - 09:00 PM	51.6	79.1	47.0
09:00 PM - 10:00 PM	49.7	76.5	46.5
10:00 PM - 11:00 PM	48.1	70.6	44.3
11:00 PM - 12:00 AM	58.3	78.3	44.7
12:00 AM - 01:00 AM	61.7	87.6	45.0
01:00 AM - 02:00 AM	44.4	60.4	43.1
02:00 AM - 03:00 AM	49.7	71.6	42.8
03:00 AM - 04:00 AM	52.4	71.2	43.1
04:00 AM - 05:00 AM	55.6	73.1	43.3
05:00 AM - 06:00 AM	58.3	88.5	43.7
06:00 AM - 07:00 AM	60.3	89.8	44.2
07:00 AM - 08:00 AM	56.5	78.0	43.9
08:00 AM - 09:00 AM	59.5	87.7	42.6
09:00 AM - 10:00 AM	61.6	92.6	41.6
10:00 AM - 11:00 AM	54.9	81.9	40.4

Leq Average 24 hrs. (dB(A)) : 56.5  
Lmax (dB(A)) : 92.9  
L90 (dB(A)) : 43.9  
Ldn (dB(A)) : 63.5  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
2. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507241-1

Page 1 of 1

Sample Number : 22126649-7  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านสวน (N1) (GPS 47N 660892, 759222)  
Measurement Date : Nov 23 - Nov 24, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1173617

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.1	87.8	39.6
12:00 PM - 01:00 PM	63.8	79.4	43.9
01:00 PM - 02:00 PM	59.7	82.3	47.8
02:00 PM - 03:00 PM	61.7	95.0	47.1
03:00 PM - 04:00 PM	53.1	73.6	44.4
04:00 PM - 05:00 PM	58.0	85.1	48.9
05:00 PM - 06:00 PM	53.6	86.8	45.9
06:00 PM - 07:00 PM	51.9	84.9	45.4
07:00 PM - 08:00 PM	50.0	78.3	45.3
08:00 PM - 09:00 PM	48.4	66.6	47.1
09:00 PM - 10:00 PM	48.2	62.8	46.4
10:00 PM - 11:00 PM	50.1	75.2	43.6
11:00 PM - 12:00 AM	45.9	64.9	43.9
12:00 AM - 01:00 AM	46.2	59.5	43.9
01:00 AM - 02:00 AM	49.5	78.5	43.2
02:00 AM - 03:00 AM	49.7	71.2	43.6
03:00 AM - 04:00 AM	51.6	72.5	43.0
04:00 AM - 05:00 AM	55.8	73.5	43.3
05:00 AM - 06:00 AM	54.6	80.1	44.4
06:00 AM - 07:00 AM	59.6	90.5	44.5
07:00 AM - 08:00 AM	52.7	76.3	44.2
08:00 AM - 09:00 AM	53.5	76.7	43.4
09:00 AM - 10:00 AM	53.6	80.7	42.5
10:00 AM - 11:00 AM	61.5	92.8	41.1

Leq Average 24 hrs. (dB(A)) : 56.9  
Lmax (dB(A)) : 95.0  
L90 (dB(A)) : 44.2  
Ldn (dB(A)) : 61.0  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
2. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507242-1

Page 1 of 1

Sample Number : 22126649-8  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดที่ 1 บ้านสวน (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 17 - Nov 18, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	50.4	74.2	44.1
12:00 PM - 01:00 PM	50.6	67.0	45.2
01:00 PM - 02:00 PM	51.3	65.4	48.9
02:00 PM - 03:00 PM	49.9	67.0	47.3
03:00 PM - 04:00 PM	50.5	72.4	47.0
04:00 PM - 05:00 PM	53.7	75.2	49.2
05:00 PM - 06:00 PM	54.2	72.7	49.0
06:00 PM - 07:00 PM	57.8	68.3	53.3
07:00 PM - 08:00 PM	58.0	62.5	56.2
08:00 PM - 09:00 PM	57.4	68.8	55.7
09:00 PM - 10:00 PM	56.6	60.5	55.2
10:00 PM - 11:00 PM	56.7	60.5	55.3
11:00 PM - 12:00 AM	56.4	60.5	54.9
12:00 AM - 01:00 AM	54.4	59.2	52.9
01:00 AM - 02:00 AM	55.5	66.6	51.8
02:00 AM - 03:00 AM	53.5	62.6	51.6
03:00 AM - 04:00 AM	53.7	58.8	52.2
04:00 AM - 05:00 AM	53.8	57.9	52.6
05:00 AM - 06:00 AM	53.9	60.9	53.0
06:00 AM - 07:00 AM	55.3	68.1	53.8
07:00 AM - 08:00 AM	54.5	67.1	52.9
08:00 AM - 09:00 AM	53.3	71.8	50.1
09:00 AM - 10:00 AM	50.8	70.3	47.7
10:00 AM - 11:00 AM	47.2	60.1	45.4

Leq Average 24 hrs. (dB(A)) : 54.5  
Lmax (dB(A)) : 75.2  
L90 (dB(A)) : 51.8  
Ldn (dB(A)) : 61.3  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
2. มาตรฐานการวัดผลกระทบสิ่งแวดล้อมระดับเสียง 15 (พ.ศ. 2540) ที่กำหนดค่ามาตรฐานระดับเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salanteh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507243-1

Page 1 of 1

Sample Number : 22126649-9  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดตรวจ/ตรวจวัดเสียง (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 18 - Nov 19, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	48.0	71.7	45.2
12:00 PM - 01:00 PM	47.5	70.8	45.0
01:00 PM - 02:00 PM	48.2	67.4	46.1
02:00 PM - 03:00 PM	48.7	64.7	46.4
03:00 PM - 04:00 PM	50.4	67.5	47.2
04:00 PM - 05:00 PM	50.9	72.5	47.6
05:00 PM - 06:00 PM	51.3	64.6	47.7
06:00 PM - 07:00 PM	59.0	69.1	51.1
07:00 PM - 08:00 PM	57.0	68.6	53.8
08:00 PM - 09:00 PM	57.0	63.9	52.9
09:00 PM - 10:00 PM	53.9	61.5	52.6
10:00 PM - 11:00 PM	54.1	58.3	53.1
11:00 PM - 12:00 AM	56.0	61.4	53.6
12:00 AM - 01:00 AM	56.7	66.1	54.5
01:00 AM - 02:00 AM	56.8	61.1	54.7
02:00 AM - 03:00 AM	54.9	60.0	52.4
03:00 AM - 04:00 AM	53.5	60.2	52.2
04:00 AM - 05:00 AM	55.7	62.3	53.9
05:00 AM - 06:00 AM	57.2	63.1	54.2
06:00 AM - 07:00 AM	57.8	65.5	56.4
07:00 AM - 08:00 AM	56.8	74.1	54.6
08:00 AM - 09:00 AM	54.1	68.7	50.5
09:00 AM - 10:00 AM	50.8	68.1	47.2
10:00 AM - 11:00 AM	49.1	72.7	46.4

Leq Average 24 hrs. (dB(A)) : 54.8  
Lmax (dB(A)) : 74.1  
L90 (dB(A)) : 52.2  
Ldn (dB(A)) : 62.2  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
2. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507244-1

Page 1 of 1

Sample Number : 22126649-10  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดตรวจ/ตรวจวัดเสียง (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 19 - Nov 20, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	49.9	65.2	45.8
12:00 PM - 01:00 PM	48.5	67.5	45.9
01:00 PM - 02:00 PM	49.2	74.8	46.2
02:00 PM - 03:00 PM	50.3	71.2	46.2
03:00 PM - 04:00 PM	51.1	72.8	47.7
04:00 PM - 05:00 PM	51.1	67.7	48.4
05:00 PM - 06:00 PM	51.3	70.5	48.8
06:00 PM - 07:00 PM	57.1	67.9	52.1
07:00 PM - 08:00 PM	58.3	64.8	54.3
08:00 PM - 09:00 PM	58.6	67.5	55.0
09:00 PM - 10:00 PM	58.2	64.5	55.5
10:00 PM - 11:00 PM	58.5	64.0	55.2
11:00 PM - 12:00 AM	58.3	62.8	54.9
12:00 AM - 01:00 AM	57.7	63.2	53.8
01:00 AM - 02:00 AM	54.8	62.6	51.3
02:00 AM - 03:00 AM	52.5	62.3	51.1
03:00 AM - 04:00 AM	51.8	58.2	49.9
04:00 AM - 05:00 AM	51.9	56.6	50.2
05:00 AM - 06:00 AM	52.8	59.4	49.9
06:00 AM - 07:00 AM	58.0	65.2	54.9
07:00 AM - 08:00 AM	57.6	63.5	54.0
08:00 AM - 09:00 AM	56.4	74.9	48.7
09:00 AM - 10:00 AM	53.8	68.5	45.6
10:00 AM - 11:00 AM	48.0	69.3	44.6

Leq Average 24 hrs. (dB(A)) : 55.2  
Lmax (dB(A)) : 74.9  
L90 (dB(A)) : 49.9  
Ldn (dB(A)) : 62.2  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
2. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507245-1

Page 1 of 1

Sample Number : 22126649-11  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดตรวจ/ตรวจวัดเสียง (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 20 - Nov 21, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	46.7	66.8	44.2
12:00 PM - 01:00 PM	46.9	62.1	44.4
01:00 PM - 02:00 PM	46.3	66.7	42.7
02:00 PM - 03:00 PM	59.1	71.9	46.1
03:00 PM - 04:00 PM	53.4	68.8	49.0
04:00 PM - 05:00 PM	52.0	70.3	49.2
05:00 PM - 06:00 PM	54.8	67.7	50.5
06:00 PM - 07:00 PM	61.9	77.7	52.8
07:00 PM - 08:00 PM	56.3	63.2	52.8
08:00 PM - 09:00 PM	55.0	60.5	53.2
09:00 PM - 10:00 PM	54.2	59.2	52.5
10:00 PM - 11:00 PM	54.0	60.9	51.5
11:00 PM - 12:00 AM	54.6	62.4	53.2
12:00 AM - 01:00 AM	55.9	60.2	54.0
01:00 AM - 02:00 AM	55.7	60.2	53.5
02:00 AM - 03:00 AM	55.6	61.8	52.4
03:00 AM - 04:00 AM	53.0	57.7	51.1
04:00 AM - 05:00 AM	55.1	60.4	51.9
05:00 AM - 06:00 AM	57.0	62.4	53.3
06:00 AM - 07:00 AM	57.3	74.9	55.1
07:00 AM - 08:00 AM	55.2	67.9	52.8
08:00 AM - 09:00 AM	51.9	68.4	49.4
09:00 AM - 10:00 AM	49.6	66.0	47.3
10:00 AM - 11:00 AM	48.8	64.2	45.7

Leq Average 24 hrs. (dB(A)) : 55.3  
Lmax (dB(A)) : 77.7  
L90 (dB(A)) : 51.9  
Ldn (dB(A)) : 61.9  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
2. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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S:\Reports\_Air Noise\pt (B 11796)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507246-1

Page 1 of 1

Sample Number : 22126649-12  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณจุดตรวจ/ตรวจวัดเสียง (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 21 - Nov 22, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	46.0	64.8	43.7
12:00 PM - 01:00 PM	45.3	59.7	43.3
01:00 PM - 02:00 PM	46.8	67.6	43.9
02:00 PM - 03:00 PM	46.9	68.7	43.1
03:00 PM - 04:00 PM	47.2	65.7	43.2
04:00 PM - 05:00 PM	52.8	71.4	46.7
05:00 PM - 06:00 PM	49.7	62.4	47.1
06:00 PM - 07:00 PM	52.7	59.2	50.2
07:00 PM - 08:00 PM	56.3	61.7	53.9
08:00 PM - 09:00 PM	57.0	60.7	55.3
09:00 PM - 10:00 PM	56.5	63.0	54.3
10:00 PM - 11:00 PM	55.1	59.7	51.4
11:00 PM - 12:00 AM	55.7	65.8	53.8
12:00 AM - 01:00 AM	53.3	62.8	51.8
01:00 AM - 02:00 AM	53.6	57.4	52.0
02:00 AM - 03:00 AM	53.5	57.6	52.0
03:00 AM - 04:00 AM	54.1	61.3	52.3
04:00 AM - 05:00 AM	52.3	57.9	50.5
05:00 AM - 06:00 AM	54.2	59.1	51.2
06:00 AM - 07:00 AM	55.5	68.2	53.0
07:00 AM - 08:00 AM	52.8	65.9	52.0
08:00 AM - 09:00 AM	50.9	61.6	48.9
09:00 AM - 10:00 AM	48.5	67.3	46.2
10:00 AM - 11:00 AM	46.9	65.4	44.4

Leq Average 24 hrs. (dB(A)) : 53.1  
Lmax (dB(A)) : 71.4  
L90 (dB(A)) : 50.5  
Ldn (dB(A)) : 60.4  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
2. ใช้นิยามและวิธีการวัดเสียงตามมาตรฐานฉบับที่ 15 (พ.ศ. 2540) สำหรับการหาผลทางสถิติของเสียง  
โดยกรม พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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S:\Reports\_Air Noise\pt (B 11796)





## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507247-1

Page 1 of 1

Sample Number : 22126649-13  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณถนน/ทางหลวงหมายเลข (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 22 - Nov 23, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	46.0	70.1	43.0
12:00 PM - 01:00 PM	45.7	66.7	43.6
01:00 PM - 02:00 PM	45.3	73.0	42.9
02:00 PM - 03:00 PM	46.5	61.6	44.1
03:00 PM - 04:00 PM	59.2	72.2	46.4
04:00 PM - 05:00 PM	54.0	69.1	50.0
05:00 PM - 06:00 PM	51.0	66.6	48.5
06:00 PM - 07:00 PM	52.3	68.1	50.2
07:00 PM - 08:00 PM	56.0	71.4	52.7
08:00 PM - 09:00 PM	56.6	63.6	53.1
09:00 PM - 10:00 PM	54.9	62.3	54.0
10:00 PM - 11:00 PM	54.8	63.5	53.1
11:00 PM - 12:00 AM	55.3	59.5	53.5
12:00 AM - 01:00 AM	54.7	58.6	52.6
01:00 AM - 02:00 AM	55.9	61.7	52.9
02:00 AM - 03:00 AM	54.4	60.4	52.6
03:00 AM - 04:00 AM	55.5	60.9	52.3
04:00 AM - 05:00 AM	53.2	58.9	50.7
05:00 AM - 06:00 AM	56.3	60.5	53.0
06:00 AM - 07:00 AM	57.0	88.2	53.5
07:00 AM - 08:00 AM	53.2	67.0	52.0
08:00 AM - 09:00 AM	51.7	63.2	49.8
09:00 AM - 10:00 AM	49.9	70.8	46.1
10:00 AM - 11:00 AM	47.4	67.8	43.4

Leq Average 24 hrs. (dB(A)) : 54.3  
Lmax (dB(A)) : 88.2  
L90 (dB(A)) : 50.7  
Ldn (dB(A)) : 61.6  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น  
2. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น และระดับเสียงที่เกินจากมาตรฐานที่กำหนด  
โดยกรม พ.ร.บ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salameh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507248-1

Page 1 of 1

Sample Number : 22126649-14  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณถนน/ทางหลวงหมายเลข (N2) (GPS 47N 662200, 759079)  
Measurement Date : Nov 23 - Nov 24, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 1000342

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	45.5	64.3	42.8
12:00 PM - 01:00 PM	45.2	60.1	42.1
01:00 PM - 02:00 PM	69.2	80.4	43.1
02:00 PM - 03:00 PM	66.2	74.5	47.9
03:00 PM - 04:00 PM	53.1	66.4	48.7
04:00 PM - 05:00 PM	49.4	64.1	47.4
05:00 PM - 06:00 PM	51.5	64.9	49.1
06:00 PM - 07:00 PM	54.1	64.8	50.6
07:00 PM - 08:00 PM	57.4	64.1	54.5
08:00 PM - 09:00 PM	60.2	69.4	56.9
09:00 PM - 10:00 PM	60.1	64.9	57.0
10:00 PM - 11:00 PM	58.3	64.7	54.9
11:00 PM - 12:00 AM	57.9	62.7	55.1
12:00 AM - 01:00 AM	57.0	61.4	53.3
01:00 AM - 02:00 AM	55.0	59.5	52.0
02:00 AM - 03:00 AM	54.8	59.6	51.3
03:00 AM - 04:00 AM	55.5	60.1	53.1
04:00 AM - 05:00 AM	57.3	60.9	54.5
05:00 AM - 06:00 AM	57.9	60.8	55.1
06:00 AM - 07:00 AM	56.5	75.2	53.9
07:00 AM - 08:00 AM	53.9	67.9	52.7
08:00 AM - 09:00 AM	52.3	82.5	46.5
09:00 AM - 10:00 AM	55.9	61.7	52.9
10:00 AM - 11:00 AM	53.4	68.8	49.0

Leq Average 24 hrs. (dB(A)) : 58.8  
Lmax (dB(A)) : 82.5  
L90 (dB(A)) : 52.0  
Ldn (dB(A)) : 63.8  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น  
2. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น และระดับเสียงที่เกินจากมาตรฐานที่กำหนด  
โดยกรม พ.ร.บ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salameh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507249-1

Page 1 of 1

Sample Number : 22126649-15  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณถนน/ทางหลวงหมายเลข (N3) (GPS 47N 716827, 738366)  
Measurement Date : Nov 17 - Nov 18, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	68.7	81.5	68.2
12:00 PM - 01:00 PM	68.7	77.4	68.4
01:00 PM - 02:00 PM	68.7	85.3	68.0
02:00 PM - 03:00 PM	68.6	84.0	68.0
03:00 PM - 04:00 PM	68.6	79.6	68.1
04:00 PM - 05:00 PM	68.8	80.4	68.4
05:00 PM - 06:00 PM	68.6	80.8	68.1
06:00 PM - 07:00 PM	68.6	80.0	68.0
07:00 PM - 08:00 PM	68.2	80.4	67.7
08:00 PM - 09:00 PM	68.1	81.8	67.6
09:00 PM - 10:00 PM	68.0	79.2	67.5
10:00 PM - 11:00 PM	67.9	80.6	67.5
11:00 PM - 12:00 AM	67.8	72.6	67.4
12:00 AM - 01:00 AM	67.7	71.6	67.3
01:00 AM - 02:00 AM	67.6	69.6	67.2
02:00 AM - 03:00 AM	67.8	63.7	67.2
03:00 AM - 04:00 AM	67.5	70.6	67.2
04:00 AM - 05:00 AM	67.6	74.6	67.2
05:00 AM - 06:00 AM	68.5	83.5	67.5
06:00 AM - 07:00 AM	67.7	85.7	67.0
07:00 AM - 08:00 AM	67.4	80.2	67.0
08:00 AM - 09:00 AM	67.5	80.7	67.1
09:00 AM - 10:00 AM	68.0	79.5	67.4
10:00 AM - 11:00 AM	68.2	79.3	67.7

Leq Average 24 hrs. (dB(A)) : 68.1  
Lmax (dB(A)) : 95.3  
L90 (dB(A)) : 67.5  
Ldn (dB(A)) : 74.3  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น  
2. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น และระดับเสียงที่เกินจากมาตรฐานที่กำหนด  
โดยกรม พ.ร.บ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salameh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507250-1

Page 1 of 1

Sample Number : 22126649-16  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณถนน/ทางหลวงหมายเลข (N3) (GPS 47N 716827, 738366)  
Measurement Date : Nov 18 - Nov 19, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	68.3	70.7	68.0
12:00 PM - 01:00 PM	68.6	78.3	68.2
01:00 PM - 02:00 PM	72.0	92.0	64.2
02:00 PM - 03:00 PM	70.4	92.3	68.4
03:00 PM - 04:00 PM	68.9	81.6	68.5
04:00 PM - 05:00 PM	68.9	73.1	68.5
05:00 PM - 06:00 PM	68.7	74.2	68.1
06:00 PM - 07:00 PM	68.4	78.9	67.9
07:00 PM - 08:00 PM	68.2	82.3	67.7
08:00 PM - 09:00 PM	68.0	72.2	67.6
09:00 PM - 10:00 PM	67.9	70.8	67.6
10:00 PM - 11:00 PM	67.8	72.7	67.5
11:00 PM - 12:00 AM	67.8	70.2	67.5
12:00 AM - 01:00 AM	67.7	74.0	67.3
01:00 AM - 02:00 AM	67.7	81.2	67.2
02:00 AM - 03:00 AM	67.4	68.9	67.0
03:00 AM - 04:00 AM	67.2	68.6	66.9
04:00 AM - 05:00 AM	67.0	80.0	66.6
05:00 AM - 06:00 AM	67.1	82.6	66.6
06:00 AM - 07:00 AM	66.8	80.5	66.4
07:00 AM - 08:00 AM	66.4	70.9	66.0
08:00 AM - 09:00 AM	66.2	70.7	65.8
09:00 AM - 10:00 AM	66.6	77.8	66.1
10:00 AM - 11:00 AM	66.6	70.3	66.2

Leq Average 24 hrs. (dB(A)) : 68.2  
Lmax (dB(A)) : 92.3  
L90 (dB(A)) : 67.3  
Ldn (dB(A)) : 74.8  
Standard (dB(A)) : 70  
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น  
2. ปรึกษาและตรวจการวัดระดับเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) ด้านการควบคุมการปล่อยเสียงในท้องถิ่น และระดับเสียงที่เกินจากมาตรฐานที่กำหนด  
โดยกรม พ.ร.บ. 2548

Technical Management

Saranya C.  
Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.  
Supat Salameh  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507251-1

Page 1 of 1

Sample Number : 22126649-17  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณรั้วหน้าอาคารพาณิชย์ (N3) (GPS 47N 716827, 738366)  
Measurement Date : Nov 19 - Nov 20, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	66.8	73.3	66.4
12:00 PM - 01:00 PM	69.0	87.7	65.8
01:00 PM - 02:00 PM	66.8	74.4	66.4
02:00 PM - 03:00 PM	67.0	79.7	66.5
03:00 PM - 04:00 PM	66.9	69.8	66.6
04:00 PM - 05:00 PM	67.1	72.0	66.7
05:00 PM - 06:00 PM	67.1	69.5	66.8
06:00 PM - 07:00 PM	67.0	70.5	66.6
07:00 PM - 08:00 PM	66.6	74.0	66.2
08:00 PM - 09:00 PM	66.3	68.7	66.0
09:00 PM - 10:00 PM	66.3	68.1	66.0
10:00 PM - 11:00 PM	66.2	68.6	65.9
11:00 PM - 12:00 AM	66.2	72.6	65.9
12:00 AM - 01:00 AM	66.0	68.7	65.7
01:00 AM - 02:00 AM	66.0	73.1	65.7
02:00 AM - 03:00 AM	65.9	68.6	65.6
03:00 AM - 04:00 AM	66.0	70.9	65.6
04:00 AM - 05:00 AM	65.9	67.5	65.5
05:00 AM - 06:00 AM	65.9	67.4	65.5
06:00 AM - 07:00 AM	65.7	68.3	65.3
07:00 AM - 08:00 AM	65.6	78.5	65.1
08:00 AM - 09:00 AM	65.6	67.9	65.2
09:00 AM - 10:00 AM	66.3	76.9	65.9
10:00 AM - 11:00 AM	66.7	82.6	66.2

Leq Average 24 hrs. (dB(A))

66.5

Lmax (dB(A))

87.7

L90 (dB(A))

65.9

Ldn (dB(A))

72.5

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร

2. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร และวิธีปฏิบัติในการตรวจวัดเสียงรบกวนในอาคาร

วันที่ 15 พ.ค. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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S:\Reports\_Air Noise.rpt (8/12/98)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507252-1

Page 1 of 1

Sample Number : 22126649-18  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณรั้วหน้าอาคารพาณิชย์ (N3) (GPS 47N 716827, 738366)  
Measurement Date : Nov 20 - Nov 21, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	66.7	80.6	66.2
12:00 PM - 01:00 PM	66.7	78.1	66.3
01:00 PM - 02:00 PM	67.2	83.1	66.3
02:00 PM - 03:00 PM	66.8	73.0	66.3
03:00 PM - 04:00 PM	66.6	71.7	66.2
04:00 PM - 05:00 PM	66.4	75.2	66.0
05:00 PM - 06:00 PM	66.2	69.0	65.9
06:00 PM - 07:00 PM	66.6	71.9	65.9
07:00 PM - 08:00 PM	65.8	68.8	65.5
08:00 PM - 09:00 PM	66.1	67.6	65.8
09:00 PM - 10:00 PM	65.9	68.1	65.6
10:00 PM - 11:00 PM	65.8	71.3	65.5
11:00 PM - 12:00 AM	65.8	68.8	65.5
12:00 AM - 01:00 AM	66.3	73.1	65.6
01:00 AM - 02:00 AM	65.8	78.0	65.3
02:00 AM - 03:00 AM	65.5	76.8	65.1
03:00 AM - 04:00 AM	65.2	74.4	64.8
04:00 AM - 05:00 AM	65.0	70.1	64.6
05:00 AM - 06:00 AM	64.9	67.4	64.5
06:00 AM - 07:00 AM	64.7	66.7	64.4
07:00 AM - 08:00 AM	64.8	80.2	64.3
08:00 AM - 09:00 AM	65.5	83.4	64.0
09:00 AM - 10:00 AM	69.9	85.6	64.6
10:00 AM - 11:00 AM	65.1	77.1	64.6

Leq Average 24 hrs. (dB(A))

66.2

Lmax (dB(A))

85.6

L90 (dB(A))

65.5

Ldn (dB(A))

72.1

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร

2. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร และวิธีปฏิบัติในการตรวจวัดเสียงรบกวนในอาคาร

วันที่ 15 พ.ค. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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S:\Reports\_Air Noise.rpt (8/12/98)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507251-1

Page 1 of 1

Sample Number : 22126649-19  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณรั้วหน้าอาคารพาณิชย์ (N3) (GPS 47N 716827, 738366)  
Measurement Date : Nov 21 - Nov 22, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	65.5	67.8	65.1
12:00 PM - 01:00 PM	68.0	86.1	65.1
01:00 PM - 02:00 PM	66.2	77.5	64.9
02:00 PM - 03:00 PM	66.6	74.3	65.7
03:00 PM - 04:00 PM	66.4	80.1	65.9
04:00 PM - 05:00 PM	66.3	71.0	65.9
05:00 PM - 06:00 PM	67.0	72.8	66.6
06:00 PM - 07:00 PM	66.7	70.9	66.4
07:00 PM - 08:00 PM	66.6	70.0	66.3
08:00 PM - 09:00 PM	66.5	70.6	66.2
09:00 PM - 10:00 PM	66.4	69.8	66.1
10:00 PM - 11:00 PM	65.9	70.9	65.5
11:00 PM - 12:00 AM	65.7	70.9	65.3
12:00 AM - 01:00 AM	65.5	68.6	65.2
01:00 AM - 02:00 AM	65.4	66.8	65.1
02:00 AM - 03:00 AM	65.4	67.2	65.0
03:00 AM - 04:00 AM	65.4	67.8	65.1
04:00 AM - 05:00 AM	65.4	67.6	65.0
05:00 AM - 06:00 AM	65.3	67.0	64.9
06:00 AM - 07:00 AM	65.1	67.6	64.8
07:00 AM - 08:00 AM	65.2	78.0	64.7
08:00 AM - 09:00 AM	65.4	71.1	65.0
09:00 AM - 10:00 AM	66.0	70.6	65.5
10:00 AM - 11:00 AM	66.2	82.6	65.5

Leq Average 24 hrs. (dB(A))

66.1

Lmax (dB(A))

86.1

L90 (dB(A))

65.2

Ldn (dB(A))

72.0

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร

2. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร และวิธีปฏิบัติในการตรวจวัดเสียงรบกวนในอาคาร

วันที่ 15 พ.ค. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 2507252-1

Page 1 of 1

Sample Number : 22126649-20  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณรั้วหน้าอาคารพาณิชย์ (N3) (GPS 47N 716827, 738366)  
Measurement Date : Nov 22 - Nov 23, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	66.0	74.5	65.5
12:00 PM - 01:00 PM	66.1	69.3	65.7
01:00 PM - 02:00 PM	66.6	75.4	66.1
02:00 PM - 03:00 PM	67.0	83.0	66.3
03:00 PM - 04:00 PM	66.2	72.2	65.8
04:00 PM - 05:00 PM	66.5	74.5	65.8
05:00 PM - 06:00 PM	66.0	80.5	65.6
06:00 PM - 07:00 PM	66.0	74.8	65.7
07:00 PM - 08:00 PM	66.1	77.8	65.5
08:00 PM - 09:00 PM	65.7	67.3	65.4
09:00 PM - 10:00 PM	65.7	70.6	65.4
10:00 PM - 11:00 PM	65.7	69.9	65.5
11:00 PM - 12:00 AM	65.5	70.8	65.2
12:00 AM - 01:00 AM	65.6	68.4	65.2
01:00 AM - 02:00 AM	65.3	69.7	65.0
02:00 AM - 03:00 AM	65.1	66.6	64.7
03:00 AM - 04:00 AM	65.1	66.4	64.8
04:00 AM - 05:00 AM	65.0	68.1	64.6
05:00 AM - 06:00 AM	65.0	67.4	64.5
06:00 AM - 07:00 AM	64.9	69.9	64.3
07:00 AM - 08:00 AM	64.7	76.0	64.1
08:00 AM - 09:00 AM	64.8	68.1	64.4
09:00 AM - 10:00 AM	65.7	79.8	65.2

Leq Average 24 hrs. (dB(A))

65.7

Lmax (dB(A))

83.0

L90 (dB(A))

65.2

Ldn (dB(A))

71.8

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร

2. ประกาศกระทรวงมหาดไทยว่าด้วยการขออนุญาตก่อสร้างอาคาร 15 (พ.ศ. 2540) ซึ่งกำหนดมาตรฐานเสียงรบกวนในอาคาร และวิธีปฏิบัติในการตรวจวัดเสียงรบกวนในอาคาร

วันที่ 15 พ.ค. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supat S.

Supat Salantheth  
Section Head

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S:\Reports\_Air Noise.rpt (8/12/98)





## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126649  
Date Received : Nov 26, 2022  
Date Reported : Dec 02, 2022  
Report Number: 250725-1

Page 1 of 1

Sample Number : 22126649-21  
Parameter : Noise (Leq 24 hrs.)  
Location : บริเวณหน้าอาคารและบริเวณใกล้เคียง (N3) (GPS 47N 116R27, 738366)  
Measurement Date : Nov 23 - Nov 24, 2022  
Measurement by : Yongsil Rangsee  
Sound Level meter : Serial No. 296519

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	66.1	72.8	65.8
12:00 PM - 01:00 PM	66.8	79.0	65.7
01:00 PM - 02:00 PM	69.6	79.1	68.3
02:00 PM - 03:00 PM	66.9	79.0	66.5
03:00 PM - 04:00 PM	66.5	77.5	66.0
04:00 PM - 05:00 PM	66.6	76.8	65.8
05:00 PM - 06:00 PM	66.0	69.1	65.6
06:00 PM - 07:00 PM	66.0	82.0	65.4
07:00 PM - 08:00 PM	66.0	80.6	65.4
08:00 PM - 09:00 PM	65.5	78.4	65.1
09:00 PM - 10:00 PM	65.4	79.0	65.0
10:00 PM - 11:00 PM	66.1	76.2	65.0
11:00 PM - 12:00 AM	64.9	68.8	64.5
12:00 AM - 01:00 AM	65.0	79.2	64.4
01:00 AM - 02:00 AM	64.9	75.5	64.4
02:00 AM - 03:00 AM	64.7	75.8	64.3
03:00 AM - 04:00 AM	64.7	67.1	64.4
04:00 AM - 05:00 AM	64.7	69.8	64.3
05:00 AM - 06:00 AM	64.6	66.4	64.2
06:00 AM - 07:00 AM	64.9	68.3	64.3
07:00 AM - 08:00 AM	64.6	77.2	64.1
08:00 AM - 09:00 AM	64.3	69.1	63.9
09:00 AM - 10:00 AM	65.5	77.1	64.8
10:00 AM - 11:00 AM	65.5	78.6	64.9

Leq Average 24 hrs. (dB(A))

65.8

Lmax (dB(A))

82.0

L90 (dB(A))

64.9

Ldn (dB(A))

71.6

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรฐานการควบคุมการปล่อยเสียงของอาคาร 15 (พ.ร.บ. 2540) ซึ่งกำหนดมาตรฐานการปล่อยเสียงของอาคาร  
2. มาตรฐานการควบคุมการปล่อยเสียงของโรงงานอุตสาหกรรม และโรงงานอุตสาหกรรมขนาดเล็ก (พ.ร.บ. 2548)  
3. มาตรฐานการควบคุมการปล่อยเสียงของโรงงานอุตสาหกรรม และโรงงานอุตสาหกรรมขนาดเล็ก (พ.ร.บ. 2548)

Technical Management

Sungja C.

Saranya Chalerthanong  
Scientist (4)

Approved by

Supt S.

Supot Salameh  
Section Head

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S. Vapornit\_Air Asset opt (0-1398)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :



TESTING  
No. 0166  
Lot ID: 2277558  
Date Received : Jul 27, 2022  
Date Reported : Aug 04, 2022  
Report Number : 2352902-1

Page 1 of 1

Sample Number : 2277558-1  
Sampled Date : Jul 27, 2022 11:14 AM  
Sample Description : Wastewater  
Location : ส้วมชุมชน  
Date Analysis Commenced : Jul 27, 2022  
Condition of Sample : Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	19	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.8	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	8.6	5.5-9.0	Based on APHA (2017), 4500-H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	123	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	10	≤50	APHA (2017), 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Apisat Chunta

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

Sutthirak T.

Sutthirak Tiprat  
Scientist (2)  
โทรศัพท์มือถือ +267-4-7299

Approved by

Kanitta H.

Kanitta Hemprasoporn  
Section Head  
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S. Vapornit\_ML (0-1398)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

TESTING  
No. 0166  
Lot ID: 2290660  
Date Received : Aug 29, 2022  
Date Reported : Jan 02, 2023  
Report Number : 2538139-1

Page 1 of 1

Sample Number : 2290660-1  
Sampled Date : Aug 29, 2022 9:15 AM  
Sample Description : Wastewater  
Location : ส้วมชุมชน  
Date Analysis Commenced : Aug 29, 2022  
Condition of Sample : Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2	7	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	68	≤120	Based on APHA (2017), 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	8.5	5.5-9.0	Based on APHA (2017), 4500-H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	380	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	12	≤50	APHA (2017), 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Note : This Analysis test report is issued to supersede report No.2383925-1, Date Reported : Sep 05, 2022 due to revise analytical information.

Sampled By : Somrak Jankong โทรศัพท์มือถือ +267-4-8341

- 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

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Approved by

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S. Vapornit\_ML (0-1398)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :



TESTING  
No. 0166  
Lot ID: 22101821  
Date Received : Sep 02, 2022  
Date Reported : Sep 09, 2022  
Report Number : 2409206-1

Page 1 of 1

Sample Number : 22101821-1  
Sampled Date : Sep 02, 2022 10:30 AM  
Sample Description : Wastewater  
Location : ส้วมชุมชน  
Date Analysis Commenced : Sep 03, 2022  
Condition of Sample : Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	16	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.8	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	7.9	5.5-9.0	Based on APHA (2017), 4500-H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	46	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	8	≤50	APHA (2017), 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Somrak Jankong

- Remark :
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  - \* : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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  - The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

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Kanitta H.

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S. Vapornit\_ML (0-1398)



## Analysis / Test Report



TESTING  
No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO012309  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22101822  
Date Received : Sep 21, 2022  
Date Reported : Sep 28, 2022  
Report Number : 2407820-1

Page 1 of 1

Sample Number	22101822-1						
Sampled Date	Sep 21, 2022 11:45 AM						
Sample Description	Wastewater						
Location	สามเวิ่น						
Date Analysis Commenced	Sep 21, 2022						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	27	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.6	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	9.0	5.5-9.0	Based on APHA (2017), 4500-H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	456	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	8	≤50	APHA (2017), 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Apinart Chanta

Remark :  
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Technical Management

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Scientist (2)  
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Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
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## Analysis / Test Report



TESTING  
No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22116524  
Date Received : Oct 18, 2022  
Date Reported : Oct 25, 2022  
Report Number : 2440584-1

Page 1 of 1

Sample Number	22116524-1						
Sampled Date	Oct 18, 2022 1:15 PM						
Sample Description	Wastewater						
Location	สามเวิ่น						
Date Analysis Commenced	Oct 18, 2022						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	16	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.7	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	7.5	5.5-9.0	Based on APHA (2017), 4500-H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	36	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	9	≤50	APHA (2017), 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Somsak Junkong, Worawut Deenuk

Remark :  
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Technical Management

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Scientist (2)  
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Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
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## Analysis / Test Report



TESTING  
No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22129573  
Date Received : Nov 24, 2022  
Date Reported : Dec 01, 2022  
Report Number : 2471583-1

Page 1 of 1

Sample Number	22129573-1						
Sampled Date	Nov 24, 2022 2:30 PM						
Sample Description	Wastewater						
Location	สามเวิ่น						
Date Analysis Commenced	Nov 24, 2022						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	17	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.5	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	208	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	8	≤50	APHA (2017), 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Somsak Junkong, Yongjai Rangsee

Remark :  
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Technical Management

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Sutthirak Tiptat  
Scientist (2)  
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Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
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## Analysis / Test Report



TESTING  
No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22141445  
Date Received : Dec 12, 2022  
Date Reported : Jan 12, 2023  
Report Number : 2541499-2

Page 1 of 1

Sample Number	22141445-1						
Sampled Date	Dec 12, 2022 11:23 AM						
Sample Description	Wastewater						
Location	สามเวิ่น						
Date Analysis Commenced	Dec 13, 2022						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
pH at 25 degree C	-	-	-	6.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Note : This Analysis test report is resubmitted to supersede report No.2497097-1, Date Reported : Dec 19, 2022 due to revise analytical information.

Sampled By : Worawut Deenuk โทรศัพท์ 09-209-4-8608, Wichapon Rorernwatt

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

Technical Management

Sutthirak T.

Sutthirak Tiptat  
Scientist (2)  
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Approved by

Kanitta H.

Kanitta Hemprasitpon  
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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyoi Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Haiyoi, Songkhla Thailand 90230  
P/O :  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22152954  
Date Received : Dec 28, 2022  
Date Reported : Jan 07, 2023  
Report Number : 2527466-1

Page 1 of 1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Songkhla
COD	mg/L	-	5	9	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.7	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Songkhla
pH at 25 degree C *	-	-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	104	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	8	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Songkhla

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Somsak Junkong (ผู้เก็บตัวอย่าง) 2527-4-8341

Remark :  
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Technical Management

Sutthirak T.

Sutthirak Tiptat  
Scientist (2)  
ผู้เก็บตัวอย่าง 2527-4-7299

Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
ผู้เก็บตัวอย่าง 2527-4-7296

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyoi Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Haiyoi, Songkhla Thailand 90230  
P/O : P0012284  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22101820  
Date Received : Aug 29, 2022  
Date Reported : Sep 05, 2022  
Report Number : 2407817-1

Page 1 of 1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	10	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	104	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.2	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	8.0	5.5-9.0	Based on APHA (2017), 4500 H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	636	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	30	≤50	APHA (2017), 2540 D	Songkhla

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Somsak Junkong

Remark :  
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Technical Management

Sutthirak T.

Sutthirak Tiptat  
Scientist (2)  
ผู้เก็บตัวอย่าง 2527-4-7299

Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
ผู้เก็บตัวอย่าง 2527-4-7296

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyoi Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Haiyoi, Songkhla Thailand 90230  
P/O : P0012309  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22118402  
Date Received : Sep 30, 2022  
Date Reported : Oct 07, 2022  
Report Number : 2445646-1

Page 1 of 1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	9	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	100	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.3	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	6.1	5.5-9.0	Based on APHA (2017), 4500 H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	964	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	39	≤50	APHA (2017), 2540 D	Songkhla

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Wuttichai Taicharoen, Yongal Rangree

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

Sutthirak T.

Sutthirak Tiptat  
Scientist (2)  
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Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
ผู้เก็บตัวอย่าง 2527-4-7296

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyoi Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Haiyoi, Songkhla Thailand 90230  
P/O : P0012310  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22116528  
Date Received : Oct 18, 2022  
Date Reported : Oct 25, 2022  
Report Number : 2440605-1

Page 1 of 1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	8	≤20	Based on APHA (2017), 5210 B	Songkhla
COD	mg/L	-	5	98	≤120	Based on APHA (2017), 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	<0.1	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Songkhla
pH at 25 degree C	-	-	-	7.8	5.5-9.0	Based on APHA (2017), 4500 H (B)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	380	≤3000	APHA (2017), 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	22	≤50	APHA (2017), 2540 D	Songkhla

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By : Somsak Junkong, Worawut Deemak

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

Sutthirak T.

Sutthirak Tiptat  
Scientist (2)  
ผู้เก็บตัวอย่าง 2527-4-7299

Approved by

Kanitta H.

Kanitta Hemprasitpon  
Section Head  
ผู้เก็บตัวอย่าง 2527-4-7296

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyao, Songkhla Thailand 90230  
P/O : P0012311  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22129581  
Date Received : Nov 24, 2022  
Date Reported : Dec 06, 2022  
Report Number : 2471651-1 Rev. No.1

Page 1 of 1

Sample Number : 22129581-1  
Sampled Date : Nov 24, 2022 2:47 PM  
Sample Description : Wastewater  
Location : แหล่งน้ำธรรมชาติ 10 ไร่  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	38	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Songkhla
COD	mg/L	-	5	148	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.3	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Songkhla
pH at 25 degree C	-	-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (0)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	444	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	47	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Note : This Analysis test report is resubmitted to supersede report No.2471651-1, Date Reported : Dec 01, 2022 due to revise guideline/specification

Sampled By : Somsak Jungsang, Yongrak Rangsee

Remark :  
- LOD : Limit of Detection  
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Technical Management

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Approved by

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyao, Songkhla Thailand 90230  
P/O : P0012312  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22141447  
Date Received : Dec 12, 2022  
Date Reported : Dec 19, 2022  
Report Number : 2497698-1

Page 1 of 1

Sample Number : 22141447-1  
Sampled Date : Dec 12, 2022 11:28 AM  
Sample Description : Wastewater  
Location : แหล่งน้ำธรรมชาติ 10 ไร่  
Date Analysis Commenced : Dec 13, 2022  
Condition of Sample : Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	40	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Songkhla
COD	mg/L	-	5	141	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Songkhla
Formaldehyde *	mg/L	-	0.1	0.4	≤1.0	Based on Wastewater Analysis	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Songkhla
pH at 25 degree C	-	-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (0)	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	356	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	48	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampled By :

Remark :  
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Technical Management

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyao, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22142189  
Date Received : Nov 30, 2022  
Date Reported : Dec 08, 2022  
Report Number : 2514065-1

Page 1 of 2

Sample Number : 22142189-1  
Sampled Date : Nov 30, 2022 9:00 AM  
Sample Description : Surface Water  
Location : แหล่งน้ำธรรมชาติ 200 ไร่ (SW1)  
Date Analysis Commenced : Nov 30, 2022  
Condition of Sample : Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Microbiological Testing</b>								
Fecal Coliform	MPN/100mL	-	-	170.0	≤4000	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B, E	Songkhla
Total Coliform	MPN/100mL	-	-	3300.0	≤20000	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Songkhla
<b>Water Testing</b>								
Ammonia Nitrogen *	mg/L	-	0.06	<0.06	≤0.5	≤0.5	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (0)	Bangkok
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Songkhla
Chloride as Cl *	mg/L	0.06	0.2	10.3	No Standard	No Standard	In-house method : STM 04-004 based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity *	microhm/cm	-	0.5	98	No Standard	No Standard	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Songkhla
Dissolved Oxygen *	mg/L	-	0.1	5.8	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (0)	Songkhla
pH at 25 degree C	-	-	-	6.8	5.0-9.0	5.0-9.0	In-house method : STM 13-004 based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (0)	Songkhla
Total Dissolved Solids Dried at 180 degree C *	mg/L	-	5	54	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Songkhla

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Approved by

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Sutthirak Tiptat  
Scientist (2)

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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyao, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22142189  
Date Received : Nov 30, 2022  
Date Reported : Dec 08, 2022  
Report Number : 2514065-1

Page 2 of 2

Guideline : (1) Notification of the National Environmental Board, No. 8, B.E.2537 issued under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, Dated February 24, B.E. 2537 (Class 3)  
(2) Notification of the National Environmental Board, No. 8, B.E.2537 issued under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, Dated February 24, B.E. 2537 (Class 3)  
(a) Not Change from natural condition  
(b) Non Objectionable  
(c) Change from Natural condition not more than 3 degree C

Sampled By : Wuttichai Taicharoen, Yongrak Rangsee

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

Approved by

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Sutthirak Tiptat  
Scientist (2)

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## Analysis / Test Report



## TESTING

No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22142189  
Date Received : Nov 30, 2022  
Date Reported : Dec 13, 2022  
Report Number : 2514066-1 Rev. No.1

Page 1 of 2

Sample Number	22142189-2						
Sample Date	Nov 30, 2022 9:15 AM						
Sample Description	Surface Water						
Location	น้ำจากบ่อน้ำหน้าพื้นที่ก่อสร้าง ฝั่งตะวันตก 200 เมตร (SW2)						
Date Analysis Commenced	Nov 30, 2022						
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method
<b>Microbiological Testing</b>							
Fecal Coliform	MPN/100mL	-	-	330.0	≤4000	No Standard	Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B, E
Total Coliform	MPN/100mL	-	-	3300.0	≤20000	No Standard	Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B
<b>Water Testing</b>							
Ammonia Nitrogen *	mg/L	-	0.06	<0.06	≤0.5	≤0.5	Based on Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (B, F)
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤2	≤4	Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B
Chloride as Cl *	mg/L	0.06	0.2	10.4	No Standard	No Standard	In-house method: STM 04-094 based on Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B
Conductivity *	microhm/cm	-	0.5	98	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B
Dissolved Oxygen *	mg/L	-	0.1	5.5	≥4	≥2	Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 4500-H (B)
pH at 25 degree C	-	-	-	6.8	5.0-9.0	5.0-9.0	In-house method: STM 13-001 based on Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 4500-H (B)
Total Dissolved solids Dried at 180 degree C *	mg/L	-	5	53	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater: APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C

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Approved by

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12049-12/0946

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## Analysis / Test Report



## TESTING

No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22142189  
Date Received : Nov 30, 2022  
Date Reported : Dec 13, 2022  
Report Number : 2514066-1 Rev. No.1

Page 2 of 2

Guideline : (1) Notification of the National Environmental Board, No. 8, B.E.2537 issued under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, Dated February 24, B.E. 2537 (Class 3)  
(2) Notification of the National Environmental Board, No. 8, B.E.2537 issued under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, Dated February 24, B.E. 2537 (Class 4)  
(a) Not Change from natural condition  
(b) Non Objectionable  
(c) Change from Natural condition not more than 3 degree C

Note : This Analysis test report is resued to supersede report No.2514066-1, Date Reported : Dec 08, 2022 due to revise guideline/specification

Sampled By : Wuttichai Lauchareon, Yongsil Rangsee

Remark :

- LOD : Limit of Detection
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Approved by

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Sutthirak Tiptat  
Scientist (2)

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## Analysis / Test Report



## TESTING

No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22116527  
Date Received : Oct 12, 2022  
Date Reported : Oct 27, 2022  
Report Number : 247419-1

Page 1 of 1

Sample Number	22116527-1						
Sample Date	Oct 12, 2022 2:00 PM						
Sample Description	Ground Water						
Location	น้ำจากบ่อน้ำหน้าพื้นที่ก่อสร้าง						
Date Analysis Commenced	Oct 14, 2022						
Condition of Sample	Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
pH at 25 degree C	-	-	-	6.6	6.5-9.2 (1)	Based on APHA (2017), 4500-H (B)	Bangkok

Guideline : Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures

(1) : มาตรฐานการปนเปื้อนในดินและน้ำใต้ดินของประเทศไทยตามเกณฑ์มาตรฐานของกรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์ และกรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์ (2) : มาตรฐานการปนเปื้อนในดินและน้ำใต้ดินของประเทศไทยตามเกณฑ์มาตรฐานของกรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์ และกรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์ (3) : มาตรฐานการปนเปื้อนในดินและน้ำใต้ดินของประเทศไทยตามเกณฑ์มาตรฐานของกรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์ และกรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์

Sampled By : Somrak Jungsak, Worawut Deemak

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Sinluk P.

Sinluk Pungpang  
Supervisor  
โทรศัพท์มือถือ : 201-4-4720

Approved by

Kanitta H.

Kanitta Hempeasopon  
Section Head  
โทรศัพท์มือถือ : 267-4-7296

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S:\Reports\AL\_20\_01 (1) (2024)



## Analysis / Test Report



## TESTING

No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P0011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22116527  
Date Received : Oct 12, 2022  
Date Reported : Oct 27, 2022  
Report Number : 247419-2

Page 1 of 1

Sample Number	22116527-1						
Sample Date	Oct 12, 2022 2:00 PM						
Sample Description	Ground Water						
Location	น้ำจากบ่อน้ำหน้าพื้นที่ก่อสร้าง						
Date Analysis Commenced	Oct 12, 2022						
Condition of Sample	Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Formaldehyde	mg/L	-	0.1	0.2	No Standard	Based on Wastewater Analysis	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	356	No Standard	Based on APHA (2017), 2540 C	Bangkok

Guideline : Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures

Sampled By : Somrak Jungsak, Worawut Deemak

Remark :

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

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Approved by

Sutthirak T.

Sutthirak Tiptat  
Scientist (2)

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12049-12/0946

S:\Reports\AL\_20\_01 (1) (2024)



## Analysis / Test Report

TESTING  
No.0009

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P001133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22116527  
Date Received : Oct 12, 2022  
Date Reported : Oct 27, 2022  
Report Number : 2474420-1

Page 1 of 1

Sample Number : 22116527-2  
Sampled Date : Oct 12, 2022 2:25 PM  
Sample Description : Ground Water  
Location : บ่อสูบน้ำประปาเทศบาลตำบล 1  
Date Analysis Commenced : Oct 14, 2022  
Condition of Sample : Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
pH at 25 degree C				7.0	6.5-9.2 (I)	Based on APHA (2017), 4500-H (B)	Bangkok

Guideline : Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures  
(I) : โดยมีขีดจำกัดการปนเปื้อนของสารพิษจากดินและน้ำใต้ดินตามเกณฑ์ที่กำหนดไว้ในการศึกษาผลกระทบจากมลพิษจากดินและน้ำใต้ดินจากกิจกรรมการดำเนินงานของโรงงานอุตสาหกรรมและพื้นที่ใกล้เคียง  
ซึ่งอาจก่อให้เกิดผลกระทบต่อสุขภาพของประชาชนได้ ดังนั้นเพื่อให้ทราบถึงระดับการปนเปื้อนของสารพิษจากดินและน้ำใต้ดินในบริเวณดังกล่าว จึงได้ทำการเก็บตัวอย่างดินและน้ำใต้ดินจากพื้นที่ดังกล่าวมาส่งให้ห้องปฏิบัติการ ALS Laboratory Group (Thailand) Co., Ltd. เพื่อทำการวิเคราะห์และรายงานผลการวิเคราะห์ให้ทราบต่อไป  
Sampled By : Somrak Junkong, Woravut Deemak

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

Siriluk P.

Siriluk Puangpang  
Supervisor  
โทรศัพท์มือถือ : 09-204-4-4720

Approved by

Kanokorn Anek

Kanokorn Anek  
Senior Manager  
โทรศัพท์มือถือ : 09-204-4-6111

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## Analysis / Test Report

Lot ID: 22116527  
Date Received : Oct 12, 2022  
Date Reported : Oct 27, 2022  
Report Number : 2474420-2

Page 1 of 1

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P001133  
Project Name : EIA Monitoring  
Project Location :

Sample Number : 22116527-2  
Sampled Date : Oct 12, 2022 2:25 PM  
Sample Description : Ground Water  
Location : บ่อสูบน้ำประปาเทศบาลตำบล 1  
Date Analysis Commenced : Oct 12, 2022  
Condition of Sample : Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Formaldehyde	mg/L		0.1	<0.1	No Standard	Based on Wastewater Analysis	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L		5	1348	No Standard	Based on APHA (2017), 2540 C	Bangkok

Guideline : Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures  
Sampled By : Somrak Junkong, Woravut Deemak

Remark :  
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## Analysis / Test Report

TESTING  
No.0166

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P001133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22116527  
Date Received : Oct 12, 2022  
Date Reported : Oct 27, 2022  
Report Number : 2474421-1

Page 1 of 1

Sample Number : 22116527-3  
Sampled Date : Oct 12, 2022 2:40 PM  
Sample Description : Ground Water  
Location : บ่อสูบน้ำประปาเทศบาลตำบล 2  
Date Analysis Commenced : Oct 14, 2022  
Condition of Sample : Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
pH at 25 degree C				7.6	6.5-9.2 (I)	Based on APHA (2017), 4500-H (B)	Bangkok

Guideline : Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures  
(I) : โดยมีขีดจำกัดการปนเปื้อนของสารพิษจากดินและน้ำใต้ดินตามเกณฑ์ที่กำหนดไว้ในการศึกษาผลกระทบจากมลพิษจากดินและน้ำใต้ดินจากกิจกรรมการดำเนินงานของโรงงานอุตสาหกรรมและพื้นที่ใกล้เคียง  
ซึ่งอาจก่อให้เกิดผลกระทบต่อสุขภาพของประชาชนได้ ดังนั้นเพื่อให้ทราบถึงระดับการปนเปื้อนของสารพิษจากดินและน้ำใต้ดินในบริเวณดังกล่าว จึงได้ทำการเก็บตัวอย่างดินและน้ำใต้ดินจากพื้นที่ดังกล่าวมาส่งให้ห้องปฏิบัติการ ALS Laboratory Group (Thailand) Co., Ltd. เพื่อทำการวิเคราะห์และรายงานผลการวิเคราะห์ให้ทราบต่อไป  
Sampled By : Somrak Junkong, Woravut Deemak

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

Technical Management

Siriluk P.

Siriluk Puangpang  
Supervisor  
โทรศัพท์มือถือ : 09-204-4-4720

Approved by

Kanitta H.

Kanitta Hempeesopon  
Section Head  
โทรศัพท์มือถือ : 09-267-4-7296

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3/1649461\_ML\_01\_01 (8/2019)



## Analysis / Test Report

Lot ID: 22116527  
Date Received : Oct 12, 2022  
Date Reported : Oct 27, 2022  
Report Number : 2474421-2

Page 1 of 1

Client : AICA Haiyao Co., Ltd.  
417/115, Kamchanwanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : P001133  
Project Name : EIA Monitoring  
Project Location :

Sample Number : 22116527-3  
Sampled Date : Oct 12, 2022 2:40 PM  
Sample Description : Ground Water  
Location : บ่อสูบน้ำประปาเทศบาลตำบล 2  
Date Analysis Commenced : Oct 12, 2022  
Condition of Sample : Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Formaldehyde	mg/L		0.1	<0.1	No Standard	Based on Wastewater Analysis	Songkhla
Total Dissolved Solids Dried at 180 degree C	mg/L		5	360	No Standard	Based on APHA (2017), 2540 C	Bangkok

Guideline : Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures  
Sampled By : Somrak Junkong, Woravut Deemak

Remark :  
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## Analysis / Test Report



TESTING  
No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22129574  
Date Received : Nov 22, 2022  
Date Reported : Nov 30, 2022  
Report Number : 2471639-1

Page 1 of 2

Sample Number : 22129574-3  
Sampled Date : Nov 22, 2022 2:50 PM  
Sample Description : Ground Water  
Location : บริเวณทางเดินรถบรรทุกสินค้าและท่าเรือ (GW1)  
Date Analysis Commenced : Nov 23, 2022  
Condition of Sample : Contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Metals Testing</b>							
Arsenic	mg/L	0.001	0.005	<0.005	≤0.05	Based on APHA (2017), 3125	Songkhla
Cadmium	mg/L	0.001	0.005	Not Detected	≤0.01	Based on APHA (2017), 3125	Songkhla
Chromium	mg/L	0.001	0.005	Not Detected	No Standard	Based on APHA (2017), 3125	Songkhla
Copper	mg/L	0.001	0.005	Not Detected	≤1.5	Based on APHA (2017), 3125	Songkhla
Iron	mg/L	0.001	0.005	<0.005	≤1.0	Based on APHA (2017), 3125	Songkhla
Lead	mg/L	0.001	0.005	Not Detected	≤0.05	Based on APHA (2017), 3125	Songkhla
Mercury	mg/L	0.0003	0.0005	Not Detected	≤0.001	Based on APHA (2017), 3125	Songkhla
Zinc	mg/L	0.001	0.005	<0.005	≤15	Based on APHA (2017), 3125	Songkhla
<b>Microbiological Testing</b>							
Fecal Coliform	MPN/100mL	-	-	4.5	No Standard	APHA (2017), 9221 E	Songkhla
Total Coliform	MPN/100mL	-	-	4.5	<2.2 (1)	APHA (2017), 9221 B	Songkhla
<b>Water Testing</b>							
Chloride as Cl <sup>-</sup>	mg/L	0.06	0.2	27.8	≤600	APHA (2017), 4110 B	Bangkok
Sulfate *	mg/L	0.15	0.5	5.0	≤250	APHA (2017), 4110 B	Bangkok
Total Dissolved Solids Dried at 180 °C	mg/L	-	5	186	≤1200	APHA (2017), 2540 C	Songkhla
Total Hardness as CaCO <sub>3</sub>	mg/L	-	1	131	≤500	APHA (2017), 2340 C	Songkhla

Guideline : Groundwater Quality Standards for Drinking Purposes set by Notification of Ministry of Natural Resources and Environment B.E. 2551, Maximum allowable, (1) Suitable Allowance  
Sampled By : Yongsil Rangsee, Woravit Deenuk

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

Sutthirak T.  
Sutthirak Tiptat  
Scientist (2)

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## Analysis / Test Report



TESTING  
No.0166

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22129574  
Date Received : Nov 22, 2022  
Date Reported : Nov 30, 2022  
Report Number : 2471639-1

Page 2 of 2

Sample Number : 22129574-4  
Sampled Date : Nov 22, 2022 3:45 PM  
Sample Description : Ground Water  
Location : บริเวณทางเดินรถบรรทุกสินค้าและท่าเรือ (GW2)  
Date Analysis Commenced : Nov 23, 2022  
Condition of Sample : Contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Metals Testing</b>							
Arsenic	mg/L	0.001	0.005	Not Detected	≤0.05	Based on APHA (2017), 3125	Songkhla
Cadmium	mg/L	0.001	0.005	Not Detected	≤0.01	Based on APHA (2017), 3125	Songkhla
Chromium	mg/L	0.001	0.005	Not Detected	No Standard	Based on APHA (2017), 3125	Songkhla
Copper	mg/L	0.001	0.005	0.02	≤1.5	Based on APHA (2017), 3125	Songkhla
Iron	mg/L	0.001	0.005	0.02	≤1.0	Based on APHA (2017), 3125	Songkhla
Lead	mg/L	0.001	0.005	Not Detected	≤0.05	Based on APHA (2017), 3125	Songkhla
Mercury	mg/L	0.0003	0.0005	Not Detected	≤0.001	Based on APHA (2017), 3125	Songkhla
Zinc	mg/L	0.001	0.005	0.02	≤15	Based on APHA (2017), 3125	Songkhla
<b>Microbiological Testing</b>							
Fecal Coliform	MPN/100mL	-	-	<1.8	No Standard	APHA (2017), 9221 E	Songkhla
Total Coliform	MPN/100mL	-	-	<1.8	<2.2 (1)	APHA (2017), 9221 B	Songkhla
<b>Water Testing</b>							
Chloride as Cl <sup>-</sup>	mg/L	0.06	0.2	7.6	≤600	APHA (2017), 4110 B	Bangkok
Sulfate *	mg/L	0.15	0.5	<0.5	≤250	APHA (2017), 4110 B	Bangkok
Total Dissolved Solids Dried at 180 °C	mg/L	-	5	48	≤1200	APHA (2017), 2540 C	Songkhla
Total Hardness as CaCO <sub>3</sub>	mg/L	-	1	10	≤500	APHA (2017), 2340 C	Songkhla

Guideline : Groundwater Quality Standards for Drinking Purposes set by Notification of Ministry of Natural Resources and Environment B.E. 2551, Maximum allowable, (1) Suitable Allowance  
Sampled By : Yongsil Rangsee, Woravit Deenuk

Remark :  
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Approved by

Sutthirak T.  
Sutthirak Tiptat  
Scientist (2)

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101/12 หมู่ 9 ต. บางพระ  
อ. ศรีราชา จ.ชลบุรี 20110  
โทร./โทรสาร. (038) 311379

Client : AICA Hatyai Co., Ltd.

Address : 417/115 Kamchanavanich Rd., Patong, Hatyai, Songkhla, Thailand, 90230

Project name : EIA Monitoring

รายงานผลการวิเคราะห์ทางเคมี

๒๒๒๒ ผลการวิเคราะห์ทางเคมี (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)

ชนิดพืช	ปริมาณทางเคมี (หน่วยต่อลูกบาศก์เมตร)	
	22129579-1	22129579-2
Division Cyanophyta		
Class Cyanophyceae		
Order Nostocales		
Family Oscillatoriaceae		
1. <i>Oscillatoria</i> sp.	18,000	23,000
Division Chlorophyta		
Class Chlorophyceae		
Order Chlorococcales		
Family Hydrodictyaceae		
2. <i>Pediastrum duplex</i>	9,000	-
3. <i>Pediastrum simplex</i>	-	8,000
Family Oocystaceae		
4. <i>Dictyosphaerium pulchellum</i>	9,000	-

๒๒๒๒ ผลการวิเคราะห์ทางเคมี (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)  
(ต่อ)

ชนิดพืช	ปริมาณทางเคมี (หน่วยต่อลูกบาศก์เมตร)	
	22129579-1	22129579-2
Family Scenedesmaceae		
5. <i>Scenedesmus armatus</i>	18,000	8,000
Order Zygomatales		
Family Zygnemataceae		
6. <i>Spirogyra</i> sp.	-	8,000
Family Desmidiaceae		
7. <i>Closterium gracile</i>	9,000	8,000
8. <i>Micrasterias thomasi</i>	-	8,000
Class Euglenophyceae		
Order Euglenales		
Family Euglenaceae		
9. <i>Euglena acus</i>	37,000	31,000
10. <i>Euglena oxyuris</i>	9,000	-
11. <i>Euglena viridis</i>	-	8,000
12. <i>Lepocinetis ovum</i>	-	23,000
13. <i>Phacus myersi</i>	-	8,000
14. <i>Phacus pleuronectes</i>	-	8,000
15. <i>Phacus tortus</i>	18,000	-
16. <i>Phacus triquetus</i>	-	8,000
17. <i>Strombomonas deflandriei</i>	28,000	15,000
18. <i>Strombomonas fluviatilis</i>	9,000	-
19. <i>Strombomonas girardiana</i>	9,000	8,000
20. <i>Trachelomonas crebea</i>	-	31,000
21. <i>Trachelomonas hispida</i>	55,000	15,000
22. <i>Trachelomonas lacustris</i>	9,000	-
23. <i>Trachelomonas superba</i>	9,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)	
	22129579-1	22129579-2
Division Chromophyta		
Class Bacillariophyceae		
Order Biddulphiales		
Suborder Coscinodiscineae		
Family Thalassiosiraceae		
24. <i>Cyclotella</i> sp.	18,000	-
Order Bacillariales		
Suborder Fragillariineae		
Family Fragillariaceae		
25. <i>Synedra acus</i>	9,000	-
26. <i>Synedra ulna</i>	46,000	23,000
Suborder Bacillariineae		
Family Eumotiaceae		
27. <i>Eumotia arcus</i>	-	8,000
28. <i>Eumotia lineolata</i>	-	15,000
29. <i>Eumotia pectinalis</i>	-	31,000
Family Cymbellaceae		
30. <i>Cymbella tumida</i>	9,000	-
31. <i>Gomphonema parvulum</i>	-	23,000
Family Naviculaceae		
32. <i>Amphora</i> sp.	18,000	8,000
33. <i>Pinnularia gibba</i>	-	15,000
Family Bacillariaceae		
34. <i>Nitzschia sigmaidea</i>	-	8,000
Family Rhopalodiaceae		
35. <i>Epithemia argus</i>	-	8,000

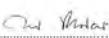
ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)	
	22129579-1	22129579-2
Family Surirellaceae		
36. <i>Surirella robusta</i>	9,000	8,000
37. <i>Surirella tenera</i>	9,000	8,000
Class Crysiophyceae		
Order Synurales		
Family Mallomonadaceae		
38. <i>Mallomonas</i> sp.	18,000	8,000
Class Dinophyceae		
Order Peridinales		
Family Peridiniaceae		
39. <i>Peridinium gatunense</i>	-	-
ชนิดแพลงก์ตอนพืช	22	28
ปริมาณแพลงก์ตอนพืช	382,000	381,000
ดัชนีความหลากหลายแพลงก์ตอนพืช	2.8750	3.1787
ดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.9301	0.9539

Sample Location : 1. สถานี 22129579-1 : คลองอู่ตะเภาด้านซ้ายมือเทียบกับที่ตั้งโครงการ 200 เมตร (SW1)  
2. สถานี 22129579-2 : คลองอู่ตะเภาด้านซ้ายมือเทียบกับที่ตั้งโครงการ 200 เมตร (SW2)

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์



(นายองกต อินทชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ.ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : AICA Hatyai Co., Ltd.

Address : 417/115 Kamchanavanich Rd., Patong, Hatyai, Songkhla, Thailand, 90230

Project name : EIA Monitoring

รายงานผลการวิเคราะห์แพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)

ชนิดแพลงก์ตอนสัตว์	ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)	
	22129579-1	22129579-2
Phylum Protozoa		
Subphylum Plasmodroma		
Class Sarcodina		
Subclass Rhizopoda		
Order Testacida		
Family Arcellidae		
1. <i>Arcella</i> sp.	9,000	8,000
2. <i>Arcella vulgaris</i>	18,000	8,000
Family Diffugiidae		
3. <i>Diffugia</i> sp.	28,000	-
Family Euglyphidae		
4. <i>Euglypha rotunda</i>	9,000	15,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)

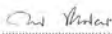
(ต่อ)


ชนิดแพลงก์ตอนสัตว์	ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)	
	22129579-1	22129579-2
Subclass Peritricha		
Order Peritrichida		
5. <i>Pycnicola</i> sp.	18,000	8,000
Phylum Rotifera		
Class Monogononta		
Order Ploima		
Family Brachionidae		
6. <i>Brachionus plicatilis</i>	9,000	-
Family Lecanidae		
7. <i>Lecane arcuata</i>	9,000	8,000
Family Tricocercidae		
8. <i>Trichocerca</i> sp.	9,000	-
Family Gastropodidae		
9. <i>Ascomorpha</i> sp.	9,000	-
ชนิดแพลงก์ตอนสัตว์	9	5
ปริมาณแพลงก์ตอนสัตว์	118,000	47,000
ดัชนีความหลากหลายแพลงก์ตอนสัตว์	2.0927	1.5701
ดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.9524	0.9756

Sample Location : 1. สถานี 22129579-1 : คลองอู่ตะเภาด้านซ้ายมือเทียบกับที่ตั้งโครงการ 200 เมตร (SW1)  
2. สถานี 22129579-2 : คลองอู่ตะเภาด้านซ้ายมือเทียบกับที่ตั้งโครงการ 200 เมตร (SW2)



Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)

  
(นางสาวกนกวรรณ ขวาคอน)  
ผู้วิเคราะห์

  
(นายอองกต อินทราช)  
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา  
101/12 หมู่ 9 ต. บางพระ  
อ. ศรีราชา จ.ชลบุรี 20110  
โทร./โทรสาร. (038) 311379

Client : AICA Hatyai Co., Ltd.

Address : 417/115 Kamchanavanich Rd., Patong, Hatyai, Songkhla, Thailand, 90230

Project name : EIA Monitoring

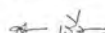
#### รายงานผลการวิเคราะห์สัตว์น้ำดิน


81213 ผลการวิเคราะห์สัตว์น้ำดิน (เก็บตัวอย่างวันที่ 30 พฤศจิกายน 2565)

ชนิดสัตว์น้ำดิน	ปริมาณสัตว์น้ำดิน (ตัว/ตารางเมตร)	
	22129580-1	22129580-2
Phylum Arthropoda		
Class Insecta		
Order Diptera		
Family Chironomidae		
Chironomus sp. (หนอนแดง)	30	-
รวมจำนวนสปีชีส์ทั้งหมด	1	-
รวมปริมาณทั้งหมด	30	-
ค่าดัชนีความหลากหลาย	0.0000	-

- Sample Location : 1. สถานี 22129580-1 : คลองคูตะกาด้านซ้ายเมื่อเทียบกับที่ตั้งโครงการ 200 เมตร (SW1)  
2. สถานี 22129580-2 : คลองคูตะกาด้านซ้ายเมื่อเทียบกับที่ตั้งโครงการ 200 เมตร (SW2)

Condition of Sample : contained in one plastic zip bag

  
(นายสโรจน์ เว้นศิริวิทย์)  
ผู้วิเคราะห์

  
(นายอองกต อินทราช)  
หัวหน้าสถานีวิจัยประมงศรีราชา



#### Analysis / Test Report



TESTING  
No.0009

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 18, 2022  
Date Reported : Aug 25, 2022  
Report Number : 2384481-1

Page 1 of 9

Sample Number : 2290964-1  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : สหกรณ์การเกษตรหนองไธย  
Date Analysis Commenced : Aug 19, 2022  
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 (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Formaldehyde *	09:45 AM - 11:45 AM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	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 : Phonpin Sornkarn

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

Approved by

  
Saranya Chalermsathorn  
Scientist (4)



#### Analysis / Test Report



TESTING  
No.0009

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 18, 2022  
Date Reported : Aug 25, 2022  
Report Number : 2384481-1

Page 2 of 9

Sample Number : 2290964-2  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : สหกรณ์การเกษตรหนองไธย  
Date Analysis Commenced : Aug 19, 2022  
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 (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Formaldehyde *	09:50 AM - 11:50 AM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	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 : Phonpin Sornkarn

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

Approved by

  
Saranya Chalermsathorn  
Scientist (4)



## Analysis / Test Report



TESTING  
No.0009

Client : AICA Haiyui Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 16, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z89401-1

Page 3 of 9

Sample Number : 2290964-3  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : อู่/สุวน/สุวาน  
Date Analysis Commenced : Aug 19, 2022  
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 (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Methanol *	09:35 AM - 11:35 AM	ppm	-	0.10	1.92	200	NIOSH (1994), 2000	ACGH	Bangkok

Guideline :  
ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2022).  
Sampled By : Phongsin Somkaew

Remark :  
- LOD : Limit of Detection  
- \*C\* : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)  
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Approved by

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Saranya Chalermtanamong  
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## Analysis / Test Report



TESTING  
No.0009

Client : AICA Haiyui Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 16, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z89401-1

Page 4 of 9

Sample Number : 2290964-4  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : อู่/สุวน/สุวาน  
Date Analysis Commenced : Aug 19, 2022  
Condition of Sample : Drawn into one filter paper placed in plastic cassette, one 10-L air sampling bag  
Barometric Pressure : 757 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Total dust	09:40 AM - 11:40 AM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), OSHA 1051	OSHA	Bangkok
Total Hydrocarbon *	09:40 AM - 11:40 AM	ppm	-	1.0	6.9	No Standard	Total Hydrocarbon Analytist	-	Bangkok

Guideline :  
OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsin Somkaew

Remark :  
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- \*C\* : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)  
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## Analysis / Test Report



TESTING  
No.0009

Client : AICA Haiyui Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 18, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z384481-1

Page 5 of 9

Sample Number : 2290964-5  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : อู่/สุวน/สุวาน/สุวาน/สุวาน  
Date Analysis Commenced : Aug 19, 2022  
Condition of Sample : Drawn into one filter paper placed in plastic cassette, one 10-L air sampling bag  
Barometric Pressure : 757 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Total dust	09:30 AM - 11:30 AM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), OSHA 1051	OSHA	Bangkok
Total Hydrocarbon *	09:30 AM - 11:30 AM	ppm	-	1.0	2.8	No Standard	Total Hydrocarbon Analyzer	-	Bangkok

Guideline :  
OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsin Somkaew

Remark :  
- LOD : Limit of Detection  
- \*C\* : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)  
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## Analysis / Test Report



TESTING  
No.0009

Client : AICA Haiyui Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 18, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z384481-1

Page 6 of 9

Sample Number : 2290964-6  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : อู่/สุวน/สุวาน/สุวาน/สุวาน  
Date Analysis Commenced : Aug 19, 2022  
Condition of Sample : Drawn into two sorbent tubes, refrigerated  
Barometric Pressure : 757 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Formaldehyde *	09:55 AM - 11:55 AM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	MOL	Bangkok
Methanol *	09:55 AM - 11:55 AM	ppm	-	0.10	<0.10	200	NIOSH (1994), 2000	ACGH	Bangkok

Guideline :  
ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2022).  
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 : Phongsin Somkaew

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

TESTING  
No.0009

Client : AICA Haiyui Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyui, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 16, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z89401-1

Page 7 of 9

Sample Number : 2290964-7  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : บริเวณพื้นที่ก่อสร้างโครงการ  
Date Analysis Commenced : Aug 19, 2022  
Condition of Sample : Drawn into one filter paper placed in plastic cassette, one 10-L air sampling bag, 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									
Methanol *	01:20 PM - 03:20 PM	ppm	-	0.10	<0.10	200	NIOSH (1994), 2000	ACGIH	Bangkok
Total dust	01:20 PM - 03:20 PM	mg/m <sup>3</sup>	-	0.15	<0.15	15	Based on NIOSH (1994), 1991	OSHA	Bangkok
Total Hydrocarbon *	01:20 PM - 03:20 PM	ppm	-	1.0	5.8	No Standard	Total Hydrocarbon Analyzer	-	Bangkok

Guideline :  
ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2022).  
OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsin Somkaew

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

TESTING  
No.0009

Client : AICA Haiyui Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyui, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 16, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z89401-1

Page 8 of 9

Sample Number : 2290964-8  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : บริเวณพื้นที่ก่อสร้างโครงการ  
Date Analysis Commenced : Aug 19, 2022  
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									
Formaldehyde *	09:55 AM - 11:55 AM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	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 : Phongsin Somkaew

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290964  
Date Received : Aug 16, 2022  
Date Reported : Aug 25, 2022  
Report Number : Z89401-1

Page 9 of 9

Sample Number : 2290964-9  
Sampled Date : Aug 16, 2022  
Sample Description : Air Quality  
Location : บริเวณพื้นที่ก่อสร้างโครงการ  
Date Analysis Commenced : Aug 19, 2022  
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									
Formaldehyde *	09:58 AM - 11:58 AM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	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 : Phongsin Somkaew

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 1 of 9

Sample Number : 22126667-1  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : เขตพื้นที่ก่อสร้าง  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into one sorbent tube, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Formaldehyde *	09:55 AM - 11:55 AM	ppm	-	0.1	0.15	0.75	NIOSH (1994), 2541	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 : Aris Srisen

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 2 of 9

Sample Number : 22126667-2  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : ถนนพหลโยธิน/ถนนสุขุมวิท  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into one sorbent tube, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Formaldehyde *	09:35 AM - 11:35 AM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	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 : Arjit Srinen

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 3 of 9

Sample Number : 22126667-3  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : ถนนพหลโยธิน/ถนนสุขุมวิท  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into one sorbent tube, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Methanol *	09:40 AM - 11:40 AM	ppm	-	0.10	4.37	200	NIOSH (1994), 2000	ACQH	Bangkok

Guideline :  
ACQH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2002).  
Sampled By : Arjit Srinen

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

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Sample Number : 22126667-4  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : ถนนพหลโยธิน/ถนนสุขุมวิท  
Date Analysis Commenced : Nov 25, 2022  
Condition of Sample : Drawn into one 10-L air sampling bag and one filter paper placed in plastic cassette  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Total dust	09:30 AM - 11:30 AM	mg/m <sup>3</sup>	-	0.15	<0.15	15	Based on NIOSH (1994), OSHA (501)	OSHA	Bangkok
Total Hydrocarbon *	09:30 AM - 11:30 AM	ppm	-	1.0	3.2	No Standard	Total Hydrocarbon Analyzer	-	Bangkok

Guideline :  
OSHA : Occupational Safety and Health Administration  
Sampled By : Arjit Srinen

Remark :  
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## Analysis / Test Report



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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 5 of 9

Sample Number : 22126667-5  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : ถนนพหลโยธิน/ถนนสุขุมวิท  
Date Analysis Commenced : Nov 25, 2022  
Condition of Sample : Drawn into one 10-L air sampling bag and one filter paper placed in plastic cassette  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Total dust	10:40 AM - 12:40 PM	mg/m <sup>3</sup>	-	0.15	<0.15	15	Based on NIOSH (1994), OSHA (501)	OSHA	Bangkok
Total Hydrocarbon *	10:40 AM - 12:40 PM	ppm	-	1.0	2.6	No Standard	Total Hydrocarbon Analyzer	-	Bangkok

Guideline :  
OSHA : Occupational Safety and Health Administration  
Sampled By : Arjit Srinen

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 6 of 9

Sample Number : 22126667-6  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : อวนลมในอาคารชั้น 1  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into two sorbent tubes, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Formaldehyde *	09:30 AM - 11:30 AM	ppm	-	0.1	0.16	0.75	NIOSH (1994), 2541	MOL	Bangkok
Methanol *	09:30 AM - 11:30 AM	ppm	-	0.10	2.03	200	NIOSH (1994), 2000	ACGIH	Bangkok

Guideline :  
ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2002).  
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 : Aris Srien

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 7 of 9

Sample Number : 22126667-7  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : อวนลมในอาคารชั้น 2  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into one 10-L air sampling bag, one filter paper placed in plastic cassette and one sorbent tube, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Methanol *	10:53 AM - 12:53 PM	ppm	-	0.10	<0.10	200	NIOSH (1994), 2000	ACGIH	Bangkok
Total dust	10:53 AM - 12:53 PM	mg/m <sup>3</sup>	-	0.15	<0.15	15	Based on NIOSH (1994), 1951	OSHA	Bangkok
Total Hydrocarbon *	10:53 AM - 12:53 PM	ppm	-	1.0	2.6	No Standard	Total Hydrocarbon Analyzer	-	Bangkok

Guideline :  
ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2002).  
OSHA : Occupational Safety and Health Administration  
Sampled By : Aris Srien

Remark :  
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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 8 of 9

Sample Number : 22126667-8  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : อวนลมในอาคารชั้น 1  
Personal Sampling : อวนลมในอาคารชั้น 1  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into one sorbent tube, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Formaldehyde *	09:50 AM - 11:50 AM	ppm	-	0.1	0.35	0.75	NIOSH (1994), 2541	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 : Aris Srien

Remark :  
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Project Location :

Lot ID: 22126667  
Date Received : Nov 24, 2022  
Date Reported : Dec 09, 2022  
Report Number : 2464760-1

Page 9 of 9

Sample Number : 22126667-9  
Sampled Date : Nov 22, 2022  
Sample Description : Air Quality  
Location : อวนลมในอาคารชั้น 2  
Personal Sampling : อวนลมในอาคารชั้น 2  
Date Analysis Commenced : Nov 24, 2022  
Condition of Sample : Drawn into one sorbent tube, refrigerated  
Barometric Pressure : 756 mmHg  
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Formaldehyde *	10:00 AM - 12:00 PM	ppm	-	0.1	<0.10	0.75	NIOSH (1994), 2541	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 : Aris Srien

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.

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Approved by

Saranya C.  
Saranya Chalermsathorn  
Scientist (4)

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126656  
Date Received : Nov 24, 2022  
Date Reported : Nov 29, 2022  
Report Number: 2502705-1

Page 1 of 1

Sample Number : 22126656-1  
Parameter : Noise (Leq 8 hrs.)  
Location : อวนการผลิตลม (Blower)  
Measurement Date : Nov 22, 2022  
Measurement by : Artit Srisen

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:56 AM - 09:56 AM	53.9	75.8	51.3
09:56 AM - 10:56 AM	54.3	70.6	52.1
10:56 AM - 11:56 AM	52.6	63.8	51.3
11:56 AM - 12:56 PM	51.6	59.3	50.6
12:56 PM - 01:56 PM	52.0	63.3	50.9
01:56 PM - 02:56 PM	52.1	58.3	51.2
02:56 PM - 03:56 PM	52.8	66.0	50.9
03:56 PM - 04:56 PM	52.2	53.7	51.0
Leq Average 8 hrs. (dB(A))	52.8		
Lmax (dB(A))		75.8	
Standard (dB(A))	on	140	

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ข้อกำหนดของกรมแรงงาน เรื่อง การวัดและประเมินผลเสียง  
ตามข้อกำหนดการประเมินผลเสียงตามมาตรฐานกรมแรงงาน พ.ศ. ๒๕๖๒

Technical Management

Suwan C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supt S.

Supot Salantheth  
Section Head

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S:\Report\_Air Noise.rpt ( 5/29/20)



## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126676  
Date Received : Nov 24, 2022  
Date Reported : Dec 10, 2022  
Report Number : 2512705-1

Page 1 of 2

Sample Number : 22126676-1  
Sampled Date : Nov 22, 2022  
Sample Description : Noise Dose  
Location : sunan Production (1) เครื่องสูบลม  
Personal Sampling : none  
Date Analysis Commenced : Nov 25, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (8 hrs.)	08:42 AM - 04:42 PM	%	-	1	40.7	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:42 AM - 04:42 PM	dB(A)	-	-	81.1	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

### Guideline :

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

Note : This Analysis test report is resused to supersede report No. 2464763-1 Reported : Nov 25, 2022 due to revise sample information.

Sampled By : Artit Srisen

Remark :

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

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## Analysis / Test Report

Client : AICA Hatyai Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126676  
Date Received : Nov 24, 2022  
Date Reported : Dec 10, 2022  
Report Number : 2512705-1

Page 2 of 2

Sample Number : 22126676-2  
Sampled Date : Nov 22, 2022  
Sample Description : Noise Dose  
Location : sunan Production (2) รถสิบล้อ  
Personal Sampling : none  
Date Analysis Commenced : Nov 25, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (8 hrs.)	08:42 AM - 04:42 PM	%	-	1	20.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:42 AM - 04:42 PM	dB(A)	-	-	78.0	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

### Guideline :

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

Note : This Analysis test report is resused to supersede report No. 2464763-1 Reported : Nov 25, 2022 due to revise sample information.

Sampled By : Artit Srisen

Remark :

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

Approved by

Wichan Ch.

Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126656  
Date Received : Nov 24, 2022  
Date Reported : Nov 29, 2022  
Report Number: 2502706-1

Page 1 of 1

Sample Number : 22126656-2  
Parameter : Noise (Leq 8 hrs.)  
Location : เครื่องสูบลม (Agitator) เครื่องปั่นในกระบวนการผลิตยางพารา  
Measurement Date : Nov 22, 2022  
Measurement by : Artit Srisen

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:02 AM - 10:02 AM	77.2	90.5	76.1
10:02 AM - 11:02 AM	77.9	97.2	75.7
11:02 AM - 12:02 PM	76.4	86.8	75.9
12:02 PM - 01:02 PM	76.1	91.8	75.1
01:02 PM - 02:02 PM	77.6	99.2	73.2
02:02 PM - 03:02 PM	74.4	91.3	72.9
03:02 PM - 04:02 PM	77.7	90.6	74.1
04:02 PM - 05:02 PM	77.1	77.7	75.8
Leq Average 8 hrs. (dB(A))	76.9		
Lmax (dB(A))		99.2	
Standard (dB(A))	90	140	

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ข้อกำหนดของกรมแรงงาน เรื่อง การวัดและประเมินผลเสียง  
ตามข้อกำหนดการประเมินผลเสียงตามมาตรฐานกรมแรงงาน พ.ศ. ๒๕๖๒

Technical Management

Suwan C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supt S.

Supot Salantheth  
Section Head

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## Analysis / Test Report

Client : AICA Haiyol Co., Ltd.  
417/115, Kamchanavanich Rd., Patong, Haiyol, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290929  
Date Received : Aug 18, 2022  
Date Reported : Aug 20, 2022  
Report Number: 2384411-1

Page 1 of 2

Sample Number : 2290929-1  
Parameter : Heat Stress (Sampling Time : 01.15 PM - 03.15 PM)  
Measurement Date : Aug 16, 2022  
Measurement by : Phongsiri Somkaew  
Location : สุ่มอากาศ 1 ชั่วโมง (ค่า-รวมจาก 5 จุดสุ่ม : - อุณหภูมิ : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
วัดอุณหภูมิ	120	27.2	25.9	30.2	30.0
Average (WBGT)		27.2			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supat S.*  
Supat Salanteh  
Section Head

Approved by

*Wichan Ch.*  
Wichan Choonharat  
Assistant Manager

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2384411-1 (Aug 20, 2022)



## Analysis / Test Report

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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290929  
Date Received : Aug 18, 2022  
Date Reported : Aug 20, 2022  
Report Number: 2384411-1

Page 2 of 2

Sample Number : 2290929-2  
Parameter : Heat Stress (Sampling Time : 01.10 PM - 03.10 PM)  
Measurement Date : Aug 16, 2022  
Measurement by : Phongsiri Somkaew  
Location : สุ่มอากาศ 1 ชั่วโมง (ค่า-รวมจาก 5 จุดสุ่ม : - อุณหภูมิ : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
วัดอุณหภูมิ	120	27.0	25.9	29.4	29.2
Average (WBGT)		27.0			
Guideline WBGT (°C)		30.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supat S.*  
Supat Salanteh  
Section Head

Approved by

*Wichan Ch.*  
Wichan Choonharat  
Assistant Manager

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2384411-2 (Aug 20, 2022)



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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126651  
Date Received : Nov 24, 2022  
Date Reported : Nov 25, 2022  
Report Number: 2464736-1

Page 1 of 2

Sample Number : 22126651-1  
Parameter : Heat Stress (Sampling Time : 11.30 AM - 01.30 PM)  
Measurement Date : Nov 22, 2022  
Measurement by : Aris Srisen  
Location : สุ่มอากาศ 1 ชั่วโมง (ค่า-รวมจาก 5 จุดสุ่ม : - อุณหภูมิ : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
วัดอุณหภูมิ	120	28.0	25.7	33.4	33.2
Average (WBGT)		28.0			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supat S.*  
Supat Salanteh  
Section Head

Approved by

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Assistant Manager

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2464736-1 (Nov 25, 2022)



## Analysis / Test Report

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P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126651  
Date Received : Nov 24, 2022  
Date Reported : Nov 25, 2022  
Report Number: 2464736-1

Page 2 of 2

Sample Number : 22126651-2  
Parameter : Heat Stress (Sampling Time : 11.30 AM - 01.30 PM)  
Measurement Date : Nov 22, 2022  
Measurement by : Aris Srisen  
Location : สุ่มอากาศ 1 ชั่วโมง (ค่า-รวมจาก 5 จุดสุ่ม : - อุณหภูมิ : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
วัดอุณหภูมิ	120	26.7	25.0	30.5	30.3
Average (WBGT)		26.7			
Guideline WBGT (°C)		32.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supat S.*  
Supat Salanteh  
Section Head

Approved by

*Wichan Ch.*  
Wichan Choonharat  
Assistant Manager

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2464736-2 (Nov 25, 2022)



## Analysis / Test Report

Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Haiyay, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290938  
Date Received : Aug 22, 2022  
Date Reported : Aug 26, 2022  
Report Number : 2415756-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux) Spot Average	Guideline Limit Spot/Min Average	Comment	
1	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า QC : ใต้ถุนถาวร	2290938-1	16 Aug 2022	Day time	1	402	400-500	Pass
2	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า QC : ใต้ถุน 1	2290938-2	16 Aug 2022	Day time	1	518	400-500	Pass
3	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า R&D : ใต้ถุน 1	2290938-3	16 Aug 2022	Day time	1	528	400-500	Pass
4	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า HSE&QC : ใต้ถุน 1	2290938-4	16 Aug 2022	Day time	1	542	400-500	Pass
5	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า HSE&QC : ใต้ถุน 2	2290938-5	16 Aug 2022	Day time	1	485	400-500	Pass
6	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า HSE&QC : ใต้ถุน 3	2290938-6	16 Aug 2022	Day time	1	475	400-500	Pass
7	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า HSE&QC : ใต้ถุน 4	2290938-7	16 Aug 2022	Day time	1	416	400-500	Pass
8	Spot - อาคารควบคุมมลพิษ : 2nd Floor : หน้า HSE&QC : ใต้ถุน 5	2290938-8	16 Aug 2022	Day time	1	708	400-500	Pass

Measurement by : Phonsan Somkiew Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
Supt Salameh  
Section Head

Approved by

Wichan Choonharat  
Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Haiyay, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290941  
Date Received : Aug 22, 2022  
Date Reported : Aug 26, 2022  
Report Number : 2415757-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux)		Guideline Limit		Comment	
					Spot	Average	Spot/Min	Average		
1	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Control Room : ใต้ถุน 1	2290941-1	16 Aug 2022	Day time	1	409	-	400-500	-	Pass
2	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Control Room : ใต้ถุน 2	2290941-2	16 Aug 2022	Day time	1	480	-	400-500	-	Pass
3	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Control Room : ใต้ถุน 3	2290941-3	16 Aug 2022	Day time	1	425	-	400-500	-	Pass
4	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Control Room : ใต้ถุน 4	2290941-4	16 Aug 2022	Day time	1	586	-	400-500	-	Pass
5	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Control Room : ใต้ถุน 5	2290941-5	16 Aug 2022	Day time	1	475	-	400-500	-	Pass
7	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Office Production : ใต้ถุน 2	2290941-6	16 Aug 2022	Day time	1	469	-	400-500	-	Pass
8	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Office Production : ใต้ถุน 3	2290941-7	16 Aug 2022	Day time	1	451	-	400-500	-	Pass
9	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Office Production : ใต้ถุน 5	2290941-8	16 Aug 2022	Day time	1	485	-	400-500	-	Pass
10	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Office Production : ใต้ถุน 4	2290941-9	16 Aug 2022	Day time	1	1,081	-	400-500	-	Pass
10	2290941-10	16 Aug 2022	Day time	2	982	-	300			
10	2290941-11	16 Aug 2022	Day time	3	590	-	200			
11	Spot - อาคารควบคุมมลพิษ : 3rd Floor : หน้า Meeting Room : ใต้ถุน 1	2290941-12	16 Aug 2022	Day time	1	406	-	400-500	-	Pass

Measurement by : Phonsan Somkiew Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
Supt Salameh  
Section Head

Approved by

Wichan Choonharat  
Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Haiyay, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290942  
Date Received : Aug 22, 2022  
Date Reported : Aug 26, 2022  
Report Number : 2415760-1

Page 1 of 2

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux)		Guideline Limit		Comment
					Spot	Average	Spot/Min	Average	
1	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 1 2290942-1	16 Aug 2022	Day time	1	472	—	400-500	—	Pass
2	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 2 2290942-2	16 Aug 2022	Day time	1	575	—	400-500	—	Pass
3	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 3 2290942-3	16 Aug 2022	Day time	1	494	—	400-500	—	Pass
4	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 4 2290942-4	16 Aug 2022	Day time	1	570	—	400-500	—	Pass
5	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 5 2290942-5	16 Aug 2022	Day time	1	628	—	400-500	—	Pass
6	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 6 2290942-6	16 Aug 2022	Day time	1	420	—	400-500	—	Pass
7	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 7 2290942-7	16 Aug 2022	Day time	1	602	—	400-500	—	Pass
8	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 8 2290942-8	16 Aug 2022	Day time	1	894	—	400-500	—	Pass
9	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 9 2290942-9	16 Aug 2022	Day time	1	418	—	400-500	—	Pass
10	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 10 2290942-10	16 Aug 2022	Day time	1	443	—	400-500	—	Pass
11	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 11 2290942-11	16 Aug 2022	Day time	1	585	—	400-500	—	Pass
12	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 12 2290942-12	16 Aug 2022	Day time	1	443	—	400-500	—	Pass
13	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 13 2290942-13	16 Aug 2022	Day time	1	448	—	400-500	—	Pass
14	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 14 2290942-14	16 Aug 2022	Day time	1	502	—	400-500	—	Pass
15	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 17 2290942-15	16 Aug 2022	Day time	1	404	—	400-500	—	Pass
16	Spot - อาคารควบคุมมลพิษ : 1st Floor : หน้า Chief Accountant : ใต้ถุน 15 2290942-16	16 Aug 2022	Day time	1	681	—	400-500	—	Pass
17	Spot - อาคารควบคุมมลพิษ : 1st Floor : หน้า HRD : ใต้ถุน 16 2290942-17	16 Aug 2022	Day time	1	496	—	400-500	—	Pass

Technical Management

Supt S  
Supt Salameh  
Section Head

Approved by

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Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Haiyay, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290942  
Date Received : Aug 22, 2022  
Date Reported : Aug 26, 2022  
Report Number : 2415760-1

Page 2 of 2

Page 2 of 2

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux) Spot      Average	Guideline Limit Spot/Min      Average	Comment
19	Spot - อาคารควบคุมมลพิษ : 1st Floor : หน้า Purchase : ใต้ถุน 18 2290942-18	16 Aug 2022	Day time	1	508	400-500	Pass
20	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 21 2290942-19	16 Aug 2022	Day time	1	592	400-500	Pass
21	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 19 2290942-20	16 Aug 2022	Day time	1	443	400-500	Pass
22	Spot - อาคารควบคุมมลพิษ : 1st Floor : หน้า General Manager : ใต้ถุน 1 2290942-21	16 Aug 2022	Day time	1	804	400-500	Pass
23	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 16 2290942-22	16 Aug 2022	Day time	1	528	400-500	Pass
24	Spot - อาคารควบคุมมลพิษ : 1st Floor : ใต้ถุน 20 2290942-23	16 Aug 2022	Day time	1	569	400-500	Pass

Measurement by : Phonsan Somkiew Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
Supt Salameh  
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## Analysis / Test Report

Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290943  
Date Received : Aug 22, 2022  
Date Reported : Aug 26, 2022  
Report Number : 2415761-1

Page 1 of 1

Layout No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux) Spot Average	Guideline Limit Spot/Min Average	Comment
1	Spot - area warehouse : 1st Floor : via Store : 1st 1						
	2290943-1	16 Aug 2022	Day time	1	439	400-500	Pass
2	Spot - area warehouse : 1st Floor : via Store : 1st 2						
	2290943-2	16 Aug 2022	Day time	1	447	400-500	Pass
3	Spot - area warehouse : 1st Floor : via Warehouse : 1st 1						
	2290943-3	16 Aug 2022	Day time	1	410	400-500	Pass

Measurement by : Phongpani Somkiew Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
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Assistant Manager

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Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 2290944  
Date Received : Aug 22, 2022  
Date Reported : Aug 26, 2022  
Report Number : 2415764-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux)		Guideline Limit		Comment	
				Spot	Average	Spot/Min	Average			
1	Spot - area Maintenance : 1st Floor : via Office : 1st 1	2290944-1	16 Aug 2022	Day time	1	410	-	400-500	-	Pass
2	Spot - area Maintenance : 1st Floor : via Office : 1st 2	2290944-2	16 Aug 2022	Day time	1	448	-	400-500	-	Pass
3.1	Area - area Maintenance : 1st Floor : via Office : Maintenance	2290944-3	16 Aug 2022	Day time	1	340	333.0	150	300	Pass
3.2	2290944-4	16 Aug 2022	Day time	2	326					
4	Spot - area Maintenance : 1st Floor : via Office UT : 1st 1	2290944-5	16 Aug 2022	Day time	1	434	-	400-500	-	Pass
6	Spot - area Maintenance : 1st Floor : via Office UT : 1st 2	2290944-6	16 Aug 2022	Day time	1	590	-	400-500	-	Pass

Measurement by : Phongpani Somkiew Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

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Client : AICA Haiyay Co., Ltd.  
417/115, Kamcharuwarach Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126660  
Date Received : Nov 28, 2022  
Date Reported : Dec 02, 2022  
Report Number : 2509504-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux)		Guideline Unit		Comment
					Spot	Average	Spot/Min	Average	
1	Spot - area warehouse : 2nd Floor : via QC : 1st 1	22126660-1	22 Nov 2022	Day time	1	470	-	400-500	Pass
	Spot - area warehouse : 2nd Floor : via QC : 1st 1	22126660-2	22 Nov 2022	Day time	1	502	-	400-500	Pass
3	Spot - area warehouse : 2nd Floor : via R&D : 1st 1	22126660-3	22 Nov 2022	Day time	1	555	-	400-500	Pass
	Spot - area warehouse : 2nd Floor : via HSE/QC : 1st 1	22126660-4	22 Nov 2022	Day time	1	492	-	400-500	Pass
5	Spot - area warehouse : 2nd Floor : via HSE/QC : 1st 2	22126660-5	22 Nov 2022	Day time	1	450	-	400-500	Pass
	Spot - area warehouse : 2nd Floor : via HSE/QC : 1st 3	22126660-6	22 Nov 2022	Day time	1	510	-	400-500	Pass
7	Spot - area warehouse : 2nd Floor : via HSE/QC : 1st 4	22126660-7	22 Nov 2022	Day time	1	502	-	400-500	Pass
	Spot - area warehouse : 2nd Floor : via HSE/QC : 1st 5	22126660-8	22 Nov 2022	Day time	1	712	-	400-500	Pass

Measurement by : Anit Sreen Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

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417/115, Kamcharuwarach Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126662  
Date Received : Nov 28, 2022  
Date Reported : Dec 02, 2022  
Report Number : 2509507-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux)		Guideline Limit		Comment
					Spot	Average	Spot/Min	Average	
1	Spot - area warehouse : 3rd Floor : via Control Room : 1st 1 22126662-1	22 Nov 2022	Day time	1	413	-	400-500	-	Pass
2	Spot - area warehouse : 3rd Floor : via Control Room : 1st 2 22126662-2	22 Nov 2022	Day time	1	474	-	400-500	-	Pass
3	Spot - area warehouse : 3rd Floor : via Control Room : 1st 3 22126662-3	22 Nov 2022	Day time	1	443	-	400-500	-	Pass
4	Spot - area warehouse : 3rd Floor : via Control Room : 1st 4 22126662-4	22 Nov 2022	Day time	1	465	-	400-500	-	Pass
5	Spot - area warehouse : 3rd Floor : via Control Room : 1st 5 22126662-5	22 Nov 2022	Day time	1	436	-	400-500	-	Pass
7	Spot - area warehouse : 3rd Floor : via Office Production : 1st 2 22126662-6	22 Nov 2022	Day time	1	491	-	400-500	-	Pass
8	Spot - area warehouse : 3rd Floor : via Office Production : 1st 3 22126662-7	22 Nov 2022	Day time	1	580	-	400-500	-	Pass
9	Spot - area warehouse : 3rd Floor : via Office Production : 1st 5 22126662-8	22 Nov 2022	Day time	1	460	-	400-500	-	Pass
10	Spot - area warehouse : 3rd Floor : via Office Production : 1st 4 22126662-9	22 Nov 2022	Day time	1	587	-	400-500	-	Pass
11	Spot - area warehouse : 3rd Floor : via Meeting Room : 1st 1 22126662-10	22 Nov 2022	Day time	1	442	-	400-500	-	Pass
12	Spot - area warehouse : 3rd Floor : via Office : 1st 1 22126662-11	22 Nov 2022	Day time	1	682	-	400-500	-	Pass

Measurement by : Anit Sreen Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

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Supt Salameh  
Section Head

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## Analysis / Test Report

Client : AICA Haiyao Co., Ltd.  
417/115, Kamcharasarn Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126663  
Date Received : Nov 28, 2022  
Date Reported : Dec 02, 2022  
Report Number : 2509509-1

Page 1 of 2

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux) Spot Average	Guideline Limit Spot/Min Average	Comment
1	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 1	22 Nov 2022	Day time	1	490	400-500	Pass
2	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 2	22 Nov 2022	Day time	1	539	400-500	Pass
3	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 3	22 Nov 2022	Day time	1	500	400-500	Pass
4	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 4	22 Nov 2022	Day time	1	626	400-500	Pass
5	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 5	22 Nov 2022	Day time	1	687	400-500	Pass
6	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 6	22 Nov 2022	Day time	1	468	400-500	Pass
7	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 7	22 Nov 2022	Day time	1	621	400-500	Pass
8	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 8	22 Nov 2022	Day time	1	822	400-500	Pass
9	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 9	22 Nov 2022	Day time	1	476	400-500	Pass
10	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 10	22 Nov 2022	Day time	1	580	400-500	Pass
11	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 11	22 Nov 2022	Day time	1	727	400-500	Pass
12	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 12	22 Nov 2022	Day time	1	618	400-500	Pass
13	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 13	22 Nov 2022	Day time	1	499	400-500	Pass
14	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 14	22 Nov 2022	Day time	1	579	400-500	Pass
15	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 15	22 Nov 2022	Day time	1	416	400-500	Pass
16	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 16	22 Nov 2022	Day time	1	722	400-500	Pass
17	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 17	22 Nov 2022	Day time	1	625	400-500	Pass

Technical Management

Supt S  
Supt Salanth  
Section Head

Approved by

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## Analysis / Test Report

Client : AICA Haiyao Co., Ltd.  
417/115, Kamcharasarn Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126663  
Date Received : Nov 28, 2022  
Date Reported : Dec 02, 2022  
Report Number : 2509509-1

Page 2 of 2

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux) Spot Average	Guideline Limit Spot/Min Average	Comment
19	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ Purchase : ไลน์ 18	22 Nov 2022	Day time	1	538	400-500	Pass
20	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 21	22 Nov 2022	Day time	1	435	400-500	Pass
21	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 19	22 Nov 2022	Day time	1	525	400-500	Pass
22	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ General Manager : ไลน์ 1	22 Nov 2022	Day time	1	910	400-500	Pass
23	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 16	22 Nov 2022	Day time	1	589	400-500	Pass
24	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ 20	22 Nov 2022	Day time	1	582	400-500	Pass

Measurement by : Anit. Srisen Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
Supt Salanth  
Section Head

Approved by

Wichan Choonharat  
Assistant Manager

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5/3 Report (light.pdf)



## Analysis / Test Report

Client : AICA Haiyao Co., Ltd.  
417/115, Kamcharasarn Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126664  
Date Received : Nov 28, 2022  
Date Reported : Dec 02, 2022  
Report Number : 2509512-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux) Spot Average	Guideline Limit Spot/Min Average	Comment
1	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ Store : ไลน์ 1	22 Nov 2022	Day time	1	407	400-500	Pass
2	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ Store : ไลน์ 2	22 Nov 2022	Day time	1	461	400-500	Pass
3	Spot - อาคารรถจักรยานยนต์ : 1st Floor : ไลน์ Warehouse : ไลน์ 1	22 Nov 2022	Day time	1	456	400-500	Pass

Measurement by : Anit. Srisen Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
Supt Salanth  
Section Head

Approved by

Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : AICA Haiyao Co., Ltd.  
417/115, Kamcharasarn Rd., Patong, Hatyai, Songkhla Thailand 90230  
P/O : PO011133  
Project Name : EIA Monitoring  
Project Location :

Lot ID: 22126665  
Date Received : Nov 28, 2022  
Date Reported : Dec 02, 2022  
Report Number : 2509515-1

Page 1 of 1

Lay out No.	Reference Number	Measurement Date	Measurement Time	Spot /Area No.	Illuminance (Lux)		Guideline Limit		Comment
					Spot	Average	Spot/Min	Average	
1	Spot - อาคาร Maintenance : 1st Floor : ไลน์ Office : ไลน์ 1								
	22126665-1	22 Nov 2022	Day time	1	431	-	400-500	-	Pass
2	Spot - อาคาร Maintenance : 1st Floor : ไลน์ Office : ไลน์ 2								
	22126665-2	22 Nov 2022	Day time	1	479	-	400-500	-	Pass
3.1	Area - อาคาร Maintenance : 1st Floor : ไลน์ Office Maintenance								
	22126665-3	22 Nov 2022	Day time	1	335	300.5	150	300	Pass
3.2	22126665-4 22 Nov 2022 Day time 2 326								
4	Spot - อาคาร Maintenance : 1st Floor : ไลน์ Office UT : ไลน์ 1								
	22126665-5	22 Nov 2022	Day time	1	445	-	400-500	-	Pass
6	Spot - อาคาร Maintenance : 1st Floor : ไลน์ Office UT : ไลน์ Office UT								
	22126665-6	22 Nov 2022	Day time	1	582	-	400-500	-	Pass

Measurement by : Anit. Srisen Personnel of ALS Laboratory Group (Thailand) Co., Ltd.  
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S  
Supt Salanth  
Section Head

Approved by

Wichan Choonharat  
Assistant Manager

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ภาคผนวก ง

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ใบรับรองการสอบเทียบเครื่องมือ



รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Nitrogen Dioxide	NO <sub>x</sub> Analyzer	SGK_FS0092	1-Jul-22	1-Jan-23	6
Ambient	Nitrogen Dioxide	NO <sub>x</sub> Analyzer	SGK_FS0094	1-Jul-22	1-Jan-23	6
Ambient	Nitrogen Dioxide	NO <sub>x</sub> Analyzer	BKK_FS0789	1-Jul-22	1-Jan-23	6
Ambient	Nitrogen Dioxide	NO <sub>x</sub> Analyzer	BKK_FS0884	1-Jul-22	1-Jan-23	6
Noise	Leq 24 hrs	Sound Calibrator	SGK_FS0011	9-Sep-22	9-Sep-23	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0030	25-Oct-22	25-Oct-23	12
Noise	Leq 24 hrs	Sound Level Meter	PHK_FS0018	19-Sep-22	19-Sep-23	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0037	9-Jun-22	9-Jun-23	12
Workplace	Formaldehyde	Field Rotameter	BKK_FS1010	1-Jul-22	1-Oct-22	3
Workplace	Formaldehyde	Field Rotameter	BKK_FS1020	1-Oct-22	1-Jan-23	3
Workplace	Formaldehyde	GC-FID	BKK_EN0126	21-Oct-21	21-Apr-23	18
Workplace	Methanol	Field Rotameter	BKK_FS1010	1-Jul-22	1-Oct-22	3
Workplace	Methanol	Field Rotameter	BKK_FS1020	1-Oct-22	1-Jan-23	3
Workplace	Methanol	GC-FID	BKK_EN0126	21-Oct-21	21-Apr-23	18
Workplace	Total Dust	Field Rotameter	BKK_FS0592	1-Jul-22	1-Oct-22	3
Workplace	Total Dust	Field Rotameter	BKK_FS1022	1-Oct-22	1-Jan-23	3
Workplace	Total Dust	Digital Balance	BKK_EN0004	25-Feb-22	25-Feb-23	12
Workplace	Total Hydrocarbon	Field Rotameter	BKK_FS1010	1-Jul-22	1-Oct-22	3
Workplace	Total Hydrocarbon	Total Hydrocarbon Analyzer	BKK_EN0057	9-Aug-22	9-Feb-24	18
Noise	Leq 8 hrs	Sound Calibrator	SGK_FS0011	9-Sep-22	9-Sep-23	12
Noise	Leq 8 hrs	Sound Level Meter	SRT_FS0009	19-Sep-22	19-Sep-23	12
Noise	Leq 8 hrs	Sound Level Meter	SRT_FS0010	19-Sep-22	19-Sep-23	12
Noise	Noise Dose, TWA	Dose Badge Reader	SGK_FS0102	27-May-22	27-May-23	12
Heat	Heat Stress	Heat Stress Monitor	SGK_FS0008	22-Jul-22	22-Jul-23	12
Heat	Heat Stress	Heat Stress Monitor	SGK_FS0009	22-Jul-22	22-Jul-23	12
Illuminance	Illuminance	Lux Meter	SGK_FS0012	14-Sep-21	14-Sep-22	12
Illuminance	Illuminance	Lux Meter	SGK_FS0012	20-Sep-22	20-Sep-23	12
Songkhla Lab	BOD (5 days at 20°C)	Incubator	SGK_CL0028	25-Jan-22	26-Jul-23	18
Songkhla Lab	BOD (5 days at 20°C)	DO/BOD Analyser	SGK_CL0073	21-Nov-22	21-May-24	18
Songkhla Lab	COD	COD Reactor	PTC/10/Z2004	8-Feb-22	8-Feb-23	12
Songkhla Lab	COD	Spectrophotometer	SGK_CL0038	24-Jan-22	24-Jan-23	12
Songkhla Lab	Formaldehyde	Spectrophotometer	SGK_CL0040	24-Jan-22	24-Jan-23	12
Songkhla Lab	Formaldehyde	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	pH at 25 °C	pH meter	SGK_CL0030	9-Nov-21	10-May-23	18
Songkhla Lab	Total Dissolved Solids 180°C	Electronic Top-Loading Balance	SGK_CL0045	5-Feb-22	5-Feb-23	12
Songkhla Lab	Total Dissolved Solids 180°C	Oven	SGK_CL0024	9-Nov-21	10-May-23	18
Songkhla Lab	Total Suspended Solids	Electronic Top-Loading Balance	SGK_CL0045	5-Feb-22	5-Feb-23	12
Songkhla Lab	Total Suspended Solids	Oven	SGK_CL0024	9-Nov-21	10-May-23	18
Songkhla Lab	Oil & Grease	Electronic Top-Loading Balance	SGK_CL0045	5-Feb-22	5-Feb-23	12
Songkhla Lab	Oil & Grease	Oven	SGK_CL0024	9-Nov-21	10-May-23	18
Songkhla Lab	Oil & Grease	Water Bath	SGK_CL0035	5-Feb-22	6-Aug-23	18
Songkhla Lab	Conductivity	Conductivity Meter	SGK_FS0051	29-Aug-22	29-Aug-23	12
Songkhla Lab	Total Coliform	Autoclave	SGK_ML0001	5-Jul-21	3-Jan-23	18
Songkhla Lab	Total Coliform	Incubator	SGK_ML0013	6-Aug-22	6-Feb-24	18
Songkhla Lab	Total Coliform	pH Meter	SGK_ML0016	5-Jul-21	3-Jan-23	18
Songkhla Lab	Total Coliform	Water Bath	SGK_ML0021	6-Aug-21	4-Feb-23	18
Songkhla Lab	Fecal Coliform	Autoclave	SGK_ML0001	5-Jul-21	3-Jan-23	18
Songkhla Lab	Fecal Coliform	Incubator	SGK_ML0013	6-Aug-22	6-Feb-24	18
Songkhla Lab	Fecal Coliform	pH Meter	SGK_ML0016	5-Jul-21	3-Jan-23	18
Songkhla Lab	Fecal Coliform	Water Bath	SGK_ML0021	6-Aug-21	4-Feb-23	18
Songkhla Lab	Arsenic	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Arsenic	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	Cadmium	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Cadmium	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	Chromium	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Chromium	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Songkhla Lab	Copper	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Copper	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	Iron	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Iron	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	Lead	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Lead	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	Zinc	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Zinc	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Songkhla Lab	Mercury	ICP-MS	SGK_CL0048	8-Feb-22	8-Feb-23	12
Songkhla Lab	Mercury	Cold Room Water	SGK_CL0065	16-Aug-21	14-Feb-23	18
Water Lab	Sulfate	Ion Chromatography	BKK_EN0050	12-Jan-22	12-Jan-23	12
Water Lab	Ammonia Nitrogen	Discrete analyzer	BKK_EN0037	28-Jun-22	28-Jun-23	12
Water Lab	Chloride	Ion Chromatography	BKK_EN0069	12-Jan-22	12-Jan-23	12
Water Lab	pH at 25 °C	pH meter	BKK_EN0072	12-Sep-22	12-Mar-24	18
Water Lab	Total Dissolved Solids 180°C	Electronic Top-Loading Balance	BKK_EN0002	25-Feb-22	25-Feb-23	12
Water Lab	Total Dissolved Solids 180°C	Oven	BKK_EN0007	1-Dec-21	1-Jun-23	18

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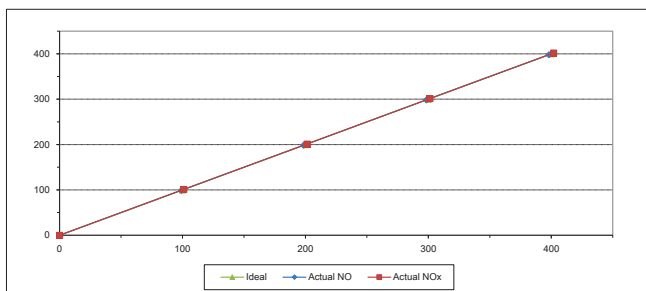
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MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	WNBGLLL	Equipment ID	SGK_FS0092
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90	101.10	1.10	1.10
2	200.00	198.50	-1.50	-0.75	201.30	1.30	0.65
3	300.00	298.50	-1.50	-0.50	301.40	1.40	0.47
4	400.00	398.20	-1.80	-0.45	402.00	2.00	0.50
AVERAGE (%)				-0.50			0.56



Calibrated By

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

Approved By

(Mr.Saranyuth Jitranont)  
Assistant General Manager

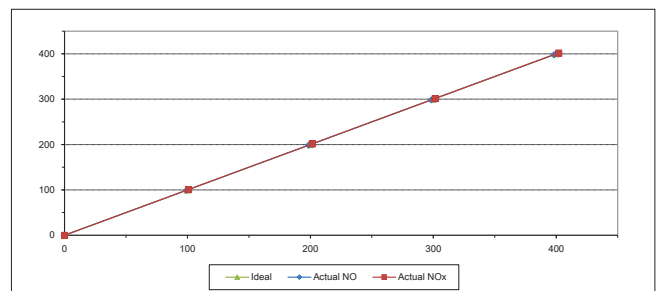
ALS Laboratory Group  
FORM NO.: F 06-056 REVISION NO.:  
ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	NK8RT3TF	Equipment ID	SGK_FS0094
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90	100.90	0.90	0.90
2	200.00	198.50	-1.50	-0.75	201.40	1.40	0.70
3	300.00	298.50	-1.50	-0.50	301.50	1.50	0.50
4	400.00	398.20	-1.80	-0.45	402.10	2.10	0.53
AVERAGE (%)				-0.50			0.55



Calibrated By

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

Approved By

(Mr.Saranyuth Jitranont)  
Assistant General Manager

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

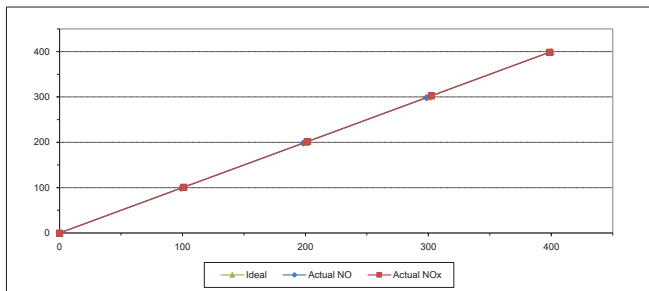




## MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	R28E09EW	Equipment ID	BKK_FS0789
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.00	-1.00	-1.00	101.10	1.10	1.10
2	200.00	198.20	-1.80	-0.90	201.30	1.30	0.65
3	300.00	298.50	-1.50	-0.50	302.50	2.50	0.83
4	400.00	398.50	-1.50	-0.38	398.90	-1.10	-0.28
AVERAGE (%)				-0.54			0.48



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)  
Assistant General Manager

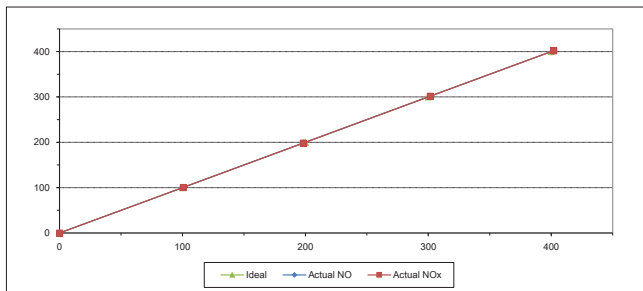
ALS Laboratory Group  
FORM NO.: F 06-056 REVISION NO.: ISSUE DATE: 02/04/12



## MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	WJ3877NG	Equipment ID	BKK_FS1084
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	100.10	0.10	0.10	100.70	0.70	0.70
2	200.00	198.50	-1.50	-0.75	198.30	-1.70	-0.85
3	300.00	301.70	1.70	0.57	301.60	1.60	0.53
4	400.00	401.60	1.60	0.40	402.10	2.10	0.53
AVERAGE (%)				0.08			0.20



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)  
Assistant General Manager

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

SITHIPORN ASSOCIATES CO., LTD.  
CALIBRATION LABORATORY

451-451/1 Sirinthorn Rd., Bangbunru, Bangplud Bangkok 10700 THAILAND.  
Tel: 0-2435-8800 Fax: 0-2433-1629 e-mail: cal-center@sithiporn.com http://www.sithiporn.com



Cert. No.: ACC22028  
Pages: 1 of 3

## Calibration Certificate

Equipment: SOUND CALIBRATOR  
Manufacturer: RION  
Model: NC-74  
Serial No.: 34478386  
ID No.: SGK\_FS0011

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 SEPTEMBER 2022  
Calibration Date: 09 SEPTEMBER 2022  
Date of Issue: 14 SEPTEMBER 2022

Calibrated by: Nathakorn Pistupaisan

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.

SITHIPORN ASSOCIATES CO., LTD.  
CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACC22028  
Job No.: VC65AC0081  
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).

Cert. No. : ACC22028  
Job No. : VC65AC0081  
Pages : 3 of 3

## Result of calibration :

## 1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.1	0.10	0.15	0.40

## 2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1002.5	0.3	0.1	1.0

## 3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.82	0.10	3.0

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

End of Calibration Certificate

QF-TS12-04-04-020664

T. Petchur

451-451/1 Sirinthon Rd., Bangbunru, Bangplud Bangkok 10700 THAILAND.  
Tel:0-2435-8800 Fax:0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.comCert. No. : ACL22248  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24  
Serial No. : 01173617 / 172179 / 74029  
ID No. : SGK\_FS0030

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 : 11 OCTOBER 2022  
Calibration Date : 25-26 OCTOBER 2022  
Date of Issue : 27 OCTOBER 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur  
( Thanakul Petchurai )

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

QF-TS12-04-04-020664

Cert. No. : ACL22248  
Job No. : VC65AC0090  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

## Calibration Method :

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

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

## Condition of this result of calibration :

## 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL_BP_04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL_BP_03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL_BP_05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

T. Petchur

Cert. No. : ACL22248  
Job No. : VC65AC0090  
Pages : 3 of 8

## Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS12-04-04-020664

T. Petchur



## Continuation of Calibration Certificate

Cert. No. : ACL22248  
Job No. : VC65AC0090  
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 )
15.9

## 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	19.2
Flat	25.0

## 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	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.6	0.7	0.7	±5.0

QF-TS12-04-04-020664

P.T.A.

## Continuation of Calibration Certificate

Cert. No. : ACL22248  
Job No. : VC65AC0090  
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	0.1	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.1	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

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

## 5.2 Time weighting at 1 kHz

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

## 6. Long - term stability

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

QF-TS12-04-04-020664

P.T.A.

## Continuation of Calibration Certificate

Cert. No. : ACL22248  
Job No. : VC65AC0090  
Pages : 6 of 8

## 7. Level linearity on the reference level range

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

QF-TS12-04-04-020664

P.T.A.

## Continuation of Calibration Certificate

Cert. No. : ACL22248  
Job No. : VC65AC0090  
Pages : 7 of 8

## 8. Level linearity including the level range control

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

## 9. Tone burst response

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, E <sub>peak</sub> ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	-
One	136.4	136.3	-0.1	±3.0

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

QF-TS12-04-04-020664

P.T.A.



## Continuation of Calibration Certificate

Cert. No. : ACL22248  
Job No. : VC65AC0090  
Pages : 8 of 8

## 11. Overload indication

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.7	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	±0.3

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

End of Calibration Certificate

QF-TS12-04-04-020664

T. Petchur

451-451/1 Sirinthorn Rd., Bangbunru, Bangplud Bangkok 10700 THAILAND  
Tel: 0-2435-8800 Fax: 0-2433-1679 e-mail: cal-center@sithiporn.com http://www.sithiporn.comCert. No. : ACL22204  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24  
Serial No. : 01000342 / 188645 / 02005  
ID No. : PHK FS0018

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 : 15 SEPTEMBER 2022  
Calibration Date : 19-21 SEPTEMBER 2022  
Date of Issue : 27 SEPTEMBER 2022



Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur  
( Thanakul Petchurai )

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

QF-TS12-04-04-020664

## Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
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	EP-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

T. Petchur

## Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
Pages : 3 of 8

## Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS12-04-04-020664

T. Petchur



## Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
Pages : 4 of 8

## Result of calibration :

## 1. Absolute sensitivity

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

## 2. Self-generated noise

## 2.1 Normal test

Measured Value ( dB )
14.6

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

Frequency Weighting	Measured value ( dB )
A - weight	12.6
C - weight	19.3
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	0.3	0.4	0.4	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.3	0.4	0.4	±5.0

QF-TS12-04-04-020664

S. Ratan

## Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
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	0.0	±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

QF-TS12-04-04-020664

S. Ratan

## Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
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	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.8	-0.2	± 1.1

QF-TS12-04-04-020664

S. Ratan

## Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
Pages : 7 of 8

## 8. Level linearity including the level range control

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

## 9. Tone burst response

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

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>Cpeak</sub> ( 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

QF-TS12-04-04-020664

S. Ratan



Continuation of Calibration Certificate

Cert. No. : ACL22204  
Job No. : VC65AC0083  
Pages : 8 of 8

11. Overload indication

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.6	89.7	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

QF-TS12-04-04-020664

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



Cert. No. : ACL22139  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00296519 / 179121 / 87528  
ID No. : SGK\_FS0037

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 : 26 MAY 2022  
Calibration Date : 09-10 JUNE 2022  
Date of Issue : 14 JUNE 2022



Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurani  
( Thanakul Petchurani )

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22139  
Job No. : VC65AC0063  
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).

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Continuation of Calibration Certificate

Cert. No. : ACL22139  
Job No. : VC65AC0063  
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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## Continuation of Calibration Certificate

Cert. No. : ACL22139  
Job No. : VC65AC0063  
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## 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	8.4
C - weight	14.8
Flat	20.6

## 3. Acoustical signal tests of frequency weightings

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

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.7	0.7	0.8	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-3.6	-3.6	-3.6	±5.0

QF-TS12-04-04-020664

T. Petch.

## Continuation of Calibration Certificate

Cert. No. : ACL22139  
Job No. : VC65AC0063  
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	0.0	±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

QF-TS12-04-04-020664

T. Petch.

## Continuation of Calibration Certificate

Cert. No. : ACL22139  
Job No. : VC65AC0063  
Pages : 6 of 8

## 7. Level linearity on the reference level range

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.1	0.1	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 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	25.1	0.1	± 1.1

QF-TS12-04-04-020664

T. Petch.

## Continuation of Calibration Certificate

Cert. No. : ACL22139  
Job No. : VC65AC0063  
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## 8. Level linearity including the level range control

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

## 9. Tone burst response

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

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>peak</sub> ( 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	133.1	0.1	-
Positive half cycle	135.4	135.3	-0.1	±2.0
Negative half cycle	135.4	135.3	-0.1	±2.0

QF-TS12-04-04-020664

T. Petch.

## Continuation of Calibration Certificate

Cert. No. : AC122139  
Job No. : VC65AC0063  
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## 11. Overload indication

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.7	89.7	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

QF-TS12-04-04-020664

*T. Petch*

## ROTA METER CALIBRATION RESULT JULY 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS0577	01 Jul 22	$Y = 1.0202x + 0.1976$	1.0000
BKK_FS0579	01 Jul 22	$Y = 1.0078x + 0.4789$	0.9998
BKK_FS0583	01 Jul 22	$Y = 1.016x + 0.3922$	1.0000
BKK_FS0584	01 Jul 22	$Y = 1.0036x + 2.2262$	0.9997
BKK_FS0585	01 Jul 22	$Y = 1.0189x - 5.6476$	0.9997
BKK_FS0586	01 Jul 22	$Y = 1.0095x - 1.1524$	0.9995
BKK_FS0587	01 Jul 22	$Y = 1.013x - 3.6619$	0.9996
BKK_FS0588	01 Jul 22	$Y = 1.0154x + 4.8357$	0.9999
BKK_FS0589	01 Jul 22	$Y = 0.9918x + 4.8069$	0.9999
BKK_FS0590	01 Jul 22	$Y = 1.0038x - 0.4857$	0.9996
BKK_FS0591	01 Jul 22	$Y = 0.9705x - 52.174$	0.9986
BKK_FS0592	01 Jul 22	$Y = 0.9646x - 37.642$	0.9985
BKK_FS0593	01 Jul 22	$Y = 0.9767x - 58.445$	0.9988
BKK_FS0594	01 Jul 22	$Y = 0.9902x - 62.87$	0.9999
BKK_FS0595	01 Jul 22	$Y = 1.0249x - 98.162$	0.9999
BKK_FS0596	01 Jul 22	$Y = 0.9843x - 26.806$	0.9991
BKK_FS0597	01 Jul 22	$Y = 0.9802x - 61.653$	0.9978
BKK_FS1004	01 Jul 22	$Y = 0.9696x + 17.69$	0.9990
BKK_FS1005	01 Jul 22	$Y = 1.0092x + 2.4571$	0.9999
BKK_FS1006	01 Jul 22	$Y = 1.168x - 5.566$	0.9997
BKK_FS1007	01 Jul 22	$Y = 0.9917x + 1.6592$	1.0000
BKK_FS1008	01 Jul 22	$Y = 1.0132x + 0.7207$	1.0000
BKK_FS1009	01 Jul 22	$Y = 1.0132x + 1.1633$	0.9960
BKK_FS1010	01 Jul 22	$Y = 1.0033x + 0.5758$	0.9999
BKK_FS1011	01 Jul 22	$Y = 1.0234x + 0.1759$	0.9996
BKK_FS1012	01 Jul 22	$Y = 1.0106x - 2.0048$	0.9997
BKK_FS1013	01 Jul 22	$Y = 0.9677x - 35.851$	0.9997
BKK_FS1014	01 Jul 22	$Y = 1.0021x + 0.3148$	0.9998
BKK_FS1015	01 Jul 22	$Y = 0.9994x + 1.786$	1.0000
BKK_FS1016	01 Jul 22	$Y = 1.0105x - 80.256$	0.9998
BKK_FS1017	01 Jul 22	$Y = 0.9995x + 0.649$	1.0000
BKK_FS1018	01 Jul 22	$Y = 1.0011x + 1.1786$	1.0000
BKK_FS1019	01 Jul 22	$Y = 1.0023x - 68.424$	0.9996
BKK_FS1020	01 Jul 22	$Y = 1.0547x - 0.666$	0.9998
BKK_FS1021	01 Jul 22	$Y = 1.018x - 3.3286$	0.9998
BKK_FS1022	01 Jul 22	$Y = 0.9932x - 57.035$	0.9986
BKK_FS1023	01 Jul 22	$Y = 1.0094x + 0.0717$	0.9999
BKK_FS1024	01 Jul 22	$Y = 1.0042x + 0.4086$	0.9997
BKK_FS1025	01 Jul 22	$Y = 1.0132x - 88.507$	0.9996

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ALS Laboratory Group



## ROTA METER CALIBRATION RESULT JULY 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS1026	01 Jul 22	$Y = 1.0018x + 1.0776$	0.9997
BKK_FS1027	01 Jul 22	$Y = 1.0053x + 0.231$	0.9995
BKK_FS1028	01 Jul 22	$Y = 0.9792x - 60.312$	0.9982
BKK_FS1029	01 Jul 22	$Y = 0.9935x + 0.8234$	1.0000
BKK_FS1030	01 Jul 22	$Y = 1.0039x + 0.515$	0.9999
BKK_FS1031	01 Jul 22	$Y = 1.009x - 79.295$	0.9998
BKK_FS1039	01 Jul 22	$Y = 0.9879x + 7.3524$	0.9996
BKK_FS1040	01 Jul 22	$Y = 0.9704x + 88.336$	0.9987
BKK_FS1041	01 Jul 22	$Y = 1.0645x - 1.7878$	0.9999
BKK_FS1042	01 Jul 22	$Y = 0.9983x + 3.6262$	0.9998
BKK_FS1043	01 Jul 22	$Y = 1.0069x - 6.9619$	1.0000
BKK_FS1044	01 Jul 22	$Y = 1.0355x - 0.6214$	0.9997
BKK_FS1161	01 Jul 22	$Y = 1.0126x + 0.7738$	0.9999
BKK_FS1162	01 Jul 22	$Y = 0.9994x + 2.6357$	0.9995
BKK_FS1163	01 Jul 22	$Y = 0.977x - 55.03$	0.9987
BKK_FS1164	01 Jul 22	$Y = 0.9914x + 0.8427$	0.9997
BKK_FS1165	01 Jul 22	$Y = 0.9893x + 6.5919$	0.9998
BKK_FS1166	01 Jul 22	$Y = 1.0031x - 77.881$	0.9996
BKK_FS1200	01 Jul 22	$Y = 1.0313x - 0.4602$	0.9995
BKK_FS1201	01 Jul 22	$Y = 1.0045x + 0.15$	0.9996
BKK_FS1202	01 Jul 22	$Y = 0.9702x - 44.156$	0.9994
RYG_FS0197	01 Jul 22	$Y = 1.0039x - 0.179$	0.9999
RYG_FS0198	01 Jul 22	$Y = 0.9971x + 16.648$	0.9999
RYG_FS0199	01 Jul 22	$Y = 1.0832x - 2.6367$	1.0000

Review By :

*Wichan Choonharat*  
(Mr. Wichan Choonharat)

Enviro Field Services Manager

Approved By :

*Sarayuth Jittrantont*  
(Mr. Sarayuth Jittrantont)

Assistant General Manager



## ROTA METER CALIBRATION RESULT OCTOBER 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS0577	01 Oct 22	$Y = 1.0202x + 0.1976$	1.0000
BKK_FS0579	01 Oct 22	$Y = 1.0078x + 0.4789$	0.9998
BKK_FS0583	01 Oct 22	$Y = 1.016x + 0.3922$	1.0000
BKK_FS0584	01 Oct 22	$Y = 1.0036x + 2.2262$	0.9997
BKK_FS0585	01 Oct 22	$Y = 1.0189x - 5.6476$	0.9997
BKK_FS0586	01 Oct 22	$Y = 1.0095x - 1.1524$	0.9995
BKK_FS0587	01 Oct 22	$Y = 1.013x - 3.6619$	0.9996
BKK_FS0588	01 Oct 22	$Y = 1.0154x + 4.8357$	0.9999
BKK_FS0589	01 Oct 22	$Y = 0.9918x + 4.8069$	0.9999
BKK_FS0590	01 Oct 22	$Y = 1.0038x - 0.4857$	0.9996
BKK_FS0591	01 Oct 22	$Y = 0.9705x - 52.174$	0.9986
BKK_FS0592	01 Oct 22	$Y = 0.9646x - 37.642$	0.9985
BKK_FS0593	01 Oct 22	$Y = 0.9767x - 58.445$	0.9988
BKK_FS0594	01 Oct 22	$Y = 0.9902x - 62.87$	0.9999
BKK_FS0595	01 Oct 22	$Y = 1.0249x - 98.162$	0.9999
BKK_FS0596	01 Oct 22	$Y = 0.9843x - 26.806$	0.9991
BKK_FS0597	01 Oct 22	$Y = 0.9802x - 61.653$	0.9978
BKK_FS1004	01 Oct 22	$Y = 0.9762x + 11.724$	0.9998
BKK_FS1005	01 Oct 22	$Y = 1.0081x + 1.5143$	1.0000
BKK_FS1006	01 Oct 22	$Y = 1.098x - 2.9327$	0.9999
BKK_FS1007	01 Oct 22	$Y = 0.9917x + 1.6592$	1.0000
BKK_FS1008	01 Oct 22	$Y = 1.0132x + 0.7207$	1.0000
BKK_FS1009	01 Oct 22	$Y = 1.0132x + 1.1633$	0.9960
BKK_FS1010	01 Oct 22	$Y = 1.0033x + 0.5758$	0.9999
BKK_FS1011	01 Oct 22	$Y = 1.0234x + 0.1759$	0.9996
BKK_FS1012	01 Oct 22	$Y = 1.0106x - 2.0048$	0.9997
BKK_FS1013	01 Oct 22	$Y = 0.9677x - 35.851$	0.9997
BKK_FS1014	01 Oct 22	$Y = 1.0021x + 0.3148$	0.9998
BKK_FS1015	01 Oct 22	$Y = 0.9994x + 1.786$	1.0000
BKK_FS1016	01 Oct 22	$Y = 1.0105x - 80.256$	0.9998
BKK_FS1017	01 Oct 22	$Y = 0.9995x + 0.649$	1.0000
BKK_FS1018	01 Oct 22	$Y = 1.0011x + 1.1786$	1.0000
BKK_FS1019	01 Oct 22	$Y = 1.0023x - 68.424$	0.9996
BKK_FS1020	01 Oct 22	$Y = 1.0547x - 0.666$	0.9998
BKK_FS1021	01 Oct 22	$Y = 1.018x - 3.3286$	0.9998
BKK_FS1022	01 Oct 22	$Y = 0.9932x - 57.035$	0.9986
BKK_FS1023	01 Oct 22	$Y = 1.0094x + 0.0717$	0.9999
BKK_FS1024	01 Oct 22	$Y = 1.0042x + 0.4086$	0.9997
BKK_FS1025	01 Oct 22	$Y = 1.0132x - 88.507$	0.9996





## ROTA METER CALIBRATION RESULT OCTOBER 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS1026	01 Oct 22	Y = 1.0018x + 1.0776	0.9997
BKK_FS1027	01 Oct 22	Y = 1.0053x + 0.231	0.9995
BKK_FS1028	01 Oct 22	Y = 0.9792x - 60.312	0.9982
BKK_FS1029	01 Oct 22	Y = 0.9935x + 0.8234	1.0000
BKK_FS1030	01 Oct 22	Y = 1.0039x + 0.515	0.9999
BKK_FS1031	01 Oct 22	Y = 1.009x - 79.295	0.9998
BKK_FS1039	01 Oct 22	Y = 0.9967x + 4.5048	0.9999
BKK_FS1040	01 Oct 22	Y = 0.9936x + 32.694	0.9998
BKK_FS1041	01 Oct 22	Y = 1.067x - 1.999	1.0000
BKK_FS1042	01 Oct 22	Y = 1.0019x + 2.1571	1.0000
BKK_FS1043	01 Oct 22	Y = 1.1569x - 96.479	0.8412
BKK_FS1044	01 Oct 22	Y = 1.0318x - 0.9374	0.9999
BKK_FS1161	01 Oct 22	Y = 1.0126x + 0.7738	0.9999
BKK_FS1162	01 Oct 22	Y = 0.9994x + 2.6357	0.9995
BKK_FS1163	01 Oct 22	Y = 0.977x - 55.03	0.9987
BKK_FS1164	01 Oct 22	Y = 0.9914x + 0.8427	0.9997
BKK_FS1165	01 Oct 22	Y = 0.9893x + 6.5919	0.9998
BKK_FS1166	01 Oct 22	Y = 1.0031x - 77.881	0.9996
BKK_FS1200	01 Oct 22	Y = 1.0313x - 0.4602	0.9995
BKK_FS1201	01 Oct 22	Y = 1.0045x + 0.15	0.9996
BKK_FS1202	01 Oct 22	Y = 0.9702x - 44.156	0.9994
RYG_FS0197	01 Oct 22	Y = 1.0039x - 0.179	0.9999
RYG_FS0198	01 Oct 22	Y = 0.9964x + 21.757	1.0000
RYG_FS0199	01 Oct 22	Y = 1.0577x - 1.7486	1.0000

Review By :

(Mr. Wichan Choonharat)  
Enviro Field Services Manager

Approved By :

(Mr. Sarayuth Jittrantont)  
Assistant General Manager

## Certificate of System Qualification

GC-OQ

System ID: GC-6  
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.  
Organization Location: 104 Phattanakarn 40, Phattanakarn Rd., Suan Luang, Bangkok 10250  
Date: October 21, 2021 10:05:40 AM  
EQP Name: AgilentRecommended  
EQP Revision: GC.O2.50  
Overall Qualification Status: Pass

REVIEW BY: *Surbodh T.*  
APPROVED BY: *Saravath M.*  
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:  $\geq -2.0$  and  $\leq 0.5$

Overall Inlet Pressure Decay Test Status  
Pass

## Inlet Pressure Accuracy

Name: 7890  
Front SSL  
Date: October 21, 2021 10:05:40 AM  
System ID: GC-6  
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Setpoint Status: Pass  
Setpoint: 25.0 psi  
Actual: 24.9 psi  
Accuracy: 0.1 psi  
Agilent Recommended:  $\leq 1.2$

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:  $\geq -2.0$  and  $\leq 0.5$

Overall Inlet Pressure Decay Test Status  
Pass

## Inlet Pressure Accuracy

Name: 7890  
Back SSL  
Setpoint Status: Pass  
Setpoint: 25.0 psi  
Actual: 24.9 psi  
Accuracy: 0.1 psi  
Agilent Recommended:  $\leq 1.2$

Overall Inlet Pressure Accuracy Test Status  
Pass

## Detector Flow Accuracy

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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:  $\leq 10.0$  % 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:  $\leq 10.0$  % 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:  $\leq 10.0$  % 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

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

Setpoint Status: **Pass**

Flow Type: **Fuel**

Setpoint: 30.0 mL/min Measured Flow: 29.1 mL/min

Accuracy: 0.9 mL/min

Agilent Recommended:  $\leq 10.0$  % 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:  $\leq 10.0$  % 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:  $\leq 10.0$  % 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

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual: 230.0 231.5 °C

Temperature: 230.0 231.5 °C

Accuracy: 1.5 °C

Agilent Recommended:  $\geq -1.0$  % setpoint in K ( -5.0 °C )  
 $\leq 1.0$  % setpoint in K ( 5.0 °C )

Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual: 100.0 100.5 °C

Temperature: 100.0 100.5 °C

Accuracy: 0.5 °C

Agilent Recommended:  $\geq -1.0$  % setpoint in K ( -3.7 °C )  
 $\leq 1.0$  % setpoint in K ( 3.7 °C )

**Overall GC Oven Temperature Accuracy Test Status**

Pass

**GC Oven Temperature Stability**

Name: 7890

Setpoint Status: **Pass**

Setpoint/Average: 100.0 100.4667 °C

Temperature: 100.0 100.4667 °C

Stability: 0.1 °C

Agilent Recommended:  $\leq 0.5$  °C

**Overall GC Oven Temperature Stability Test Status**

Pass

**Scouting Run**

Tested Combination1 Front SSL / Front FID

Injection Tower

Name: 7893A

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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Setpoint Status: **Completed**

Injection Volume on Column: 1.0 µL

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: 0.06 pA

Drift: 0.10 pA/hr

Agilent Recommended:  $\leq 0.10$  pA  $\leq 2.50$  pA/hr

Status: **Pass**

**Overall Noise and Drift Test Status**

Pass

**Injection Precision**

Tested Combination1 Front SSL / Front FID

Name: 7893A

Setpoint Status: **Pass**

Injection Volume on Column: 1.0 µL

Area RSD: 0.42 %

Retention Time RSD: 0.16 %

Agilent Recommended:  $\leq 3.00$  %  $\leq 1.00$  %

**Overall Injection Precision Test Status**

Pass

**Signal to Noise**

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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Tested Combination1 Front SSL / Front FID

Injection Tower

Name: 7890

Setpoint Status: **Pass**

Signal to Noise: 1174661

Agilent Recommended:  $\geq 300000$

**Overall Signal to Noise Test Status**

Pass

**Scouting Run**

Tested Combination2 Back SSL / Back FID

Injection Tower

Name: 7893A

Setpoint Status: **Completed**

Injection Volume on Column: 1.0 µL

**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: 0.05 pA

Drift: 0.00 pA/hr

Agilent Recommended:  $\leq 0.10$  pA  $\leq 2.50$  pA/hr

Status: **Pass**

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## 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	µL			
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

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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## 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 3
Inlet	Back
Detector	Back
LTM Included?	No
Sampler 1	
Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN15380030
Firmware Revision	A.11.01
Vial Heater	Not installed

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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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 (µL)	10

Sampler 3	
Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN16280128
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
Component ID/Asset No.	GC-6
Oven Type	Standard

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System ID: GC-6

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Inlet 1	
Manufacturer	Agilent Technologies
Name	7890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes
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

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System ID: GC-6

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### Purpose

### Details

### Regulatory Disclaimer

### Warranty

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

User Name: suriya.thongkaew  
Hostname: ASBKKW7015

Print Date: October 21, 2021 10:05:48 AM

OO GC ALS CN1461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 12:18:50 PM	Audit	Session Created	Session	None
October 20, 2021 12:18:50 Start PM		Configuration	Session	None
October 20, 2021 12:18:50 Audit PM		Entitlement	Licensing	User is Nonpaying and does not require an unlock code
October 20, 2021 12:24:57 Audit PM		Eng. loaded	Session	EQP details for primary technique [X] = TNA pair: [ProtocolPackets/GGConfiguration/02.515/GC:02.515] EQP File Name: [GC:02.515.esq]. EQP Name: [Agent/ethernetconnected]
October 20, 2021 12:25:02 End PM		Configuration	Session	None
October 20, 2021 12:25:09 Start PM		Qualification	Session	DG
October 20, 2021 12:25:09 Start PM		Execution	System Inspection and Basic: Safety and Operation - 7590 : Qualitative Test - No setpoints associated	None
October 20, 2021 12:30:25 End PM		Execution	System Inspection and Basic: Safety and Operation - 7590 : Qualitative Test - No setpoints associated	Run Count = 1
October 20, 2021 12:56:29 Start PM		Execution	Inlet Pressure Decay - Front SSLS - Pressure Controlled test - 8-26.0 psi - L: <= -2.9 psi and >= 0.5 m	None

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

User Name: suriya.thongkew  
Hostname: ASEKKW7015

System ID: DC-6  
Print Date: October 21, 2021 10:05:45 AM

00 GC ALS CN1146106 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 <= 0.0 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 <= 0.0 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 <= 0.0 psi	Run Count: 1
October 20, 2021 1:07:03 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 1:20:23 PM	Auto	Data	Detector Flow Accuracy - Front FID - Type: Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:20:26 PM	End	Execution	Detector Flow Accuracy - Front FID - Type: Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count: 1

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

User Name: Suriya.Thongkiew  
Hostname: ASBKW7015

System ID: GC-4  
Print Date: October 21, 2021 10:55:46 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1:20:29 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type: Oxidizer - S: 400.0 mL/min - L <= 10.0% setpoint	None
October 20, 2021 1:23:27 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 1:23:29 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 1:23:31 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type: Makeup - S: 25.0 mL/min - L <= 10.0% setpoint	None
October 20, 2021 1:27:40 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 1:27:42 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 1:27:46 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	Manual Data Entry

Date: October 21, 2021 10:05:40 AM  
System ID: GC-6



User Name: suriya.thongkiew  
Hostname: ASBKKW7915  
Print Date: October 21, 2021 10:05:46 AM  
System ID: GC-6

## OQ GC ALS CN11461966 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: Outlier - S: 409.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
October 20, 2021 1:34:46 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:36:33 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 1:36:36 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 2:04:32 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: 230.0°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: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

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Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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User Name: suriya.thongkiew  
Hostname: ASBKKW7915  
Print Date: October 21, 2021 10:05:46 AM  
System ID: GC-6

## OQ GC ALS CN11461966 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 2:10:48 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: 100.0°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 2:43:08 PM	Audit	AppClosed	Session	None
October 21, 2021 9:18:09 AM	Audit	AppRestarted	Session	None
October 21, 2021 9:19:02 AM	Audit	SessionReloaded	Session	None
October 21, 2021 9:19:09 AM	Start	Qualification	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	AppClosed	Session	None

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System ID: GC-6

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User Name: suriya.thongkiew  
Hostname: ASBKKW7915  
Print Date: October 21, 2021 10:05:46 AM  
System ID: GC-6

## OQ GC ALS CN11461966 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:20:08 AM	Audit	AppRestarted	Session	None
October 21, 2021 9:20:09 AM	Audit	SessionReloaded	Session	None
October 21, 2021 9:20:13 AM	Start	Qualification	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 File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 15:49-01\SCOUT_F001.D\FID1A.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/Hz	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/Hz	Data File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 15:49-01\SCOUT_F001.D\FID1A.ch
October 21, 2021 9:31:10 AM	End	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/Hz	Run Count: 1

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Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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User Name: suriya.thongkiew  
Hostname: ASBKKW7915  
Print Date: October 21, 2021 10:05:46 AM  
System ID: GC-6

## OQ GC ALS CN11461966 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 File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 16:51-16\INPREC_F003.D\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 File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 16:51-16\INPREC_F003.D\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 File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 16:51-16\INPREC_F004.D\FID1A.ch
October 21, 2021 9:32:58 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 16:51-16\INPREC_F005.D\FID1A.ch
October 21, 2021 9:32:58 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 16:51-16\INPREC_F006.D\FID1A.ch
October 21, 2021 9:32:58 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\DATA\AQIPV20\21OQPV2021_F 2021-10-20 16:51-16\INPREC_F007.D\FID1A.ch

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Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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User Name: suriya.thongkham  
Host Name: ASBKKW7915  
System ID: GC-6  
Print Date: October 21, 2021 10:05:46 AM

GC ALS CNY1461966 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 (Ret. 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	Auto	Data	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: >= 300000	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 16-51-18\SGTONGS_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	Auto	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\SCOUT_F001.D\FID2B.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 9:35:37 AM	Start	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 µA - L (Drift) <= 2.50 µA/hour	None

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Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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User Name: suriya.thongkham  
Host Name: ASBKKW7915  
System ID: GC-6  
Print Date: October 21, 2021 10:05:46 AM

GC ALS CNY1461966 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:35:06 AM	Auto	Data	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 µA - L (Drift) <= 2.50 µA/hour	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F001.D\FID2B.ch
October 21, 2021 9:35:16 AM	End	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 µA - L (Drift) <= 2.50 µA/hour	Run Count: 1
October 21, 2021 9:35:20 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
October 21, 2021 9:35:57 AM	Auto	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F002.D\FID2B.ch
October 21, 2021 9:36:57 AM	Auto	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F003.D\FID2B.ch
October 21, 2021 9:38:57 AM	Auto	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F004.D\FID2B.ch
October 21, 2021 9:38:57 AM	Auto	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F005.D\FID2B.ch

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Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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User Name: suriya.thongkham  
Host Name: ASBKKW7915  
System ID: GC-6  
Print Date: October 21, 2021 10:05:46 AM

GC ALS CNY1461966 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:35:57 AM	Auto	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F006.D\FID2B.ch
October 21, 2021 9:36:57 AM	Auto	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\NSUPREC_F007.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 (Ret. 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	Auto	Data	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Data File Path: C:\Chem32\1\DATA\AQGPV20\210QPV2021_B 2021-10-20 17-13-45\SGTONGS_F001.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	QC
October 21, 2021 9:39:43 AM	Start	Reporting	Session	None
October 21, 2021 10:04:15 AM	Auto	Reporting	Session	Report Generated Certificate

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Date: October 21, 2021 10:05:40 AM  
System ID: GC-6

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**PENTA**  
CALIBRATION

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

## Certificate of Calibration

Represent to Certificate of Calibration JPTC/07/22072

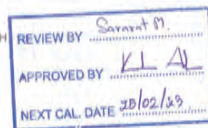
Certificate No.:	JPTC/07/22072	Page:	1 of 3
Equipment:	Digital Balance	Condition:	Normal
Manufacturer:	METTLER TOLEDO	Serial No.:	1123091884
Model:	XP105	ID No.:	BKK_EN0004
Type of Balance:	Multi interval		

Customer: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakarn 40 Phatthanakarn Rd.,  
Khaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250.

Environment Condition: Temperature 21.0 °C ± 0.4 °C  
Humidity 62.8 %RH ± 3.7 %RH  
Air density 1.20 kg/m<sup>3</sup>

Calibration Place: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakarn 40 Phatthanakarn Rd.,  
Khaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250.

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-ONSAC Accreditation No.: Calibration 0189  
Date Received: February 25, 2022  
Calibration Date: February 25, 2022  
Issued Date: March 01, 2022  
Calibration By: Mr. Rungroje Metakul



(Mr. Kiangsak 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 indicated 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



Represent to Certificate of Calibration : PTC/07/22072

Certificate No.: PTC/07/22072

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 30 (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	0.00005

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
40	40.00005	40.0000	0.0000	0.00016	2.11
50	50.00001	50.0000	0.0000	0.00015	2.13
60	60.00003	60.0000	0.0000	0.00016	2.08
70	70.00003	70.0000	0.0000	0.00017	2.07
80	80.00005	80.0001	-0.0001	0.00019	2.04
90	90.00006	90.0001	0.0000	0.00020	2.03
100	100.00002	99.9999	0.0001	0.00018	2.06

Note: Weight of adjust (g)

PTC/MS-01/02: 2 Feb. 2023

Represent to Certificate of Calibration : PTC/07/22072

Certificate No.: PTC/07/22072

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 30 (g)				
Position (g)				
1	2	3	4	5
0.00000	-0.00001	-0.00002	0.00000	0.00000
Maximum deviation: 0.00002				

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
20	0.000005

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	0.000016	2.52
0.1	0.100000	0.10000	0.00000	0.000019	2.00
0.5	0.499999	0.50000	0.00000	0.000019	2.00
2	2.000010	1.99999	0.00002	0.000024	2.00
5	5.000005	5.00001	0.00000	0.000027	2.00
10	10.000015	10.00001	0.00000	0.000031	2.00
20	20.000019	20.00001	0.00001	0.000042	2.00
30	30.000034	30.00006	-0.00003	0.000069	2.00

Note: Weight of adjust (g)

The End of Certificate

PTC/MS-01/02: 2 Feb. 2023

**J NAC**  
JANANAI ASSOCIATES CO., LTD.

**CALIBRATION REPORT**

REVIEW BY: Vichuta N.  
APPROVED BY: Somrat M.  
NEXT CAL DATE: 9/8/23

CUSTOMER NAME : ALS Laboratory Group (Thailand) Co., Ltd.  
EQUIPMENT NAME : Total Hydrocarbon Analyzer  
MANUFACTURER : Baseline MODEL : 9000 NMHC SERIAL NO : 0314DRO170  
STANDARD GAS CONCENTRATION (PPM) : : 100 PPM (Methane) CYLINDER NO : ND55981  
CYLINDER PRESSURE (psig) : 900 PSI CERTIFIED DATE : 12/02/2022  
CERTIFIED BY : AIRGAS EXPIRED DATE : 12/02/2025

**CALIBRATION RESULTS**

POINT NO	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.00	0.00	-
1	100.00	101.00	1.0	1.00
AVERAGE (%)				0.25

CALIBRATED BY: วิภาดา อภิชาติกุล DATE: 9/8/23  
CHECKED BY: วิภาดา อภิชาติกุล DATE: 9/8/23

ข้อมูลการสอบเทียบสารมาตรฐานนี้เป็นข้อมูลเฉพาะของลูกค้าเท่านั้น : โทร 02-888-0812 x 31, E-Mail : Engineer@jnanai.com  
เลขที่ 63/14-15,67/35-38 ถนน เพชรเกษม 7/1 แขวง หลักสี่ เขต หลักสี่ กรุงเทพมหานคร 10600 โทร 02-888-0812-13 โทรสาร 02888-1888

**J NAC**  
JANANAI ASSOCIATES CO., LTD.

**CALIBRATION REPORT**

REVIEW BY: Vichuta N.  
APPROVED BY: Somrat M.  
NEXT CAL DATE: 9/8/23

CUSTOMER NAME : ALS Laboratory Group (Thailand) Co., Ltd.  
EQUIPMENT NAME : Total Hydrocarbon Analyzer  
MANUFACTURER : Baseline MODEL : 9000 NMHC SERIAL NO : 0314DRO170  
STANDARD GAS CONCENTRATION (PPM) : : 100 PPM (Propane) CYLINDER NO : ND55981  
CYLINDER PRESSURE (psig) : 900 PSI CERTIFIED DATE : 12/02/2022  
CERTIFIED BY : AIRGAS EXPIRED DATE : 12/02/2025

**CALIBRATION RESULTS**

POINT NO	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.00	0.00	-
1	300.00	301.00	1.0	0.33
AVERAGE (%)				0.08

CALIBRATED BY: วิภาดา อภิชาติกุล DATE: 9/8/23  
CHECKED BY: วิภาดา อภิชาติกุล DATE: 9/8/23

ข้อมูลการสอบเทียบสารมาตรฐานนี้เป็นข้อมูลเฉพาะของลูกค้าเท่านั้น : โทร 02-888-0812 x 31, E-Mail : Engineer@jnanai.com  
เลขที่ 63/14-15,67/35-38 ถนน เพชรเกษม 7/1 แขวง หลักสี่ เขต หลักสี่ กรุงเทพมหานคร 10600 โทร 02-888-0812-13 โทรสาร 02888-1888







## Continuation of Calibration Certificate

Cert. No. : ACL22201  
Job No. : VC65AC0083  
Pages : 4 of 8

## Result of calibration :

## 1. Absolute sensitivity

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

## 2. Self-generated noise

## 2.1 Normal test

Measured Value ( dB )
14.6

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

Frequency Weighting	Measured value ( dB )
A - weight	12.0
C - weight	18.7
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	0.4	0.4	0.4	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-1.0	-0.9	-0.9	±5.0

QF-TS12-04-04-020664

P. B. L. -

## Continuation of Calibration Certificate

Cert. No. : ACL22201  
Job No. : VC65AC0083  
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	-0.1	0.0	0.0	±1.5
250	0.0	-0.1	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	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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P. B. L. -

## Continuation of Calibration Certificate

Cert. No. : ACL22201  
Job No. : VC65AC0083  
Pages : 6 of 8

## 7. Level linearity on the reference level range

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	132.9	-0.1	± 1.1
132.0	131.9	-0.1	± 1.1
131.0	130.9	-0.1	± 1.1
129.0	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

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P. B. L. -

## Continuation of Calibration Certificate

Cert. No. : ACL22201  
Job No. : VC65AC0083  
Pages : 7 of 8

## 8. Level linearity including the level range control

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

## 9. Tone burst response

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

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>peak</sub> ( 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

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P. B. L. -



## Continuation of Calibration Certificate

Cert. No. : ACL22201  
Job No. : VC65AC0083  
Pages : 8 of 8

## 11. Overload indication

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

## 12. High level stability

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

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

End of Calibration Certificate

QF-TS12-04-04-020664

451-451/1 Sindhorn Rd., Bangbunru, Bangplud Bangkok 10700 THAILAND.  
Tel:0-2435-8800 Fax:0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.comCert. No. : ACL22202  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24  
Serial No. : 01000340 / 188643 / 02003  
ID No. : SRT\_FS0010

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 : 15 SEPTEMBER 2022  
Calibration Date : 19-21 SEPTEMBER 2022  
Date of Issue : 27 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.

QF-TS12-04-04-020664

## Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

## Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

## Condition of this result of calibration :

## 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL_BP_04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL_BP_03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL_BP_05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

## Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
Pages : 3 of 8

## Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS12-04-04-020664



## Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
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 )
15.3

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

Frequency Weighting	Measured value ( dB )
A - weight	13.8
C - weight	20.4
Flat	25.7

## 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	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.4	0.4	0.4	±5.0

QF-TS12-04-04-020664

r. P. K. A.

## Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
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	-0.1	±1.5
250	0.0	0.0	-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

QF-TS12-04-04-020664

r. P. K. A.

## Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
Pages : 6 of 8

## 7. Level linearity on the reference level range

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.1	0.1	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.0	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	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

QF-TS12-04-04-020664

r. P. K. A.

## Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
Pages : 7 of 8

## 8. Level linearity including the level range control

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

## 9. Tone burst response

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

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, Lepeak ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	-
One	136.4	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	133.1	0.1	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QF-TS12-04-04-020664

r. P. K. A.



Continuation of Calibration Certificate

Cert. No. : ACL22202  
Job No. : VC65AC0083  
Pages : 8 of 8

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

QF-TS12-04-04-020664

CERTIFICATE OF CALIBRATION

ISSUED BY: Cirrus Research plc  
DATE OF ISSUE: 27/05/22  
CERTIFICATE NUMBER: 175061

REVIEW BY: *Michael P.*  
APPROVED BY: *Michael P.*  
NEXT CAL. DATE: 27/5/23

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

Page 1 of 1  
Test engineer:  
Michael McDonald  
Electronically signed:  
*M J McDonald*

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc  
Model Number: RC:110A  
Serial Number: 98651  
Notes:

Calibration Procedure

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

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	114.00	996.6	0.74
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

No adjustments were made during this calibration.

Environmental Conditions

Pressure: 99.90 kPa  
Temperature: 21.0 °C  
Humidity: 46.3 %

Notes

ALS LABORATORY GROUP (THAILAND) COMPANY LIMITED

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. This certificate relates only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%.

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



CERTIFICATE OF CALIBRATION

Certificate No. : CL-131-65  
Page 1 of 2

Equipment Name: Heat Stress Monitor  
Manufacturer: DeltaOHM  
Model: HD32.2  
Serial No: 17011744  
ID No: SGK\_FS0008

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

Received date: 15 Jul 2022  
Calibration date: 22 Jul 2022  
Issue date: 01 Aug 2022

Reference Used During Calibration  
1. Standard Temperature Probe Model: STS-100 A500,  
Serial No.: 667682-09, Due date: 23 Mar 2023  
2. Digital Temperature Indicator Model: DTI-1000-A MK  
II, Serial No.: 671407-00591 Due date: 04 June 2022

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

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

Traceability  
The measurement results are traceable to the  
international system of units (SI) through National  
Institute of Metrology Thailand (NIMT) Certificate  
number: TT-0034-22, Certificate number: ER-0032-  
21

REVIEW BY: *Michael P.*  
APPROVED BY: *Michael P.*  
NEXT CAL. DATE: 22/7/23

Calibrated by  
☐ Mr. Sorawit Thachalad  
☒ Miss Jitraporn Lertsomphol



Approved Signatory: *Mr. Parinya Booncharoen*  
Mr. Parinya Booncharoen  
Calibration Department Manager

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



Certificate No. : CL-131-65  
Page 2 of 2

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment  
Calibration Range: 20 - 40 °C  
Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 17015113.  
Dimension: Diameter 14 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	20.047	20.0	0.0	0.099
30	25.045	24.9	-0.1	0.14
30	30.034	29.9	-0.1	0.099
30	35.029	34.9	-0.1	0.099
30	40.020	39.9	-0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 17003391.  
Dimension: Diameter 14 mm. Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.047	20.3	0.3	0.099
70	25.045	25.1	0.1	0.099
70	30.034	29.8	-0.2	0.099
70	35.029	34.6	-0.4	0.099
70	40.021	39.5	-0.5	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 17015117.  
Dimension: Diameter 8 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.047	20.1	0.1	0.099
110	25.045	25.1	0.1	0.099
110	30.034	30.1	0.1	0.099
110	35.029	35.1	0.1	0.099
110	40.021	40.1	0.1	0.099

UUC\* : Unit Under Calibration

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

★ End of Certificate ★





## CERTIFICATE OF CALIBRATION

Certificate No.: CL-132-65  
Page 1 of 2

Equipment Name: Heat Stress Monitor  
Manufacturer: Delta OHM  
Model: HD32.2  
Serial No: 17011746  
ID No: SGK\_FS0009

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

Received date: 15 Jul 2022  
Calibration date: 22 Jul 2022  
Issue date: 01 Aug 2022

Reference Used During Calibration  
1. Standard Temperature Probe Model: STS-100 A500,  
Serial No.: 667682-09, Due date: 23 Mar 2023  
2. Digital Temperature Indicator Model: DTI-3000-A MK  
II, Serial No.: 671407-00591 Due date: 04 June 2022

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

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

Traceability  
The measurement results are traceable to the  
international system of units (SI) through National  
Institute of Metrology Thailand (NIMT) Certificate  
number: TT-0034-22, Certificate number: ER-0032-  
21



Calibrated by  
☐ Mr. Sorawit Thachalad  
☒ Miss Jitraporn Lertsomphol



Approved Signatory:  
Mr. Parinya Booncharoen  
Calibration Department Manager

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

Certificate No.: CL-132-65  
Page 2 of 2

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment  
Calibration Range: 20 - 40 °C  
Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 17011157,  
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	20.046	20.0	0.0	0.099
30	25.044	25.0	0.0	0.099
30	30.034	29.9	-0.1	0.099
30	35.028	34.9	-0.1	0.099
30	40.021	39.9	-0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 17009116,  
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.046	20.2	0.2	0.099
70	25.044	25.0	0.0	0.099
70	30.034	29.8	-0.2	0.099
70	35.028	34.7	-0.3	0.099
70	40.021	39.5	-0.5	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 17015116,  
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.046	20.1	0.1	0.099
110	25.044	25.1	0.1	0.099
110	30.034	30.0	0.0	0.14
110	35.028	35.0	0.0	0.099
110	40.021	40.0	0.0	0.099

UUC\* = Unit Under Calibration

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

★ End of Certificate ★



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250  
TEL: 0-2717-3000-24 FAX: 0-2719-9484



## Certificate of Calibration

Certificate No.: 21PH447  
Page: 1 of 2

Equipment: Lux Meter  
Manufacturer: Delta OHM  
Model: HD 2102.2  
Serial No.: 17005868  
ID No.: SGK\_FS0012

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except with the prior written approval of the head of  
Corporate Services & Equipment Calibration and Testing Services.

Condition As-Received: Used item  
Received Date: 25 August 2021  
Calibration Date: 14 September 2021

Reference: 2106-0781WSC Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.  
Ambient Temperature: ( 23 ± 2 ) °C  
Relative Humidity: ( 50 ± 15 ) %  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwaeng Phatthanakan, Khet Suan Luang,  
Bangkok 10250 Thailand

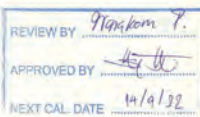
Procedure used: Calibration were conducted using in-house calibration procedure CP-PH01 by measuring against  
luminous-intensity standard lamp (source-based method) According to the inverse square law measurement  
method.

### Condition of this result of calibration

1. Reference standards instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Photometry & Encoder	LMguide 9.6 m	120RC003	61-140006-1	30 Apr 2022
2) High-accuracy Irradiance Standard	OL-FEL-U	F-1472	TP-1045-20	20 Oct 2021

- This result of calibration was made on requested at the point specified by customer.
- Test Equipment: Programmable Voltage/Current Source ( Model: OL83A, S/N: 09220284 ).
- Test Equipment: Illuminance Meter ( Model: 51002, S/N: 080129 ).
- The certificate is valid only to the item calibrated on date and place of calibration.
- This Certification is traceable to the International System of Unit maintained at-  
National Institute of Metrology Thailand (NIMT)



Calibrated by: Nuntawat Khamchai  
Issue Date: 16 September 2021

Approved Signatory:  
[ ] Phalinee Pratsapaipal  
[ ] Chatchawan Khunpilaok

B 0269821



Cert. No.: 21PH447  
Page: 2 of 2

Result of calibration: ( \* ) Without adjustment ( ) After adjustment  
Function: Illuminance Measurement Range: Auto range

Standard Value	UUC* Reading	Error	Uncertainty
( lx )	( lx )	( lx )	( ± lx )
0	0.00	0.00	0.060
15	15.00	0.00	0.20
100	100.01	0.01	1.3
500	500.0	0.0	6.5
1000	1001.4	1.4	13
2000	2004	4	28
3000	3004	4	39
4000	4000	0	52
5000	5001	1	65

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 %.

Calibration with probe sensor s/n. 17014097

UUC\* = Unit Under Calibration.

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a 1071785





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



## Certificate of Calibration

Certificate No.: 22PH500  
Page: 1 of 2

Equipment: Lux Meter  
Manufacturer: Delta OHM  
Model: HD 2102.2  
Serial No.: 17005868  
ID No.: SGK\_FS0012  
Condition As-Received: Used Item  
Received Date: 16 September 2022  
Calibration Date: 20 September 2022  
Reference: 2209-0806WSC  
Ambient Temperature:  $(23 \pm 2) ^\circ\text{C}$   
Relative Humidity:  $(50 \pm 15) \%$

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Corporate Services 3: Equipment Calibration and Testing Services

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

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

Procedure used: Calibration were conducted using In-house calibration procedure CP-PH01 by measuring against  
luminous-intensity standard lamp (source-based method) According to the inverse square law measurement  
method.

### Condition of this result of calibration

#### 1. Reference standards Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Photometry & Encoder	LMGuide 9.8 m	120RC003	DL-0064-22	20 Jul 2025
2) High-accuracy Irradiance Standard	OL-FEL-U	F-1472	TP-1038-21	15 Dec 2022

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

3. Test Equipment: Programmable Voltage/Current Source (Model: OL83A, SN: 09220284).

4. Test Equipment: Illuminance Meter (Model: 51002, SN: 080129).

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

6. This Certificate is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)



Calibrated by: Nivat Nitas  
Issue Date: 22 September 2022

Approved Signatory:  
| | Phalinee Prabpaipal  
| | Chatchawan Khunpiluek  
| | Nuntawee Khanchai

B 0297860



Cert. No.: 22PH500  
Page: 2 of 2

### Result of calibration:-

Function	Illuminance Measurement	Range	Autorange	Uncertainty
Standard Value	UUC* Reading	Error		
(lx)	(lx)	(lx)	(lx)	(lx)
0	0.00	0.00		0.060
15	14.23	-0.77		0.24
100	95.93	-4.07		1.6
500	485.2	-14.8		7.9
1000	976.2	-23.8		16
2000	1979.1	-20.9		32
3000	3011	11		48
4000	4002	2		64
5000	5058	56		80

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 %

Calibration with probe sensor s/n. 17014097

UUC\* = Unit Under Calibration.

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



## Certificate of Calibration

Cert. No.: 22TM75  
Page: 1 of 3

Equipment: Incubator  
Manufacturer: Memmert  
Model: ICP 750  
Serial No.: FB16.0063  
ID No.: SGK\_CL0028

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.  
Songkhla Branch,  
114/1 Moo 8, Kanjanavanij Rd., Bangphu,  
Hatyai, Songkhla 90250, Thailand  
Location: BOD Room

Received Order: 24 January 2022  
Calibration Date: 25 January 2022  
Ambient Temperature:  $(28 \pm 10) ^\circ\text{C}$   
Relative Humidity:  $(50 \pm 30) \%$

Calibrated by: Kunchit Promprat

Approved by:   
Approved Signatory

( ) Pomsitthipa Tarneyasul  
(x) Maioe Bulkruea  
( ) Suwit Imjai

Issue Date: 7 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 0037405



Equipment: Incubator  
Condition As-Received: Used Item  
Reference: 2201-0617OC-3

Cert. No.: 22TM75  
Page: 2 of 3

### Procedure Used :-

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

The temperature scale used was based on ITS-90.

### Condition of this result of calibration

#### 1. Reference standard instrument:-

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

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

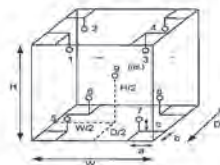
3. This certificate is traceable to the International System of Unit.

### Result of Calibration :-

(\*) Without Adjustment

Function of UUC: Temperature Source

Fresh air setting: Close



Probe Installation Details: Dimension of Chamber:  
 $a = 10 \text{ cm}$   $D = 0.80 \text{ m}$   
 $b = 10 \text{ cm}$   $W = 1.0 \text{ m}$   
 $c = 10 \text{ cm}$   $H = 1.2 \text{ m}$   
Capacity  $\approx 0.75 \text{ m}^3$

Environment during calibration		
	Beginning	Finished
Temp. ( $^{\circ}\text{C}$ )	28	28
REL.Humid. (%)	57	52
AC Supply (Volt)	231	231

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

a 1093310





Equipment : Incubator  
 Condition As-Received : Used Item  
 Reference : 2201-06170C-3  
 Result of Calibration : ( ° ) Without Adjustment  
 Function of UUC\* : Temperature Source  
 Fresh air setting : Close

Cert. No.: 22TM75  
 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	20.1	0.094	0.50	0.63	0.30	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.280	20.370	20.383	20.378	19.915	19.925	19.673	19.727	20.098

Average\* : The average of 30 values in each position.  
 Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.  
 Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.  
 Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.  
 UUC\* : Unit Under Calibration  
 Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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a 1093309



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
 CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES  
 3344 PATTANAKARN ROAD SOI 18, SUANLIANG, SUANLIANG BANGKOK, 10250  
 TEL. 0-2717-3006-27 FAX. 0-2719-9484



Cert. No.: 22LM162  
 Page.: 1 of 2

## Certificate of Calibration

Equipment : DO Meter with Sensor  
 Manufacturer : YSI  
 Model : 5000  
 Serial No. : 17B101473  
 ID No. : SGK\_CL0073  
 Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
 Songkhla Branch,  
 114/1 Moo 8, Kanjanavanij Rd., Banphru,

Location : TPA Chemistry Calibration Lab.2

Received Order : 18 November 2022  
 Calibrated Date : 21 November 2022  
 Ambient Temperature : ( 26 ± 10 ) °C  
 Relative Humidity : ( 50 ± 30 ) %  
 AC Line Voltage : ( 220 ± 22 ) V

Calibrated by : Warakorn Lemgagrakul

Approved by : Warakorn Lemgagrakul  
 Approved Signatory

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

Issue Date : 22 November 2022

The Uncertainties are for a confidence probability of approximately 95 %

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

A 0047729



Equipment : DO Meter with Sensor  
 Condition As-Received : Used Item  
 Reference : 2111-0863DSC-2

Cert. No.: 22LM162  
 Page.: 2 of 2

### Procedure Used :

Calibration were conducted using in-house calibration procedure CP-QT01 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	3240076	221249	02 Mar 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 : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 17B100103

Calibration Point ( °C )	Immersion Depth ( mm )	Standard Temperature ( °C )	UUC* Reading ( °C )	Error ( °C )	Uncertainty ( ± °C )	Coverage Factor k
20.00	80	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 %.

--000--

a 1136519



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
 CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES  
 3344 PATTANAKARN ROAD SOI 18, SUANLIANG, SUANLIANG BANGKOK, 10250  
 TEL. 0-2717-3000 FAX. 0-2719-9484

Cert.No.: 22TW259  
 Page.: 1 of 2

## Certificate of Testing

Equipment : DO Meter  
 Manufacturer : YSI  
 Model : 5000  
 Serial No. : 17B101473  
 ID No. : SGK\_CL0073  
 Received Date : 18 November 2022  
 Test Date : 21 November 2022  
 Reference : 2111-0863DSC-1  
 Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
 Songkhla Branch,  
 114/1 Moo 8, Kanjanavanij Rd., Banphru,  
 Hatyai, Songkhla 90250, 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 : Watalek Sirithean

Approved by : Warakorn Lemgagrakul  
 Approved Signatory

(x) Malee Butkruea  
 ( ) Saithip Meangmai  
 ( ) Warakorn Lemgagrakul

Issue Date : 22 November 2022

B 0300950



Cert.No.: 22TW259  
Page: 2 of 2

#### Condition of this result of calibration

##### 1. Reference Standard Instruments

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

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Burette	-	130BU10	21CG1389	25 Mar 2023
2) Balance	1128143784	140RC004	22MM50	20 Sep 2023

##### 2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1783316	100.2%

**Result :** Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 17B100103

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.12	8.12	0.0045

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.

-000-

11/11/2023

a 1136621



PENTA CALIBRATION CO., LTD.  
68/124 The Connect 33 Village Kanchanaphisek Road  
Dokmai, Prawet Bangkok 10250  
Tel: +66 (0) 2059-9773  
www.pentacal.com

## Certificate of Calibration

Certificate No.:	PTC/10/22004	Page:	1 of 4
Equipment:	Cod Reactor	Condition:	New
Manufacturer:	Heidi	Serial No.:	21120C1313
Model:	DRB200	ID No.:	-
Covers:	None	Holes:	30

Environment Condition:	Temperature:	25.2 °C	± 0.1 °C
	Humidity:	49.5 %RH	± 1.1 %RH
	Voltage:	221.8 VAC	± 0.6 VAC

Customer: ALS LABORATORY GROUP (THAILAND)  
114/1 Moo.8, Kamchanawach Rd., T.Ban Phru,  
A.Hat Yai, Songkhla 90250 Thailand.

Calibration Place: Penta Calibration Co., Ltd. ( Temperature Laboratory )  
68/124 The connect 34 Village, Kanchanaphisek Road,  
Dokmai, Prawet Bangkok 10250 Thailand

The Method used: In house method, PTC-Wi-10, based on Compare with Standard Thermometer  
Traceability: This certificate is traceable to the SI Units through Quality Reborn Co.,Ltd ,  
NSC-ONSC Accreditation No.: Calibration 0292

Date Received: February 08, 2022  
Date Calibrated: February 08, 2022  
Date Issued: February 08, 2022  
Calibrated By: Mr. Todsapol Mooksuang

Mr. Kriangsak Kalsari

( Mr. Kriangsak Kalsari )

Reviewed by

Approved By:

Mr. Kriangsak Kalsari

( Mr. Kriangsak Kalsari )

Laboratory Manager

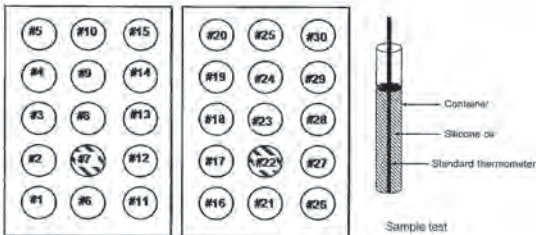
PTC-FM-C1502/18 DEC 2017



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68/124 The Connect 33 Village Kanchanaphisek Road  
Dokmai, Prawet Bangkok 10250  
Tel: +66 (0) 2059-9773  
www.pentacal.com

Certificate No.: PTC/10/22004

Page 2 of 4



#### Standard Installation Position:

Module	1									
Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Probe No.	1	2	3	4	5	6	7	8	9	10

Module	2									
Position of Std	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Probe No.	1	2	3	4	5	6	7	8	9	10

Module	2									
Position of Std	#21	#22	#23	#24	#25	#26	#27	#28	#29	#30
Probe No.	1	2	3	4	5	6	7	8	9	10

This certificate is issued for 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, without written approval from penta calibration co., Ltd

PTC-FM-C1502/18 DEC 2017



PENTA CALIBRATION CO., LTD.  
68/124 The Connect 33 Village Kanchanaphisek Road  
Dokmai, Prawet Bangkok 10250  
Tel: +66 (0) 2059-9773  
www.pentacal.com

Certificate No.: PTC/10/22004

Page 3 of 4

#### Measurement Results:

##### Without adjustment

Position heating block	Calibration point (°C)	Setting (°C)	UUC Reading (°C)
Left	150	150	150

Measurement Temperature (°C) @ Probe No.			
Position	Standard Reading (°C)	Correction of UUC: (°C)	Uncertainty (± °C)
#1	150.77	0.77	0.64
#2	149.49	-0.51	0.63
#3	150.38	0.38	0.63
#4	150.28	0.28	0.63
#5	149.74	-0.26	0.63
#6	150.94	0.94	0.64
#7	149.01	-0.99	0.64
#8	150.82	0.82	0.64
#9	149.49	-0.51	0.63
#10	149.11	-0.89	0.63
#11	149.31	-0.69	0.64
#12	150.73	0.73	0.64
#13	150.48	0.48	0.64
#14	149.13	-0.87	0.63
#15	149.79	-0.81	0.64

##### UUC Characterization

UUC Setting (°C)	UUC Reading (°C)	Measured Uniformity (°C)	Measured Stability (± °C)
150	150	1.55	0.12

Note: UUC = Unit Under Calibration

##### Definitions

UUC Reading: The average reading of indicating device which forms the integral part of UUC.

Standard Reading: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with any holes of UUC at steady-state. The reference probe is preferably located in the geometric center of UUC.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

PTC-FM-C1502/18 DEC 2017



Certificate No.: PTC10/22004

Page: 4 of 4

**Measurement Results:**

Without adjustment

Position heating block	Calibration point (°C)	Setting (°C)	UUC Reading (°C)
Right	150	150	150

Measurement Temperature (°C) @ Probe No.			
Position	Standard Reading (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#16	149.46	-0.54	0.64
#17	149.79	-0.21	0.64
#18	149.27	-0.73	0.64
#19	150.14	0.14	0.64
#20	149.38	-0.62	0.64
#21	150.81	0.81	0.64
#22	150.80	0.80	0.65
#23	150.71	0.71	0.64
#24	149.86	-0.14	0.64
#25	149.23	-0.77	0.64
#26	150.61	0.61	0.64
#27	149.10	-0.90	0.64
#28	150.71	0.71	0.64
#29	149.10	-0.90	0.64
#30	150.74	0.74	0.64

UUC Characterization

UUC Setting (°C)	UUC Reading (°C)	Measured Uniformity (°C)	Measured Stability (± °C)
150	150	1.55	0.12

Note: UUC = Unit Under Calibration

**Definitions:**
**UUC Reading:** The average reading of indicating device which forms the integral part of UUC.

**Standard Reading:** The average reading of standards at any positions or location.

**Measured Uniformity:** The maximum difference of measured temperatures between of any probes and the measured temperatures at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with any holes of UUC at steady-state. The reference probe is preferably located in the geometric center of UUC.

**Measured Stability:** The one-half of greatest maximum difference of measured temperatures at any one probe.

The End of Certificate

PTC10/22004-13 DEC 22


**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
 CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
 534/4 PATTANAKARN ROAD SOI 16, SUANLIANG, SUANLIANG BANGKOK 10250  
 TEL: 0-2717-3056-27 FAX: 0-2718-9584

 Cert.No.: 22CHO32  
 Page: 1 of 3

**Certificate of Calibration**
**Equipment:** UV-VIS Spectrophotometer

**Manufacturer:** Hach

**Model:** DR 3900

**Serial No.:** 1687645

**ID No.:** SGK\_CL0038

**Condition As-Received:** Used Item

**Received Date:** 24 January 2022

**Calibration Date:** 24 January 2022

**Reference:** 2201-0817OC-1

**Submitted by:** ALS Laboratory Group (Thailand) Co., Ltd.  
 Songkhla Branch  
 114/1 Moo 8, Kanjanavanij Rd., Banphru, Hatyai,  
 Songkhla 90250, Thailand

**Calibration Place:** Chemistry Room

**Ambient Temperature:** (24.9 - 25.2) °C (On-Site)

**Relative Humidity:** (39.2 - 45.2) % (On-Site)

**Calibration Procedure:** In-house method :  
 CP-OCH4 based on ASTM E 275-01

**Calibrated by:** Kunchit Promrat

**Approved by:**
  
 Approved Signatory

☒ Malee Butkruea  
☐ Sathip Meangmai  
☐ Werakorn Lergagtrakul

**Issue Date:** 7 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 0037403



Cert. No.: 22CHO32

Page: 2 of 3

**Condition of calibration result**

1. Reference Standard Material:

Material	Serial No.	Certificate No.	Due date
1. Absorbance Standard set	8331	88623	08 Sep 2022
2. Wavelength Standard set	29829	94776	02 Sep 2023
3. Wavelength Standard set	29829	94777	02 Sep 2023

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

3. This certificate is traceable to the International System of Unit maintained at:

- National Physical Laboratory (NPL), The United Kingdom of Great Britain and Northern Ireland
- National Institute of Standards and Technology (NIST), The United States of America

 4. Spectral Bandwidth: 5 nm  
 Scan Speed: - nm/min

**Calibration Results: without adjustment**
**Wavelength Accuracy**

Certified Values of Reference Material (nm)	UUC Reading (nm)	Uncertainty of Measurement (± nm)	Coverage Factor k
418.40	418	0.59	2.00
479.88	480	0.59	2.00
513.75	514	0.59	2.00
537.00	536	0.59	2.00
638.00	638	0.59	2.00
747.61	748	0.59	2.00
807.04	807	0.59	2.00



Cert. No.: 22CHO32

Page: 3 of 3

**Calibration Results: without adjustment**
**Photometric Accuracy**

Wavelength (nm)	Certified Values of Reference Material (Abs)	UUC Reading (Abs)	Uncertainty of Measurement (± Abs)	Coverage Factor k
420.0	Zero	0.000	0.0028	2.00
	0.5723	0.572	0.0033	2.00
	0.7522	0.751	0.0031	2.00
	1.0907	1.090	0.0033	2.00
440.0	Zero	0.000	0.0028	2.00
	0.5618	0.560	0.0034	2.00
	0.7345	0.732	0.0032	2.00
	1.0646	1.063	0.0033	2.00
465.0	Zero	0.000	0.0028	2.00
	0.5118	0.514	0.0034	2.00
	0.8773	0.879	0.0031	2.00
	0.9809	0.984	0.0033	2.00
546.1	Zero	0.000	0.0028	2.00
	0.5228	0.522	0.0030	2.00
	0.8861	0.884	0.0030	2.00
	0.8841	0.893	0.0030	2.00
590.0	Zero	0.000	0.0028	2.00
	0.5546	0.552	0.0029	2.00
	0.7159	0.712	0.0030	2.00
	1.0369	1.039	0.0030	2.00
635.0	Zero	0.000	0.0028	2.00
	0.5401	0.538	0.0029	2.00
	0.6835	0.680	0.0029	2.00
	0.9889	0.988	0.0030	2.00

**Remark**

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer

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 1093315

a 1093314







Southern Calibration Service Co., Ltd.

669/35 Kamjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



Certificate No. : 21OV449

CSR No. : A078/3892

Page : 2 of 3

## CALIBRATION CERTIFICATE

Issued Date : 19-Aug-2021

Certificate No. : 21OV449

CSR No. : A078/3892

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8 Kamchanawanch Rd. T.Ban Phru,  
A. Hat Yai, Songkhla 90250 TH

Calibration Place : Chemical Laboratory  
Instrument Name : Cold Room Water  
Manufacturer : MODULAR  
Model : N/A  
Serial No. : N/N  
ID No. : SGK\_CL0065  
Resolution : 0.1 °C  
Received Date : 16-Aug-2021  
Calibrated Date : 16-Aug-2021  
Ambient Temperature : (30 ± 10) °C  
Relative Humidity : (50 ± 30) %

REVIEW BY : *Suthinok T.*  
APPROVED BY : *Kanika H.*  
NEXT CAL. DATE : 18/01/2023

### Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.012 based on G-20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Ibrorhim Saleem

Approved by :

Sakeerun Heemhad / Technical Manager

The uncertainties are for a confidence probability of approximately 95%

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### Details of Calibration

#### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

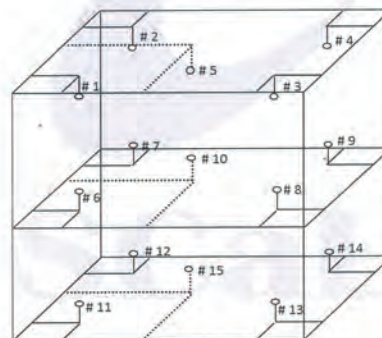
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

#### 1. Sensor Installation Diagram



#### Sensor Installation Details

a = 5.0 cm  
b = 5.0 cm  
c = 5.0 cm

#### Dimension of the chamber

W = 370.0 cm  
H = 250.0 cm  
D = 540.0 cm



Certificate No. : 21OV449

CSR No. : A078/3892

Page : 3 of 3

### Result of Calibration :

#### 2. Temperature Measurement Accuracy Test

The measurement results of the Cold Room Water and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)														
	#1	#2	#3	#4	#5	#6	#7	#8	#9	Ref.10	#11	#12	#13	#14	#15
4	3.63	3.35	3.58	3.80	4.14	3.76	3.77	3.72	3.82	3.80	3.62	3.88	3.67	3.80	3.61

The uncertainty of measurement was ± 0.38 °C

#### 3. Performance Result

The performance of the Cold Room Water are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
4	4.0	4.0	1.23	0.69	3.33

\* UUC = Unit Under Calibration

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

... End ...



Southern Calibration Service Co., Ltd.

669/35 Kamjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



## CALIBRATION CERTIFICATE

Issued Date : 12-Nov-2021

Certificate No. : 21PH192

CSR No. : A012/00583

Page : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8 Kamchanawanch Rd. T.Ban Phru,  
A. Hat Yai, Songkhla 90250 TH

Calibration Place : Chemical Laboratory  
Instrument Name : pH meter  
Manufacturer : Mettler Toledo  
Model : S220  
Serial No. : B625631849  
ID No. : SGK\_CL0030  
Electrode No. : 6404000  
Received Date : 9-Nov-2021  
Calibrated Date : 9-Nov-2021  
Ambient Temperature : (25 ± 3) °C  
Relative Humidity : (55 ± 15) %

REVIEW BY : *Suthinok T.*  
APPROVED BY : *Kanika H.*  
CAL. DATE : 10/05/2023

### Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.008 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- HACH : LANGE United For Water Quality

- WK : WK Electric Co., Ltd.

- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Jessadagon Lemhud

Approved by :

Sakeerun Heemhad / Technical Manager

The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 21PH192  
 CSR No. : A012/00583  
 Page : 2 of 2

#### Details of Calibration

##### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.005	C02840	1617	24-Aug-2022
Standard Solution	7.000	C02841	1618	24-Aug-2022
Standard Solution	10.012	C02843	1619	24-Aug-2022
Temperature/Electrical Calibrator	MC2-MF	23642	WK2102-006-229	21-Feb-2022
Digital Thermometer With Sensor	1529	B4C223	QR21-2009	15-Sep-2022

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.  
 3. This certificate is not certified any commercial transaction  
 4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

##### 1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV)	Correction (mV)	Uncertainty (± mV)
177.48	177.5	-0.02	0.17
0.00	0.0	0.00	0.13
-177.48	-177.5	0.02	0.17

##### 2. Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.007	3.99	0.017	0.011
6.999	7.02	-0.021	0.014
10.011	10.01	0.001	0.036

##### 3. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
25	24.93	25.0	-0.07	0.11

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



**Southern Calibration Service Co., Ltd.**  
 669/35 Kamjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand  
 Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



## CALIBRATION CERTIFICATE

Issued Date : 8-Feb-2022

Certificate No. : 22EB149

CSR No. : A023/01123

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
 114/1 Moo 6 Kamchanawanit Rd. T.Ban Phan,  
 A. Hai Yai, Songkhla 90250 TH

Calibration Place : Chemical Laboratory  
 Instrument Name : Electronic Balance  
 Manufacturer : Sartorius  
 Model : MSE22AS-100-DU  
 Serial No. : 34705158  
 ID No. : SGK\_DL0045  
 Resolution : 0.0001 g  
 Received Date : 5-Feb-2022  
 Calibrated Date : 5-Feb-2022  
 Ambient Temperature : (30 ± 1) °C  
 Relative Humidity : (50 ± 20) %

REVIEW BY : Ananta B.  
 APPROVED BY : Kanitha H.  
 NEXT CAL. DATE : 5 Feb 2023

##### Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.001 based on UKAS LAB 14 : 2015  
 The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

##### Traceability of measurement :

This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through :  
 - Tcs : Thai Calibration Service Co., Ltd.

Calibrated by : Imron Rattanayum

Approved by :

Saksereen Heemhad / Technical Manager

This certificate may not be reproduced other than in full, except with the prior written approval of Southern Calibration Service Co., Ltd.



Certificate No. : 22EB149  
 CSR No. : A023/01123  
 Page : 2 of 3

#### Details of Calibration

##### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Weight Set	2mg-2kg	1111951401	M2107051S	6-Jul-2022

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.  
 3. This certificate is not certified any commercial transaction  
 4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

##### 1. Repeatability

Nominal Value (g)	Standard Deviation (g)
200	0.00009

##### 2. Effect of tare

Nominal Value (g)	Standard Value (g)	Balance Reading (g)	Correction (g)
20	20.0000	20.0000	0.0000
40	40.0001	40.0000	0.0001
60	60.0000	60.0001	-0.0001
80	80.0001	80.0001	-0.0001
100	100.0000	100.0000	0.0000



Certificate No. : 22EB149  
 CSR No. : A023/01123  
 Page : 3 of 3

##### Result of Calibration :

##### 3. Off-centre loading

A mass approximately 50g was placed on a pan and moved to various position.  
 The balance reading obtained are given in the table.

Position					Maximum Difference (g)
1	2	3	4	5	
50.0000	50.0000	50.0000	50.0000	50.0000	0.0000



##### 4. Departure from nominal value

Nominal Value (g)	Standard Value (g)	UUC Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor (k)
0.01	0.0100	0.0100	0.0000	0.00008	2.0
0.1	0.1000	0.1000	0.0000	0.00008	2.0
0.5	0.5000	0.5000	0.0000	0.00008	2.0
1	1.0000	1.0000	0.0000	0.00006	2.0
2	2.0000	2.0000	0.0000	0.00008	2.0
5	5.0000	5.0000	0.0000	0.00009	2.0
10	10.0000	10.0000	0.0000	0.00009	2.0
20	20.0000	20.0000	0.0000	0.00009	2.0
50	50.0000	50.0000	0.0000	0.00011	2.0
100	100.0000	100.0000	0.0000	0.00016	2.0
120	120.0000	120.0000	0.0000	0.00024	2.0
140	140.0001	140.0000	0.0001	0.00024	2.0
160	160.0000	160.0000	0.0000	0.00026	2.0
180	180.0000	180.0000	0.0000	0.00029	2.0
200	200.0000	200.0000	0.0000	0.00030	2.0

UUC = Unit Under Calibration

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

...End...





# Southern Calibration Service Co., Ltd.

669/35 Kamjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



Certificate No. : 21OV733

CSR No. : A012/00583

Page. : 2 of 3

## CALIBRATION CERTIFICATE

Issued Date : 12-Nov-2021

Certificate No. : 21OV733

CSR No. : A012/00583

Page. : 1 of 3

**Customer :** ALS Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8 Kamchanavanich Rd. T.Ban Phru,  
A. Hat Yai, Songkhla 90250 TH

**Calibration Place :** Chemical Laboratory  
**Instrument Name :** Hot Air Oven  
**Manufacturer :** Memmert  
**Model :** UF110  
**Serial No. :** B416.3387  
**ID No. :** SGK\_CL0024  
**Resolution :** 0.1 °C  
**Received Date :** 9-Nov-2021  
**Calibrated Date :** 9-Nov-2021  
**Ambient Temperature :** (30 ± 10) °C  
**Relative Humidity :** (50 ± 30) %

REVIEW BY: *Sutthirak P.*  
APPROVED BY: *Kanitha H.*  
NEXT CAL. DATE: 10/09/2025

### Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.W1.012 based on G-20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :  
- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Ibrorhimi Saleemini

Approved by :

Sakeereen Heemhad / Technical Manager

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 Southern Calibration Service Co., Ltd.

### Details of Calibration

#### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

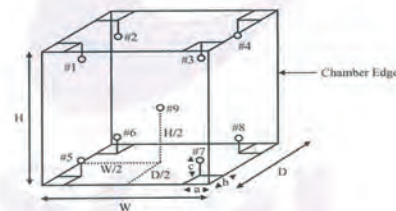
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of Item : normal condition , no indication for any damage or malfunction

**Result of Calibration :** (✓) Without Adjustment ( ) After Adjustment

#### 1. Sensor Installation Diagram



#### Sensor Installation Details

a = 5.0 cm  
b = 5.0 cm  
c = 5.0 cm

#### Dimension of the chamber

W = 40.0 cm  
H = 40.0 cm  
D = 33.0 cm



Certificate No. : 21OV733

CSR No. : A012/00583

Page. : 3 of 3

### Result of Calibration:

#### 2. Temperature Measurement Accuracy Test

The measurement results of the Hot Air Oven and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
40	39.85	39.81	39.68	39.57	39.94	39.80	39.81	39.93	39.69	0.36
70	70.53	70.23	70.08	69.74	70.51	70.37	70.43	69.79	70.15	0.36
103	103.47	102.96	102.95	102.77	103.40	103.46	103.33	102.73	102.83	0.36
104	104.47	103.92	103.95	103.77	104.33	104.46	104.30	103.73	103.80	0.36
105	105.34	104.85	104.85	104.67	105.16	105.27	105.07	104.81	105.06	0.36
180	180.04	180.03	179.99	179.86	180.11	180.28	180.27	180.16	180.26	0.41

#### 3. Performance Result

The performance of the Hot Air Oven are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
40	40.0	40.0	0.10	0.34	0.47
70	70.0	70.0	0.10	0.48	0.82
103	103.0	103.0	0.10	0.71	0.74
104	104.0	104.0	0.10	0.71	0.74
105	105.0	105.0	0.20	0.39	0.70
180	180.0	180.0	0.20	0.53	0.62

- UUC = Unit Under Calibration

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

... End ...



# Southern Calibration Service Co., Ltd.

669/35 Kamjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

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## CALIBRATION CERTIFICATE

Issued Date : 8-Feb-2022

Certificate No. : 22W8004

CSR No. : A0223/01123

Page. : 1 of 3

**Customer :** ALS Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8 Kamchanavanich Rd. T.Ban Phru,  
A. Hat Yai, Songkhla 90250 TH

**Calibration Place :** Chemical Laboratory  
**Instrument Name :** Water Bath  
**Manufacturer :** Memmert  
**Model :** WNE29  
**Serial No. :** L616.0538  
**ID No. :** SGK\_CL0035  
**Resolution :** 0.1 °C  
**Received Date :** 5-Feb-2022  
**Calibrated Date :** 5-Feb-2022  
**Ambient Temperature :** (30 ± 10) °C  
**Relative Humidity :** (50 ± 30) %

REVIEW BY: *Ananda B.*  
APPROVED BY: *Kanitha H.*  
NEXT CAL. DATE: 10/09/2025

### Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.W1.014 based on ASTM E 715 : 1989 (reapproved 2001)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Inuon Rattanayuan

Approved by :

Sakeereen Heemhad / Technical Manager

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Certificate No. : 22WB004  
CSR No. : A0223/01123  
Page : 2 of 3

#### Details of Calibration

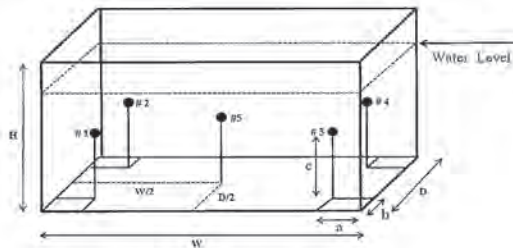
##### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

##### 1. Sensor Installation Diagram



##### Sensor Installation Details

a = 5 cm  
b = 5 cm  
c = 5 cm

##### Dimension of the chamber

W = 45 cm  
H = 30 cm  
D = 35 cm



Certificate No. : 22WB004  
CSR No. : A0223/01123  
Page : 3 of 3

#### Result of Calibration :

##### 2. Temperature Measurement Accuracy Test

The measurement results of the Water Bath and associates are reported in the manner as shown below:

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)					Uncertainty (±°C)
	#1	#2	#3	#4	Ref.5	
80	79.95	80.07	79.95	79.99	80.03	0.14

##### 3. Performance Result

The performance of the Water Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
80	81.0	81.0	0.10	0.19	0.19

- UUC = Unit Under Calibration

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

--- End ---



#### TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN) CALIBRATION AND TESTING EQUIPMENT SERVICES

534/4 PATTANAKARN ROAD SOI 16, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL: 0-2717-3000-24 FAX: 0-2719-9484

Cert.No.: 22CH1137  
Page.: 1 of 2

### Certificate of Calibration

Equipment : Conductivity Meter  
Manufacturer : Mettler Toledo  
Model : SevenGo S3  
Serial No. : B914464504  
ID No. : SGK\_FS0051  
Condition As-Received : Used Item  
Received Date : 26 August 2022  
Calibration Date : 29 August 2022  
Reference : 2208-0961DSC-1  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
Songkhla Branch,  
114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,  
A.Hat Yai, Songkhla 90250 Thailand  
Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In-house method :  
- CP-CH6 : based on direct measurement by  
using certified reference material (CRM)  
Calibrated by : Uthen Kankawi  
Approved by :   
(✓) Malee Bulkruea  
( ) Saitip Meangmai  
( ) Warakorn Lemgagtrakul  
Issue Date : 2 September 2022

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

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approval of the head of Calibration and Testing Equipment Services.



Cert.No.: 22CH1137  
Page.: 2 of 2

#### Condition of this result of calibration

##### 1. Reference Standard Instrument >

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	9549224	130RC003	221484	17 Apr 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 >

- Conductivity calibration solution, Thermo Scientific (traceable to NIST)

Conductivity Solution	Manufacturer	Lot No.	Exp. date
84 µS/cm	Thermo Scientific	152/02	14 Apr 2023
1413 µS/cm	Thermo Scientific	081/02	26 Feb 2024
12.88 mS/cm	Thermo Scientific	041/01	29 Jan 2024

- Control Conductivity calibration solution temperature by Water bath (25±0.1) °C

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

#### Calibration results

##### Function : Conductivity Measurement

(\*) After Adjustment at 1413 µS/cm

Conductivity Electrode Serial No.: 5819080541

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor k
84 µS/cm	82.15 µS/cm	84.25 µS/cm	4.3 µS/cm	2.00
1413 µS/cm	1374 µS/cm	1413 µS/cm	15 µS/cm	2.00
12.88 mS/cm	12.51 mS/cm	12.83 mS/cm	0.14 mS/cm	2.00

Remark - UUC\* = Unit Under Calibration  
- Cell constant = 0.548 cm<sup>-1</sup>

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

-000-





# Southern Calibration Service Co., Ltd.

669/35 Kornjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



## CALIBRATION CERTIFICATE

Issued Date : 8-Jul-2021

Certificate No. : 21ATC051

CSR No. : A047/2301

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8, Karnchanawich Rd., T. Ban Phru,  
A. Hat Yai, Songkhla 90250 TH

Calibration Place : Microbiological Laboratory

Instrument Name : Autoclave

Manufacturer : TOMY

Model : SX-700

Serial No. : 52134079

ID No. : SGK\_ML0001

Resolution : 1. °C

Received Date : 5-Jul-2021

Calibrated Date : 5-Jul-2021

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY : *[Signature]*  
APPROVED BY : *[Signature]*  
NEXT CAL. DATE : 01/01/2023

### Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.16.013 based on BS 2646 : 1993 (part 5)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- SCAL : Southern Calibration Service Co., Ltd.,

Calibrated by : Ibrahim Saleem

Approved by :

Adolf Lemsh / Laboratory Manager

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Certificate No. : 21ATC051

CSR No. : A047/2301

Page : 2 of 3

### Details of Calibration

#### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	GL220	H11119557	21SDAT001	7-May-2022

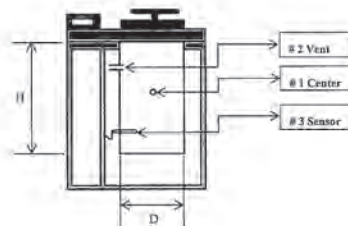
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of Item : normal condition, no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

#### 1. Sensor Installation Diagram



Chamber Diameter (D) : 30 cm

Chamber Height (H) : 70 cm



Certificate No. : 21ATC051

CSR No. : A047/2301

Page : 3 of 3

### Result of Calibration :

#### 2. Temperature Measurement Accuracy Test

The measurement results of the Autoclave and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)			Pressure Reading	Operating Time (sec)	Uncertainty (±°C)
	Center #1	Vent #2	Sensor #3			
115	116.2	115.9	116.3	0.8 MPa	1800.18	0.76
118	119.2	118.9	119.3	0.1 MPa	1800.26	0.76
121	121.5	121.2	121.6	0.12 MPa	1800.34	0.76

#### 3. Performance Result

The performance of the Autoclave are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
115	115	115	0.10	0.50	0.50
118	118	118	0.10	0.50	0.50
121	121	121	0.00	0.40	0.40

\* UUC = Unit Under Calibration

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

... End ...



# Southern Calibration Service Co., Ltd.

669/35 Kornjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 08 1999 0417 Fax: 07480 5113 Email: s.calibration@gmail.com www.scal-lab.com



## CALIBRATION CERTIFICATE

Issued Date : 9-Aug-2022

Certificate No. : 22OV529

CSR No. : A037/01847

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8, Karnchanawich Rd., Tambon, Ban Phru,  
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : Incubator

Manufacturer : Memmert

Model : ICP750

Serial No. : FB16-0061

ID No. : SGK\_ML0013

Resolution : 0.1 °C

Received Date : 8-Aug-2022

Calibrated Date : 6-Aug-2022

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY : *[Signature]*  
APPROVED BY : *[Signature]*  
NEXT CAL. DATE : 06/01/2024

### Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.012 based on G-20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- SCAL : Southern Calibration Service Co., Ltd.,

Calibrated by : Ibrahim Saleem

Approved by :

Kanyarat Chaipet / Technical Manager

The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 22OV529  
CSR No. : A037/01847  
Page : 2 of 3

#### Details of Calibration

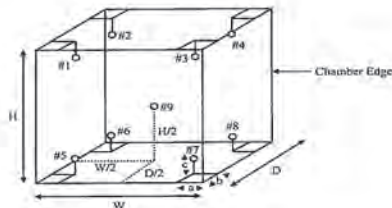
##### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY58059813	22SDAT004	24-May-2023

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
3. This certificate is not certified any commercial transaction.
4. Condition of item : normal condition, no indication for any damage or malfunction.

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

##### 1. Sensor Installation Diagram



##### Sensor Installation Details

a = 5.0 cm  
b = 5.0 cm  
c = 5.0 cm

##### Dimension of the chamber

W = 104.0 cm  
H = 120.0 cm  
D = 60.0 cm



Certificate No. : 22OV529  
CSR No. : A037/01847  
Page : 3 of 3

#### Result of Calibration:

##### 2. Temperature Measurement Accuracy Test

The measurement results of the Incubator and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)								Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	
35	34.99	34.92	34.95	34.88	34.96	35.00	34.94	34.94	0.38

##### 3. Performance Result

The performance of the incubator are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35	35.0	35.0	0.10	0.12	0.19

-UUC = Unit Under Calibration

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

... End ...



## Southern Calibration Service Co., Ltd.

669/35 Karmjansavit Rd., Banpru, Haryai, Songkhla 90250 Thailand  
Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



## CALIBRATION CERTIFICATE

Issued Date : 8-Jul-2021

Certificate No. : 21PH098  
CSR No. : A047/2301  
Page : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd  
114/1 Moo 8 Kanchanawachin Rd. T.Ban Pru,  
A. Hat Yai, Songkhla 90250 TH

Calibration Place : Microbiological Laboratory  
Instrument Name : pH meter  
Manufacturer : Sartorius  
Model : Basic pH Meter PB-10  
Serial No. : C07160695  
ID No. : SQX\_ML0016  
Electrode No. : N/A  
Received Date : 5-Jul-2021  
Calibrated Date : 5-Jul-2021  
Ambient Temperature : (25 ± 3) °C  
Relative Humidity : (55 ± 15) %

REVIEW BY : *[Signature]*  
APPROVED BY : *[Signature]*  
NEXT CAL. DATE : 03/07/2023

##### Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.W1.008 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

##### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- HACH : LANGE United For Water Quality
- WK : WK Electric Co., Ltd.

Calibrated by : Jussadagorn Lemhad

Approved by :

Adul Lemhad / Laboratory Manager

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Certificate No. : 21PH098  
CSR No. : A047/2301  
Page : 2 of 2

#### Details of Calibration

##### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.005	C02730	1593	22-May-2022
Standard Solution	7.000	C02775	1551	20-Oct-2022
Standard Solution	10.012	C02770	1545	17-Sep-2022
Temperature/Electrical Calibrator	MC2-MF	23642	WK2102-006-229	21-Feb-2022

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
3. This certificate is not certified any commercial transaction.
4. Condition of item : normal condition, no indication for any damage or malfunction.

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

##### 1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV)	Correction (mV)	Uncertainty (± mV)
177.48	177.4	0.08	0.17
0.00	0.0	0.00	0.13
-177.48	-177.4	-0.08	0.17

##### 2. Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.006	3.99	0.016	0.012
6.997	7.01	-0.013	0.015
10.012	9.98	0.032	0.036

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

... End ...





Southern Calibration Service Co., Ltd.

669/35 Kamjanavanit Rd., Banpui, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



## CALIBRATION CERTIFICATE

Issued Date : 9-Aug-2021

Certificate No. : 21WB064

CSR No. : A047/2346

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd  
114/1 Moo 8 Kamchanawanich Rd. T.Ban Phru,  
A. Hat Yai, Songkhla 90250 TH

Calibration Place : Microbiological Laboratory

Instrument Name : Water Bath

Manufacturer : Memmert

Model : WPE45

Serial No. : L716.0558

ID No. : SGK\_ML0021

Resolution : 0.1 °C

Received Date : 6-Aug-2021

Calibrated Date : 6-Aug-2021

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY *Amrita B.*  
APPROVED BY *Karntika H.*  
NEXT CAL. DATE *8/08/2025*

### Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WL014 based on ASTM E 715 : 1980 (reapproved 2001)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

### Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Ibrahim Saleem

Approved by :

Sakeereen Heemhad / Technical Manager

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 Southern Calibration Service Co., Ltd.



Certificate No. : 21WB064

CSR No. : A047/2346

Page : 2 of 3

### Details of Calibration

#### 1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

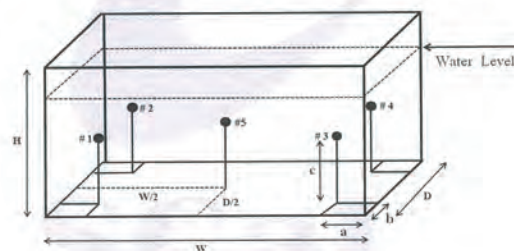
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment ( ) After Adjustment

#### 1. Sensor Installation Diagram



#### Sensor Installation Details

a = 5 cm  
b = 5 cm  
c = 5 cm

#### Dimension of the chamber

W = 45 cm  
H = 30 cm  
D = 35 cm



Certificate No. : 21WB064

CSR No. : A047/2346

Page : 3 of 3

### Result of Calibration :

#### 2. Temperature Measurement Accuracy Test

The measurement results of the Water Bath and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)					Uncertainty (±°C)
	#1	#2	#3	#4	Ref.5	
44.5	44.49	44.55	44.48	44.51	44.47	0.14

#### 3. Performance Result

The performance of the Water Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.5	44.6	44.6	0.20	0.24	0.24

- UUC = Unit Under Calibration

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

... End ...

REVIEW BY *Amrita B.*  
APPROVED BY *Karntika H.*  
NEXT CAL. DATE *8/08/2025*

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Agilent CrossLab Compliance Services



#### Agilent CrossLab Compliance

Qualification Type:	ICPMS-QQ
System ID:	JP16511669
EQP Name:	Agilent Recommended
EQP Revision:	ICPMS.02.50
EQP Publish Date:	March 2020
Date:	February 8, 2022 11:47:17 AM
Report Type:	Report
Org. Name:	ALS laboratory Group (Thailand) Co., Ltd.
Org. Location:	114/1 Moo8, Kamchanawanich Rd., T.Ban Phru, A. Hatyai, Songkhla 90250

Date: February 8, 2022 11:47:17 AM  
System ID: JP16511669

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## Certificate of System Qualification

ICPMS-OQ

System ID: JP16511669  
Organization Name: A.L.S laboratory Group (Thailand) Co.,Ltd.  
Organization Location: 114/1 Moo8, Kanchanawaritch Rd., T.Ban Phru, A.Hatyai, Songkhla 90250

Date: February 8, 2022 11:39:47 AM  
EQP Name: Agilent/Recommended  
EQP Revision: ICPMS.O2.50  
Overall Qualification Status: Pass

## Autosampler Check

## Overall Autosampler Check Test Status

Pass

## Integrated Sample Introduction System (ISIS) Check

## Overall Integrated Sample Introduction System (ISIS) Check Test Status

Pass

## Autotune

Peakwidth Mass 7	Pass
Peakwidth Mass 89	Pass
Peakwidth Mass 205	Pass
Mass Axis 7	Pass
Mass Axis 89	Pass
Mass Axis 205	Pass
Mass 7 Sensitivity No Gas	Pass
Mass 89 Sensitivity No Gas	Pass
Mass 205 Sensitivity No Gas	Pass
Mass 59 Sensitivity He	Pass
Mass 89 Sensitivity H2	Pass
Oxide Ratio 156/140	Pass
Doubly Charged Species Ratio 70/140	Pass

Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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## Overall Autotune Test Status

Pass

## Background (No Gas Mode)

Setpoint Status: Pass

Masses (AMU):  
Measured Value:  
Agilent Recommended:  
Status:

7	89	205
6.400	1.800	5.700
<= 6.9	<= 4.6	<= 11.5
Pass	Pass	Pass

## Overall Background (No Gas Mode) Test Status

Pass

## Background (Gas Mode)

Gas Mode: Helium

Setpoint Status: Pass

Mass (AMU):  
Measured Value:  
Agilent Recommended:  
Status:

78
4.60
<= 115
Pass

Gas Mode: Hydrogen

Setpoint Status: Pass

Mass (AMU):  
Measured Value:  
Agilent Recommended:  
Status:

78
1.45
<= 4.8
Pass

## Overall Background (Gas Mode) Test Status

Pass

Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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## 20-Minute Stability (No Gas Mode)

Masses (AMU):  
Stability RSD:  
Agilent Recommended:  
Status:

7	89	205
1.28	0.28	0.43
<= 2.3	<= 2.3	<= 2.3
Pass	Pass	Pass

## Overall 20-Minute Stability (No Gas Mode) Test Status

Pass

Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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## Instrument Details

## Purpose

This section describes the as found system configuration

## Details

## ICP-MS 1

Manufacturer	Agilent Technologies
Name	7900
Model Number	G8403A
Installed Options	#100H: Standard Package with Hydrogen option
Detector Type	SQ
Nebulizer	Mira Mist (G3161)
Spray Chamber	Quartz
Torch	Quartz
Sampling Cone	Ni
Skimmer Cone	Ni
Serial Number	JP16511669
Firmware Revision	4.00.02

## ISIS 1

Manufacturer	Agilent Technologies
Name	ISIS3
Model Number	G8411A
Type	Peristaltic pump system
Serial Number	JP16510376

## Autosampler 1

Manufacturer	Agilent Technologies
Name	SPS4
Model Number	G8410A
Serial Number	AU16351647

Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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## Order 1

Manufacturer	Agilent Technologies
Name	Chiller
Model Number	G3292A
Serial Number	701711320

Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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## Electronic Signature

## Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and login to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

## Details

Full Name of Signer: Burin Ngamvithi  
Logged On User Name: Burin\_ngamvithi@agilent.com  
Signature Creation Date: February 8, 2022  
Reason for Signature: Published this original version of document.

## Regulatory Disclaimers

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

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Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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User Name: burin\_ngamvithi  
Hardware: ASS06XW039  
Print Date: February 8, 2022 11:39:48 AM  
System ID: JP16511669

## OQ HW T960CPMS ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
February 8, 2022 9:18:05 AM	Auto	Session Created	Session	None
February 8, 2022 9:18:05 AM	Start	Configuration	Session	None
February 8, 2022 9:19:05 AM	Auto	Entitlements	Learning	User is First Engineer and does not require an unlock code
February 8, 2022 9:22:06 AM	Auto	Exp/Unlocked	Session	EQP details for primary technique (cpMts) - File path [Protocol\Factors\cpMts\Config\unlocked\T2.59\cpMts_02_52.eeq] EQP File Name: [cpMts_02_59.eeq] EQP Name: [unlocked] (Agilent Recommended)
February 8, 2022 9:34:32 AM	End	Configuration	Session	None
February 8, 2022 9:24:06 AM	Start	Qualification	Session	OQ
February 8, 2022 9:24:06 AM	Start	Execution	Autosampler Check : SP54; Autosampler Check	None
February 8, 2022 9:24:04 AM	End	Execution	Autosampler Check : SP54; Autosampler Check	Run Count : 1
February 8, 2022 9:24:57 AM	Start	Execution	Integrated Sample Introduction System (ISIS) Check : ISIS2; Integrated Sample Introduction System (ISIS) Check	None
February 8, 2022 10:52:47 AM	End	Execution	Integrated Sample Introduction System (ISIS) Check : ISIS2; Integrated Sample Introduction System (ISIS) Check	Run Count : 1

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Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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User Name: burin\_ngamvithi  
Hardware: ASS06XW039  
Print Date: February 8, 2022 11:39:48 AM  
System ID: JP16511669

## OQ HW T960CPMS ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
February 8, 2022 10:32:55 AM	Start	Execution	Autosave : G0603A; Autosave 1	None
February 8, 2022 10:55:26 AM	End	Execution	Autosave : G0603A; Autosave 1	Run Count : 1
February 8, 2022 10:55:34 AM	Start	Execution	Background (No Gas Mode) : G0603A; No Gas Mode Background 1	None
February 8, 2022 10:55:56 AM	End	Execution	Background (No Gas Mode) : G0603A; No Gas Mode Background 1	Run Count : 1
February 8, 2022 10:56:00 AM	Start	Execution	Background (Gas Method) : G0603A; Gas Mode Background -Helium	None
February 8, 2022 10:56:29 AM	End	Execution	Background (Gas Method) : G0603A; Gas Mode Background -Helium	Run Count : 1
February 8, 2022 10:56:24 AM	Start	Execution	Background (Gas Method) : G0603A; Gas Mode Background -Hydrogen	None
February 8, 2022 10:56:40 AM	End	Execution	Background (Gas Method) : G0603A; Gas Mode Background -Hydrogen	Run Count : 1
February 8, 2022 10:56:43 AM	Start	Execution	25-Minute Stability (No Gas Mode) : G0603A; 20-Minute Stability (No Gas Mode) 1	None
February 8, 2022 11:01:33 AM	End	Execution	25-Minute Stability (No Gas Mode) : G0603A; 20-Minute Stability (No Gas Mode) 1	Run Count : 1
February 8, 2022 11:07:37 AM	End	Qualification	Session	OQ
February 8, 2022 11:37:37 AM	Start	Reporting	Session	None

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Date: February 8, 2022 11:39:47 AM  
System ID: JP16511669

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Date: February 8, 2022 11:38:47 AM  
System ID: JP16511669



4. Sotgiyansky 14, Ushakovskiy pereulok, Moscow 107680 Tel: (095) 925-745-7000 Fax: (095) 925-745-7000  
4. Soti Ltd., 14, Ushakovskiy Pereulok, Moscow 107680 Tel: (095) 925-745-7000 Fax: (095) 925-745-7000

Maintenance Plan YEAR : 2022

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011						27						

### Periodical maintenance check list for KoneLab

- |   | 6M                                  | 12M                                 | Note! |
|---|-------------------------------------|-------------------------------------|-------|
| 1.Diluent-wash tubing change                              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 2.ISE tubing change                                       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |       |
| 3.Syringe check/change                                    |                                     | <input checked="" type="checkbox"/> |       |
| 4.Dispensing check/ change                                |                                     | <input checked="" type="checkbox"/> |       |
| 5.Waste tubing change when necessary                      |                                     | <input checked="" type="checkbox"/> |       |
| 6.Lamp check/change                                       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 7.Mixer paddle/paddle change(not Konelab20)               |                                     | <input checked="" type="checkbox"/> |       |
| 8.ISE needles check/change                                |                                     | <input checked="" type="checkbox"/> |       |
| 9.Pump tubing check/ change                               | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 10.Broken/worn out part check /change                     |                                     | <input checked="" type="checkbox"/> |       |
| 11.Peristaltic pump check /cleaning/ lubrication          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 12.Heating check  |                                     | <input checked="" type="checkbox"/> |       |
| 13.Cooling check  |                                     | <input checked="" type="checkbox"/> |       |
| 14.Dispenser mechanic check/adjustment                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 15.Cuvette transfer mechanic check/adjustment             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 16.Dispenser movement check/adjustment                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 17.Sample/reagent register check/adjustment               | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 18.Dispensing tubing tightness check                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 19.Photometer and optics cleaning/check/adjustment        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 20.Workstation PC cleaning if necessary                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 21.Mechanic cleaning/lubrication                          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 22.Instrument cleaning if necessary                       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 23.Complete analyzer testing with waterblank/QC or sample | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 24.Test parameters/Adjustment/config. Save to USB key     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |
| 25.LIPS Test  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |       |

Name: ALC LAB Instrument: ALC 6000  
 Date/Time: 6-6-05 Serial no: 8781  
 Service done by: \_\_\_\_\_ Install date: \_\_\_\_\_  
 Signature of customer: ALC Date/Time: 7/6/06



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
53/48 PATTANAKARN ROAD SOI 16, SUAN LUANG, SUANLUANG BANGKOK 10250.  
TEL. 0-2717-3000-27 FAX. 0-2719-0484



Cert.No.: 22CH1222  
Page: 1 of 2

## Certificate of Calibration

Equipment :	ph Meter
Manufacturer :	Mettler Toledo
Model :	Seven Compact S220
Serial No. :	B520948426
ID No. :	BKK_EN0072
Condition As-Received:	Used Item
Received Date :	09 September 2022
Calibration Date :	12 September 2022
Reference :	2209-0312QSC-1
Submitted by :	ALS Laboratory Group (Thailand) Co., Ltd. 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand
Ambient Temperature :	(25 $\pm$ 2.5) °C
Relative Humidity :	(50 $\pm$ 15) %
Calibration Procedure :	In - house method : - CP-QH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)

Calibrated by : Warakorn Lemgagrakul

Approved by : Males  
Approved Signatory

( / ) Malee Butkruea  
( ) Saitip Moangmai  
( ) Warakorn Lemgatrakul

Issue Date : 15 September 2022

The Uncertainties are for a confidence probability of approximately 95 %

This certificate may not be reproduced either (a) in full, except with the prior written approval of the Board of Certified Teachers, or (b) in part, without the prior written approval of the Board of Certified Teachers.





#### Condition of this calibration result

##### 1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	22E2789	24 Aug 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	823320	20 June 2024
pH 6.885	CPA chem	784122	14 Feb 2023
pH 10.008	CPA chem	823323	20 June 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 ( $\pm$ mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N: B52094B426	4.000	177.48	177.4	4.000	0.058	2.00
	7.000	0.00	0.0	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

##### Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement ( $\pm$ )	Coverage factor k
pH Electrode S/N: PCE-65-EX1001	4.008	3.999	153.9	0.0055	2.00
	6.885	7.017	-13.7	0.0084	2.00
	10.008	9.996	-179.0	0.0078	2.00

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

-000-

a 1126274



**PENTA**  
CALIBRATION

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

## Certificate of Calibration

Represent to Certificate of Calibration : PTC/07/22071

Certificate No.:	PTC/07/22071	Page:	1 of 2
Equipment:	Digital Balance	Condition:	Normal
Manufacturer:	Sartorius	Serial No:	26207042
Model:	MSE224-100-DU	ID No:	BKK_EN0002
Type of Balance:	Single interval		

Customer: ALS Laboratory Group (Thailand) Co.,Ltd.  
104 Phatthanakarn 40 Phatthanakarn Rd.,  
Khaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250.

Environment Condition:	Temperature	21.5 °C	$\pm$ 0.7 °C
	Humidity	61.8 %RH	$\pm$ 4.7 %RH
	Air density	1.19	kgm <sup>-3</sup>

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd.  
104 Phatthanakarn 40 Phatthanakarn Rd.,  
Khaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250.

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-ONSAC Accreditation No.: Calibration 0189

Date Received: February 25, 2022

Calibration Date: February 25, 2022

Issued Date: March 01, 2022

Calibration By: Mr. Rungroj Metakul



( Mr. Kriangsak Kalasri )  
Reviewed by

Approved By : ( Mr. Keattisak Kerdti )  
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.

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PTC-FMD-07-02-2 Feb 2020



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Represent to Certificate of Calibration : PTC/07/22071

Certificate No. : PTC/07/22071

Page: 2 of 2

#### Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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

Eccentricity test

100

(g)

Position (g)

1	2	3	4	5
0.0000	-0.0002	-0.0001	0.0001	-0.0001

Maximum deviation: 0.0002

Repeatability Test : Weight to be  $1/2 \leq L \leq$  Maximum capacity

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

Nominal test value (g)	Standard Deviation
200	0.00005

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

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.00000	0.0000	0.0000	0.00016	2.52
0.1	0.10000	0.1000	0.0000	0.00017	2.20
0.5	0.50000	0.5000	0.0000	0.00016	2.28
1	1.00001	1.0000	0.0000	0.00016	2.28
2	2.00001	2.0000	0.0000	0.00016	2.28
5	5.00001	5.0000	0.0000	0.00016	2.28
10	10.00002	10.0000	0.0000	0.00016	2.28
20	20.00002	20.0000	0.0000	0.00016	2.23
50	50.00001	50.0000	0.0000	0.00017	2.15
100	100.00002	99.9999	0.0001	0.00020	2.06
120	120.00004	120.0000	0.0000	0.00023	2.03
150	150.00003	150.0000	0.0000	0.00026	2.00
200	200.00003	199.9999	0.0001	0.00030	2.00

Note: Weight of adjust (g)

The End of Certificate

PTC-FMD-07-02-2 Feb 2020



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL: 0-2713-3889-27 FAX: 0-2719-9484



Cert. No.: 21TM2189  
Page.: 1 of 3

## Certificate of Calibration

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UFE 500

Serial No. : G511.1574

ID No. : BKK\_EN0007

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.  
104 Phatthanakarn 40, Phatthanakarn Rd.,  
Khaeng Phatthanakarn, Khet Suan Luang,  
Bangkok 10250 Thailand

Location : Oven Room

Received Order : 1 December 2021

Calibration Date : 1 December 2021

Ambient Temperature : (26  $\pm$  10) °C

Relative Humidity : (50  $\pm$  30) %

Calibrated by : Khit Rutianaprapachai

Approved by : ( Malee Butkruea )  
Approved Signatory

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

Issue Date : 7 December 2021

The Uncertainties are for a confidence probability of approximately 95%

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

A 0032815



Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2112-0002OC-1

Cert. No.: 21TM2189  
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	34970A	MY44060450	21LM4/1	06 Mar 2022

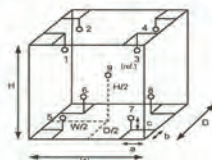
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

**Result of Calibration :-** ( ° ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close



**Probe Installation Details :**

Probe	Dimension of Chamber :
a = 5.0 cm	D = 0.40 m
b = 5.0 cm	W = 0.56 m
c = 5.0 cm	H = 0.48 m
	Capacity = 0.11 m <sup>3</sup>

Environment during calibration		
	Beginning	Finished
Temp. ( °C )	25	25
REL.Humid. ( % )	51	53
AC Supply ( Volt )	221	222

Ref. Std. ID No.: @ Calibration Point		
Position :	( 104 ) °C	( 121,175,180 ) °C
1	19-14RTD-01	19-14TC-01
2	19-14RTD-02	19-14TC-02
3	19-14RTD-03	19-14TC-03
4	19-14RTD-04	19-14TC-04
5	19-14RTD-05	19-14TC-05
6	19-14RTD-06	19-14TC-06
7	21-14RTD-07	19-14TC-07
8	19-14RTD-08	19-14TC-08
9 (ref.)	19-14RTD-09	19-14TC-09

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Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2112-0002OC-1  
**Result of Calibration :-** ( ° ) Without Adjustment

Cert. No.: 21TM2189  
Page.: 3 of 3

Function of UUC\* : Temperature Source

Fresh air setting : Close

Calibration Point ( °C )	UUC* Setting ( °C )	UUC* Reading ( °C )	Temperature stability ( ± °C )	Temperature uniformity ( °C )	Overall Variation ( °C )	Uncertainty ( ± °C )	Coverage Factor k
104.0	104.0	104.0	0.059	0.52	0.59	0.45	2
121.0	121.0	121.0	0.11	0.75	1.2	1.1	2
175.0	175.0	175.0	0.13	0.90	1.6	1.1	2
180.0	180.0	180.0	0.13	0.93	1.6	1.1	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	104.265	104.229	104.080	103.922	104.390	104.304	104.284	103.994	103.909
121.0	120.838	120.519	120.661	120.524	121.162	120.855	120.703	120.126	120.726
175.0	175.021	174.603	174.848	174.652	175.830	175.321	175.411	174.440	175.222
180.0	179.792	179.374	179.575	179.376	180.643	180.081	180.174	179.217	180.014

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

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

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

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

**UUC\* :** Unit Under Calibration

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

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

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ภาคผนวก จ

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สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการ  
วิเคราะห์เอกชนจากกรมโรงงานอุตสาหกรรม

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

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


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

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)  
จำกัด คัดอาชญาหนึ่งสืบทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

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

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

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ  
  
(นายคิระ จันทรเจิด)  
อธิบดีกรมโรงงานอุตสาหกรรม  
ผู้อำนวยการกองบริหารและส่งเสริมโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนากลพิษโรงงาน


กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๔๔๖ - ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๒๕๔ ๓๒๐๘ - ๐ ๒๒๕๔ ๓๖๐๔

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

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

  
(นายคิระ จันทรเจิด)  
อธิบดีกรมโรงงานอุตสาหกรรม  
ผู้อำนวยการกองบริหารและส่งเสริมโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

- |   |                             |
|---|-----------------------------|
| ๑) นางสาวจินดา โขกุลธรรม                    | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๑ |
| ๒) นางสาวสิริวิทย์ น้อยเสถียร               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๒ |
| ๓) นางสาวชัญญะอุบล อัมม                     | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๓ |
| ๔) นางสาววันวิมล สัมบุรณ์                   | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๔ |
| ๕) นางสาวศรียา เอี่ยมศิริวงศ์               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๕ |
| ๖) นางสาวสิริวิมล สัมบุรณ์                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๖ |
| ๗) นางสาวสิริวิมล สัมบุรณ์                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๗ |
| ๘) นางสาวสิริวิมล สัมบุรณ์                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๘ |
| ๙) นายพนมกร จันทบุรี                        | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๙ |
| ๑๐) นายธนกรชัย โกมลย์                       | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๐ |
| ๑๑) นายธนากร อธิยา                          | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๑ |
| ๑๒) นางสาวเกศรินทร์ แก้วมณี                 | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๒ |
| ๑๓) นางสาวสุวิมล ชัยเจริญ                   | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๓ |
| ๑๔) นางสาวสุวิมล ชัยเจริญ                   | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๔ |
| ๑๕) นางสาวเป็กร ชัยเจริญ                    | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๕ |
| ๑๖) นางสาวศศิธร พูลสวัสดิ์                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๖ |
| ๑๗) นางสาวเสาวลักษณ์ ภูพานิพัทธ์            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๗ |
| ๑๘) นายอภิสิทธิ์ สิงหา                      | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๘ |
| ๑๙) นายศักดิ์สิทธิ์ โพธิ์คำ                 | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๙ |
| ๒๐) ว่าที่ร้อยตรีหญิง พรรณีภา จำเริญ        | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๐ |
| ๒๑) นางจิตตา คำแก้ว                         | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๑ |
| ๒๒) นางสาวอรรณพ รักษ์                       | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๒ |
| ๒๓) นางสาวพรรัตน์ อัมม                      | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๓ |
| ๒๔) นายจุลเชษฐ์ วารินทร์                    | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๔ |
| ๒๕) นางสาวสุวิมล รุ่งคำ                     | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๕ |
| ๒๖) นายสมชาย สุขเจริญ                       | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๖ |
| ๒๗) นายปฐมา นามะรัตน์                       | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๗ |
| ๒๘) นายพนม ศรีปิ่นนคร                       | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๘ |
| ๒๙) นายสุชาติ อัมม                          | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๙ |
| ๓๐) ว่าที่ร้อยตรี เจริญเกียรติ อมาศิริวัฒน์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๐ |
| ๓๑) นางสาววิภา สว่าง                        | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๑ |
| ๓๒) นายสุพจน์ รัตนศิริประเสริฐ              | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๒ |
| ๓๓) นางสาวจุฬารัตน์ โอนสินธุ์               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๓ |
| ๓๔) นางสาวจรรณพร พิมพ์สุกัญญา               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๔ |

(นายคิระ จันทรเจิด)

อธิบดีกรมโรงงานอุตสาหกรรม  
ผู้อำนวยการกองบริหารและส่งเสริมโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๓๕) นางสาวปราณีทิพย์...

- |                                     |                             |
|-------------------------------------|-----------------------------|
| ๓๕) นางสาวปราณีทิพย์ กิจไพศาลศักดิ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๕ |
| ๓๖) นางสาวเดือนใจ พากุล             | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๖ |
| ๓๗) นางสาวจิราพร ศิริเว             | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๗ |
| ๓๘) นายวรวิทย์ สุทธิรักษ์           | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๘ |
| ๓๙) นายพนม วิริยะสหกิจ              | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๙ |
| ๔๐) นายธนิต เจนจบ                   | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๐ |
| ๔๑) นายคณิศร จำเริญ                 | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๑ |
| ๔๒) นายอรรถพล บิณฑิยาพันธ์          | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๒ |
| ๔๓) นายสุวิทย์ พรมเสถียร            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๓ |
| ๔๔) นายสมเดช โกวิทพันธ์             | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๔ |
| ๔๕) นายสุวิทย์ วัชรินทร์            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๕ |
| ๔๖) นายอาทิตย์ ศรีสน                | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๖ |
| ๔๗) นายเจตนาถ ศรีกิติโย             | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๗ |
| ๔๘) นายจิรุต บุญธิ                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๘ |
| ๔๙) นายสมศักดิ์ เอนก                | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๙ |
| ๕๐) นายอภิวัฒน์ ภูพานิ              | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๐ |
| ๕๑) นางสาวสุภาวัญญา มา              | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๑ |
| ๕๒) นางสาวทิพย์ ขวาลสมบุญ           | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๒ |
| ๕๓) นางสาววิมล ภูพานิ               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๓ |
| ๕๔) นางสาวกนกกร เข็มเพชร            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๔ |
| ๕๕) นางสาวพัชรีา พงษ์มณี            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๕ |
| ๕๖) นางสาวกานดา สุวรรณศรี           | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๖ |
| ๕๗) นางสาวกานดา นามวัฒน์            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๗ |
| ๕๘) นางสาวสุวิมล พงษ์มณี            | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๘ |
| ๕๙) นายสุวิมล พงษ์มณี               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๙ |
| ๖๐) นายอภิสิทธิ์ ยะโส               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๐ |
| ๖๑) นายประพนธ์ วรรณสุข              | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๑ |
| ๖๒) นายชรัส พงษ์มณี                 | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๒ |
| ๖๓) นางสาวกนกกร อัมม                | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๓ |
| ๖๔) นางสาวนันท ฤทธิบุญ              | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๔ |
| ๖๕) นายสิทธิโชค ธรรม                | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๕ |
| ๖๖) นายศุภวรรณ บุญ                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๖ |
| ๖๗) นางสาวพรวิมล ทุม                | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๗ |
| ๖๘) นางสาวสุวิมล ยี่ง               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๘ |
| ๖๙) นายสมชาย ศรีวิชัย               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๙ |
| ๗๐) นายสุวิมล พงษ์มณี               | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๘๐ |
| ๗๑) นายวิมล ภูพานิ                  | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๘๑ |

(นายคิระ จันทรเจิด)

อธิบดีกรมโรงงานอุตสาหกรรม  
ผู้อำนวยการกองบริหารและส่งเสริมโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๗๒) นายสมบุญ...







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

44 Methomyl...

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

น้ำใต้ดิน จำนวน 126 รายการ

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

3 Aldrin...

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

18 Bis(2-ethylhexyl)phthalate...

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

34 Chromium (III)...

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

  
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51 cis-1,2-Dichloroethylene...

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

  
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
68 Fluorene...

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

  
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84 Methanol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
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 <sup>(4)</sup>

  
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 กรมวิทยาศาสตร์บริการ

97 Pentachlorophenol...



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

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114 1,1,2-Trichloroethane...

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กรมส่งเสริมการค้าระหว่างประเทศ

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

ตารางรายชื่อ (ปล่องระบาย) จำนวน 16 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>

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3 Carbon Monoxide...

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

วิทย์กุล

สิ่งปฏิกูล...

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สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,3,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,13)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,6)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,13)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,6)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,13)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,6)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,13)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,6)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>

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6 Cadmium...

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

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11 Cobalt....

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

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2) Soxhlet....

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

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2) Waste Extraction...

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

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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 <sup>(1,9,23)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,23)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>

  
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28 Pentachlorophenol...

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


  
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4) Digestion...

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


เพิ่ม จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(14,20)</sup>
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,14)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,14)</sup>
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,14)</sup>

  
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9 Benz(a)anthracene...


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

  
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26 Carbon tetrachloride...




ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,15,17)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,15,17)</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>(8,17)</sup>
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
37	Cyanide	Extraction, Distillation, Colorimetric Method <sup>(26,28)</sup>
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>

  
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
40 DDE...

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

  
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
57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
58	Diethyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
59	2,4-Dimethylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
60	2,4-Dinitrophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
61	2,4-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
62	2,6-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
63	Di-n-Octyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
67	Fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
68	Fluorene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
70	Heptachlor Epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>

  
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71 Hexachlorobenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(16,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(18)</sup>

  
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2) Thermal...



ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry <sup>(1)(9)</sup> 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(20)</sup> Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(12)(21)</sup>
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(1)(22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(7)(13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7)(16)</sup>
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(1)(23)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(1)(23)</sup>

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- Aroclor 1242...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
	- Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2,3,4,5-Pentachlorobiphenyl - 2,2,4,5,5-Pentachlorobiphenyl - 2,3,3',4,6-Pentachlorobiphenyl - 2,2,3,4,4,5-Hexachlorobiphenyl - 2,2,3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Norachlorobiphenyl	
97	Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
98	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
99	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>

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101 Selenium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(7)(13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7)(16)</sup>
102	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>(7)(13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7)(16)</sup>
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(1)(22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
108	TPH (C <sub>9</sub> -C <sub>10</sub> )	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
109	TPH (C <sub>10</sub> -C <sub>15</sub> )	1) Solvent Extraction, Gas Chromatographic Method <sup>(1)(21)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(23)(31)</sup>
110	TPH (C <sub>16</sub> -C <sub>20</sub> )	1) Solvent Extraction, Gas Chromatographic Method <sup>(1)(21)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(23)(31)</sup>
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>

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116 2,4,6-Trichlorophenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(23)(31)</sup>
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>(7)(13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7)(16)</sup>
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(1)(24)</sup>
125	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(7)(13)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7)(16)</sup>

#### เอกสารอ้างอิง


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 วิทยาลัยการอาชีพสุพรรณบุรี

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วิมล  
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ผู้อำนวยการกลุ่มมาตรฐานวิชาการและการพัฒนา  
และประเมินผลเพื่อประกันคุณภาพ

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและประเมินห้องปฏิบัติการ ก่อตั้งขึ้นและดำเนินงานโดยสถาบัน กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๖๐๒ ๔๐๐๑, ๔๐๐๒



ਜੀ ਬੀ ਾਯਕਰ(ਕ)/ ੫੬੭੦

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

២៤ មិថុនា ២៥៦៥

เรื่อง ชื่นตะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอนเธอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน  
ห้องปฏิบัติการวิเคราะห์โรคเขตร้อน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์โรคเขตร้อนที่ประจำ  
ห้องปฏิบัติการวิเคราะห์โรคเขตร้อน และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี จำกัด (ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้ง ๖๓๖/๓๐ หมู่ที่ ๕ ตำบลสมเ็นทร์ อำเภอลำลูกเกด จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช จ้างชน	ทะเบียนเลขที่	7-๓๒๓-ก-๑๙๔๒๒
๒) นางวิลาวัลย์ บริรักษ์	ทะเบียนเลขที่	7-๓๒๓-ก-๑๙๔๓๓
๓) นายสุพจน์ สุลามเตีย	ทะเบียนเลขที่	7-๓๒๓-ก-๑๙๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณมุต บรรจงกิจ	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๒) นางพนา สิตา	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๓) นางสาวอนิตา กุลสุริวงศ์	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๔) นายพิทยา ทองแดง	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๕) นางชลธิชา สุขสง	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๖) ภัทรี ร.ม.ชัย ม่วงมา	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๗) นายวรวิมล ทับพา	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๘) นายศักดิ์รินทร์ ฤทธิสกาย	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๙) นายสุศักดิ์ สาทิน	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๑๐) นางสาวพรพูนฏ ภาวตานนท์	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๑๑) นายสถพร ถาวา	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑
๑๒) นายศักดิ์วงค์ โชคปิตินันท์	ทะเบียนเลขที่	7-๑๒๓๑-๑-๑๙๕๙๑

๓๓) นายวัลลภ หันใจเนาว์  
๓๔) นางสาววาปี เหนือพระคุณ  
๓๕) นางสาวสิริดา หงุดจิดต์  
๓๖) นายธนสิทธิ์ วงศ์ไชย  
๓๗) นายชัยสุนทร เลิศบันนากฤทธิ์  
๓๘) นายเสด็จ เพ็ชรแสน  
๓๙) นายเอกภม วัฒนพันธ์  
๔๐) นางสาวจันทิพย์ โภกนขณะ  
๔๑) นายธีรวิทย์ อธิกนกนา  
๔๒) นายคุณวุฒิ พิธีชัย  
๔๓) นายคุณชัย ศรีชัยอภัย  
๔๔) นายปฐมพงศ์ กรสวีสัก  
๔๕) นายสราห์ ต้นโพธิ์  
๔๖) นางสาวกนิษฐา สันยุภาธิราช  
๔๗) นางสาวเสงี่ยมพร ทรัพย์เจริญ  
๔๘) นางสาวมณีนุช สิงห์นา  
๔๙) นางสาวสิริกานต์ ศิริมงคลโร  
๕๐) นายพิทักษ์ นิมิตรเศรษฐ์  
๕๑) นายศิริวิทย์ เรืองสม  
๕๒) นายปาริชาติ สันตุคุณ  
๕๓) นายอนุภาพ ธรรมะโร  
๕๔) นางสาวสุภาวดี โสจันทร์  
๕๕) นายพชรกร อิมพรเสนา  
๕๖) นายพิทกร เชื้องาม  
๕๗) นายอุไรฤทธิ์ ทองระจกศักดิ์  
๕๘) นายอภิชาติ วิลาศ  
๕๙) นายจรัสระวี ศรีรักษา  
๕๐) นายประสพมิตร เชื้อเพ็ญ  
๕๑) นางสาวณัฏฐา วิธง  
๕๒) นายสันติ ชัยชนะ  
๕๓) นายสาธิชัย แก้วทาตุ  
๕๔) นายไพฑูรย์ กลุฑาดี

[illegible]

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๓๕ รายการ  
อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๔๕ รายการ  
ตามสิ่งที่ส่งมาด้วย



หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ  
  
(นางจินดา เจตะขรินทร์)  
ผู้อำนวยการสายวิชาชีพและเครื่องมือวัดทางเคมี  
ปฏิบัติการทางเคมีและเครื่องมือวัดทางเคมี

๒๔ มิ.ย. ๒๕๖๕

กองวิจัยและเตือนภัยมลพิษโรงงาน  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
โทร. ๐ ๓๘๐๕ ๙๒๖๖๑-๓  
ไปรษณีย์อิเล็กทรอนิกส์ [elrvw@dlw.mail.go.th](mailto:elrvw@dlw.mail.go.th)


เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓  
ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐ ลงวันที่ ๒๔ มิถุนายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ  
เข้าเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method <sup>(2)</sup> 2) 5-Day BOD Test, Azide Modification Method <sup>(2)</sup>
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method <sup>(2)</sup> 2) Closed Reflux, Colorimetric Method <sup>(2)</sup> 3) Closed Reflux, Titrimetric Method <sup>(2)</sup>
3	Color	ADMI Weighted - Ordinate Spectrophotometric Method <sup>(2)</sup>
4	Cyanide	Distillation, Colorimetric Method <sup>(2)</sup>
5	Formaldehyde	Distillation, Colorimetric Method <sup>(1)</sup>
6	Free Chlorine	DPD-Ferrous Titrimetric Method <sup>(2)</sup>
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method <sup>(2)</sup>
8	pH	Electrometric Method <sup>(2)</sup>
9	Phenols	1) Distillation, Chloroform Extraction Method <sup>(2)</sup> 2) Distillation, Direct Photometric Method <sup>(2)</sup>
10	Sulfide	ZnS Precipitation, Iodometric Method <sup>(2)</sup>
11	Temperature	Laboratory and Field Method <sup>(2)</sup>
12	Total Dissolved Solids	Dried at 180 °C <sup>(2)</sup>
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method <sup>(2)</sup>
14	Total Suspended Solids	Dried at 103-105 °C <sup>(2)</sup>

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method <sup>(3)</sup> 2) Instrumental Analyzer Method <sup>(3)</sup>
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>(3)</sup>
3	Opacity	Ringelmann's Method <sup>(3,4)</sup>
4	Oxide of Nitrogen	1) Absorption Sampling, Phenolsulfonic Acid Method <sup>(4)</sup> 2) Instrumental Analyzer Method <sup>(3)</sup>
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>(3)</sup> 2) Instrumental Analyzer Method <sup>(10)</sup>

  
(นางสาววิชุดา สัมฤทธิ์ผล)  
ผู้อำนวยการ  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...


ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium - Thorin Titrimetric Method <sup>(4)</sup>
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>(1)</sup>

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method <sup>(2)</sup>
2	pH	Electrometric Method <sup>(2)</sup>
3	Phenols	Distillation, Direct Photometric Method <sup>(2)</sup>

เอกสารอ้างอิง

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(นางสาววิชุดา สัมฤทธิ์ผล)  
ผู้อำนวยการ  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก



ที่ อก ๐๓๑๐(๕)/ ๑๑๖๓๒

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ เขตราชเทวี  
กรุงเทพมหานคร ๑๐๕๐๐

๑๕ ตุลาคม ๒๕๖๓

เรื่อง ต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๓๐ สิงหาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๓ แนบ

ตามที่หนังสือที่อ้างถึง บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุ  
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๖๒๗ สภาที่ตั้งเลขที่ ๑๑๑๔/๑ หมู่ที่ ๘  
ถนนกาญจนาภิเษก ตำบลบ้านโพธิ์ อำเภอหาดใหญ่ จังหวัดสงขลา ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย)  
จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์  
นางสาวกัญญา เหมประสาทร พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๔๖
- ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์  
๑) นางสาวปริยา พงษ์ปาน พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๔๘  
๒) นางสาวสุวิภา พันธ์รัตน์ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๔๙  
๓) นางสาวนริสา นฤมิตร พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๐  
๔) นางสาวขวัญภากร ภัคิ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๑  
๕) นายวุฒิชัย หวอยเจริญ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๒  
๖) นายยศศิลป์ รังษี พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๓  
๗) นางสาวณิศา บัวสิงห์ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๔  
๘) นายอภิวัฒน์ อ้นทะ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๕  
๙) นายศิริชัย กลัยงเกิด พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๖  
๑๐) นายสมศักดิ์ จันทร์คง พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๗  
๑๑) นางสาวพิชญา कुमारานนท์ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๘  
๑๒) นายปัญญา เกียรติพิทักษ์ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๕๙  
๑๓) นางสาวชัญญา เพชรณิเชติ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๖๐  
๑๔) นางสาวศศิณิภา สิงหนาทพงศ์ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๖๑  
๑๕) นางสาวสุภาวดี สุทธสวัสดิ์ พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๖๒  
๑๖) นางสาวจันทิมา ศุภาน พะเบียนเลขที่ ๖-๒๖๒๗-จ-๙๒๗๖๓

(๑๙) นางสาวสมฤดี...



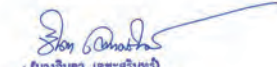
๑๙) นางสาวสมฤดี จูบัว ทะเบียนเลขที่ ๖-๒๖๗-๖-๘๐๙๘๘  
๒๐) นายสรวิทย์ ตีเลิศ ทะเบียนเลขที่ ๖-๒๖๗-๖-๘๐๙๘๙

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๒๖ รายการ  
อากาศเสีย จำนวน ๑๒ รายการ รวมทั้งสิ้น ๓๘ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๖ สิงหาคม ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือขึ้น  
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงาน  
อุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอ  
ต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นางสาว เศรษฐินทวี)  
ผู้อำนวยการศูนย์วิจัยและเฝ้าระวังมลพิษโรงงาน  
มูลนิธิเพื่อการลดมลพิษจากโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน  
ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคใต้  
โทร. ๐ ๙๔๖๒ ๕๐๒๙ - ๓๑  
ไปรษณีย์อิเล็กทรอนิกส์ sirw@dw.mail.go.th

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอนเอเอส แลบริวารโฮรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๖๗  
ที่ ๐๓๑๐(๕)/ ๑ ๑๖ ๑๒ ลงวันที่ ๑๕ ตุลาคม ๒๕๖๓

ขอบข่ายสารมลพิษที่ได้รับการขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๘ รายการ  
น้ำเสีย จำนวน ๒๖ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Arsenic	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
2	Barium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
3	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>[2]</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>[2]</sup>
4	Cadmium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
5	Chemical Oxygen Demand	Closed Reflux, Colorimetric/Titrimetric Method <sup>[2]</sup>
6	Chromium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
7	Color	ADMI Weighted-Ordinate Spectrophotometric Method <sup>[2]</sup>
8	Copper	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
9	Cyanide	Distillation, Colorimetric Method <sup>[2]</sup>
10	Formaldehyde	Distillation, Colorimetric Method <sup>[2]</sup>
11	Free Chlorine	DPD Ferrous Titrimetric Method <sup>[2]</sup>
12	Hexavalent Chromium	Filtration, Colorimetric Method <sup>[2]</sup>
13	Lead	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
14	Manganese	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
15	Mercury	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>

(นายเนตรศรี ตรียงค์)  
ผู้อำนวยการศูนย์วิจัยและเฝ้าระวัง  
มลพิษโรงงานภาคใต้  
16 Nickel...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
16	Nickel	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
17	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method <sup>[2]</sup>
18	pH	Electrometric Method <sup>[2]</sup>
29	Phenol	Distillation, Direct Photometric Method <sup>[2]</sup>
20	Selenium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>
21	Sulfide	ZnS Precipitation, Iodometric Method <sup>[2]</sup>
22	Temperature	Laboratory and Field Methods <sup>[2]</sup>
23	Total Dissolved Solids	Dried at 180 °C <sup>[2]</sup>
24	Total Suspended Solids	Dried at 103-105 °C <sup>[2]</sup>
25	Trivalent Chromium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method, Colorimetric Method; Calculation <sup>[2]</sup>
26	Zinc	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[2]</sup>

อากาศเสีย (ปล่อยระบาย) จำนวน 12 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[3]</sup>
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[3]</sup>
3	Carbon Monoxide	Sampling Bag, Non-Dispersive Infrared Method <sup>[4]</sup>
4	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[3]</sup>
5	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory <sup>[5]</sup>
6	Hydrogen Sulfide	Absorption, Iodometric Method <sup>[6]</sup>
7	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[3]</sup>

(นายเนตรศรี ตรียงค์)  
ผู้อำนวยการศูนย์วิจัยและเฝ้าระวัง  
มลพิษโรงงานภาคใต้  
8 Opacity...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Opacity	Ringelmann's Method <sup>[1]</sup>
9	Oxides of Nitrogen	Absorption Sampling, Phenoldisulfonic Acid Method <sup>[3]</sup>
10	Sulfur Dioxide	Absorption Sampling, Barium-Thorin Titrimetric Method <sup>[3]</sup>
11	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>[3]</sup>
12	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>[3]</sup>

เอกสารอ้างอิง

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เขม่าควันที่เจือปนในอากาศที่ระเหยออกจากปล่องของหม้อน้ำโรงสีข้าวที่ขึ้นทะเบียนเป็นเชื้อเพลิง  
ราชกิจจานุเบกษา, 4 ธันวาคม 2549, เล่มที่ 123 ตอนที่ ๒๓๖ ก
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Wastewater, 23<sup>rd</sup> ed. Washington, DC: APHA, 2017.
- United States Environmental Protection Agency. Standards of Performance for  
New Stationary Sources, 40 CFR 60, Appendix A, 2013.

(นายเนตรศรี ตรียงค์)  
ผู้อำนวยการศูนย์วิจัยและเฝ้าระวัง  
มลพิษโรงงานภาคใต้



บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด

104 ซอยพัฒนาการ 40 ถนนพัฒนาการ แขวงสวนหลวง  
เขตสวนหลวง กรุงเทพฯ 10250

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