
ภาคผนวก

ภาคผนวก ก

หนังสือรับรองผลการตรวจวิเคราะห์

ภาคผนวก ก1

ผลการตรวจวัดคุณภาพอากาศในบรรยากาศโดยทั่วไป

Report No. : 2022-5004114 / 001-1 (Page 1 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : Factory

SAMPLING DATE : April 18-25, 2022
SAMPLING BY : Nopparut Jampakrum

Station	Date	Parameter	
		TSP (mg/m ³)	Formaldehyde (ppm)
Factory	April 18-19, 2022	0.074	N.D.
	April 19-20, 2022	0.135	N.D.
	April 20-21, 2022	0.079	N.D.
	April 21-22, 2022	0.041	N.D.
	April 22-23, 2022	0.043	N.D.
	April 23-24, 2022	0.032	N.D.
	April 24-25, 2022	0.029	N.D.
Standard ^{1/}		≥0.33	-

- Remarks :**
- N.D. = Not Detected, detection limit of Formaldehyde <0.39 µg
 - There is no relative standard for Formaldehyde.
 - Sampling and analytical technique for TSP based on High Volume Air Sampler/Gravimetric Method
 - Sampling and analytical technique for Formaldehyde based on HPLC/DAD
- Source :** ^{1/} The notification of the National Environment Board No. 24, B.E. 2547 (2004), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 121, Part 104D, dated September 22, B.E. 2547 (2004).
- Sampling and analytical technique for n-Heptane based on NIOSH 1500

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Technical Manager

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E 245177

Report No. : 2022-5004114 / 001-1 (Page 2 of 6)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality

MEASUREMENT LOCATION : Factory

MEASUREMENT DATE : April 18-25, 2022

MEASURED BY : Nopparut Jampakrum

Time	NO ₂ Concentration (ppm)						
	April 18-19, 2022	April 19-20, 2022	April 20-21, 2022	April 21-22, 2022	April 22-23, 2022	April 23-24, 2022	April 24-25, 2022
09:00-10:00	0.003	0.005	0.005	0.003	0.001	0.007	0.006
10:00-11:00	0.004	0.006	0.006	0.007	0.003	0.004	0.004
11:00-12:00	0.007	0.005	0.008	0.003	0.003	0.004	0.007
12:00-13:00	0.004	0.006	0.009	0.006	0.002	0.005	0.005
13:00-14:00	0.003	0.009	0.006	0.003	0.002	0.007	0.004
14:00-15:00	0.003	0.007	0.002	0.004	0.005	0.004	0.003
15:00-16:00	0.002	0.007	0.002	0.003	0.005	0.006	0.012
16:00-17:00	0.005	0.008	0.004	0.005	0.007	0.003	0.004
17:00-18:00	0.012	0.009	0.005	0.003	0.013	0.005	0.007
18:00-19:00	0.008	0.008	0.004	0.004	0.002	0.005	0.008
19:00-20:00	0.005	0.015	0.004	0.007	0.004	0.002	0.007
20:00-21:00	0.006	0.012	0.005	0.006	0.003	0.003	0.004
21:00-22:00	0.005	0.011	0.005	0.002	0.003	0.004	0.005
22:00-23:00	0.004	0.006	0.005	0.007	0.015	0.005	0.004
23:00-00:00	0.006	0.003	0.005	0.004	0.008	0.003	0.003
00:00-01:00	0.006	0.005	0.008	0.002	0.005	0.004	0.008
01:00-02:00	0.005	0.012	0.003	0.008	0.002	0.003	0.005
02:00-03:00	0.008	0.011	0.006	0.010	0.005	0.004	0.002
03:00-04:00	0.007	0.008	0.008	0.006	0.007	0.002	0.005
04:00-05:00	0.004	0.007	0.014	0.007	0.008	0.004	0.007
05:00-06:00	0.012	0.006	0.008	0.011	0.009	0.004	0.005
06:00-07:00	0.010	0.008	0.014	0.011	0.005	0.009	0.005
07:00-08:00	0.011	0.005	0.010	0.010	0.006	0.004	0.009
08:00-09:00	0.008	0.005	0.004	0.010	0.004	0.003	0.005
1 hr Minimum	0.002	0.003	0.002	0.002	0.001	0.002	0.002
1 hr Maximum	0.012	0.015	0.014	0.011	0.015	0.009	0.012
Standard ^{II} (avg. 1 hr)	>0.17						

Analytical Method : - Chemiluminescence Method.

Source : The notification of the National Environment Board No. 33, B.E. 2552 (2009), subjected "The nitrogen dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 126, Special part 114D, dated August 14, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004114 / 001-1 (Page 3 of 6)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Factory

MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Time	SO ₂ Concentration (ppm)						
	April 18-19, 2022	April 19-20, 2022	April 20-21, 2022	April 21-22, 2022	April 22-23, 2022	April 23-24, 2022	April 24-25, 2022
09:00-10:00	0.003	0.003	0.002	0.003	0.003	0.001	0.003
10:00-11:00	0.004	0.005	0.004	0.002	0.002	0.001	0.002
11:00-12:00	0.003	0.003	0.003	0.002	0.002	0.003	0.003
12:00-13:00	0.002	0.003	0.003	0.002	0.002	0.004	0.003
13:00-14:00	0.003	0.001	0.004	0.001	0.003	0.002	0.002
14:00-15:00	0.003	0.001	0.004	0.001	0.003	0.002	0.001
15:00-16:00	0.005	0.002	0.002	0.001	0.004	0.002	0.001
16:00-17:00	0.006	0.003	0.002	0.001	0.001	0.002	0.002
17:00-18:00	0.004	0.003	0.001	0.002	0.001	0.002	0.002
18:00-19:00	0.002	0.003	0.001	0.002	0.002	0.003	0.001
19:00-20:00	0.003	0.002	0.003	0.003	0.002	0.001	0.001
20:00-21:00	0.002	0.002	0.002	0.003	0.003	0.002	0.002
21:00-22:00	0.003	0.001	0.001	0.003	0.004	0.001	0.003
22:00-23:00	0.003	0.002	0.002	0.003	0.002	0.002	0.004
23:00-00:00	0.002	0.001	0.002	0.002	0.003	0.003	0.003
00:00-01:00	0.003	0.001	0.002	0.002	0.002	0.003	0.003
01:00-02:00	0.002	0.003	0.003	0.001	0.002	0.002	0.001
02:00-03:00	0.003	0.003	0.003	0.002	0.002	0.001	0.003
03:00-04:00	0.004	0.002	0.004	0.001	0.003	0.001	0.004
04:00-05:00	0.003	0.002	0.002	0.002	0.003	0.003	0.002
05:00-06:00	0.004	0.002	0.001	0.003	0.002	0.002	0.002
06:00-07:00	0.003	0.001	0.001	0.004	0.002	0.002	0.002
07:00-08:00	0.003	0.001	0.001	0.003	0.003	0.002	0.001
08:00-09:00	0.004	0.001	0.003	0.001	0.004	0.002	0.002
1 hr Minimum	0.002	0.001	0.001	0.001	0.001	0.001	0.001
1 hr Maximum	0.006	0.005	0.004	0.004	0.004	0.004	0.004
Avg. 24 hr	0.003	0.002	0.002	0.002	0.002	0.002	0.002
Standard ^{1/} (avg. 1 hr)	≥ 0.30						
Standard ^{2/} (avg. 24 hr)	≥ 0.12						

Analytical Method : - UV Fluorescence Method.

Sources :
^{1/} The notification of the National Environment Board No. 21, B.E. 2544 (2001), subjected "The sulfur dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 118, Part 39D, dated April 30, B.E. 2544 (2001).
^{2/} The notification of the National Environment Board No. 24, B.E. 2547 (2004), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 121, Part 104D, dated September 22, B.E. 2547 (2004).



Technical Manager

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Report No. : 2022-5003470 / 001-5 (Page 1 of 1)

Issued date : July 19, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : January 5-6, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Fence Line (North)	Benzene	1.00	3.19	210

Remarks : - Canister Tank No.H3982 and Regulator No.5799
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5003470 / 001-7 (Page 1 of 1)

Issued date : July 19, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : January 5-6, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	Benzene	1.16	3.71	210

Remarks : - Canister Tank No.7097 and Regulator No.2243
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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E 248065

Report No. : 2022-5003470 / 001-8 (Page 1 of 1)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : January 5-6, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	Benzene	0.64	2.04	210

Remarks : - Canister Tank No. 7105 and Regulator No. 5804
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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E 248064

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality

MEASUREMENT LOCATION : Factory

MEASUREMENT DATE : April 18-25, 2022

MEASURED BY : Nopparut Jampakrum

TIME	April 18-19, 2022		April 19-20, 2022		April 20-21, 2022		April 21-22, 2022		April 22-23, 2022		April 23-24, 2022		April 24-25, 2022	
	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)
09:00-10:00	NW	1.3	NW	0.9	N	0.9	SSW	1.8	SSE	1.8	W	1.3	W	1.8
10:00-11:00	NW	1.8	NW	0.9	N	1.3	W	1.8	SSW	1.8	W	1.3	W	1.8
11:00-12:00	SSE	1.3	-	Calm	N	0.9	W	1.3	W	1.3	W	1.8	W	1.8
12:00-13:00	NW	0.9	E	0.9	N	0.9	WSW	0.9	W	0.9	W	1.3	W	1.3
13:00-14:00	WNW	0.9	-	Calm	N	0.9	SE	0.9	W	1.3	W	1.3	W	1.8
14:00-15:00	NW	1.3	-	Calm	N	0.9	SE	0.9	SSW	1.3	W	1.8	W	1.3
15:00-16:00	W	1.3	NE	0.9	N	1.3	W	1.3	W	1.3	W	1.3	W	0.9
16:00-17:00	W	1.3	NE	1.8	N	0.9	SSE	1.3	ENE	0.9	W	1.3	W	1.3
17:00-18:00	WNW	0.9	NE	2.2	N	1.3	NW	1.3	W	1.3	WNW	1.8	SSW	1.3
18:00-19:00	SSE	0.9	NE	1.8	W	2.2	WSW	1.3	W	1.8	W	1.8	S	1.8
19:00-20:00	NE	0.9	ESE	1.8	W	2.2	W	1.8	W	2.2	SW	2.2	SSW	0.9
20:00-21:00	ENE	0.9	W	1.8	W	2.7	W	2.7	W	2.7	W	2.7	SSW	2.2
21:00-22:00	W	0.9	W	2.7	W	3.1	W	2.2	W	2.7	W	2.7	SSW	2.2
22:00-23:00	W	1.3	W	2.7	N	2.7	W	2.7	W	2.2	W	2.7	WSW	1.3
23:00-00:00	W	1.3	W	1.3	N	2.7	W	2.2	W	2.2	W	2.7	WSW	1.8
00:00-01:00	W	1.8	-	Calm	N	2.2	W	1.8	W	2.2	W	2.2	W	1.8
01:00-02:00	NW	2.2	-	Calm	N	2.2	SSE	2.7	W	1.8	W	1.3	WNW	1.3
02:00-03:00	NW	2.2	-	Calm	W	1.8	S	2.7	W	1.8	W	1.3	WSW	0.9
03:00-04:00	NW	1.8	N	0.9	S	2.2	SSE	2.7	W	1.8	W	1.8	W	0.9
04:00-05:00	WNW	0.9	N	0.9	W	1.8	S	1.8	W	1.3	SSW	2.2	-	Calm
05:00-06:00	-	Calm	N	1.3	SSE	1.8	SSW	2.2	S	1.8	W	2.2	WSW	1.3
06:00-07:00	NNW	0.9	N	0.9	S	2.2	SSE	1.8	SSW	1.8	SSE	2.2	WSW	2.2
07:00-08:00	-	Calm	N	1.3	S	2.2	SSE	2.2	S	1.8	SSW	2.2	SSW	2.7
08:00-09:00	-	Calm	N	1.3	S	1.8	SSE	2.2	SSE	1.8	W	1.8	SSW	1.8

Measurement Method : - Wind Speed and Wind Direction recording meter

Remarks : - WS = Wind Speed
- WD = Wind Direction



Technical Manager

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality

MEASUREMENT LOCATION : Factory

MEASUREMENT DATE : April 18-25, 2022

MEASURED BY : Nopparut Jampakrum

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	5.36	3.57	2.38	-	-
NNE	-	-	-	-	-
NE	1.19	1.19	0.60	-	-
ENE	1.19	-	-	-	-
E	0.60	-	-	-	-
ESE	-	0.60	-	-	-
SE	1.19	-	-	-	-
SSE	0.60	3.57	2.98	-	-
S	-	2.98	2.38	-	-
SSW	0.60	3.57	3.57	-	-
SW	-	-	0.60	-	-
WSW	1.19	2.38	0.60	-	-
W	2.38	26.19	12.50	0.60	-
WNW	1.79	1.19	-	-	-
NW	1.79	2.98	1.19	-	-
NNW	0.60	-	-	-	-
CALM	5.95				

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E 245181

Report No. : 2022-5004114 / 001-1 (Page 6 of 6)

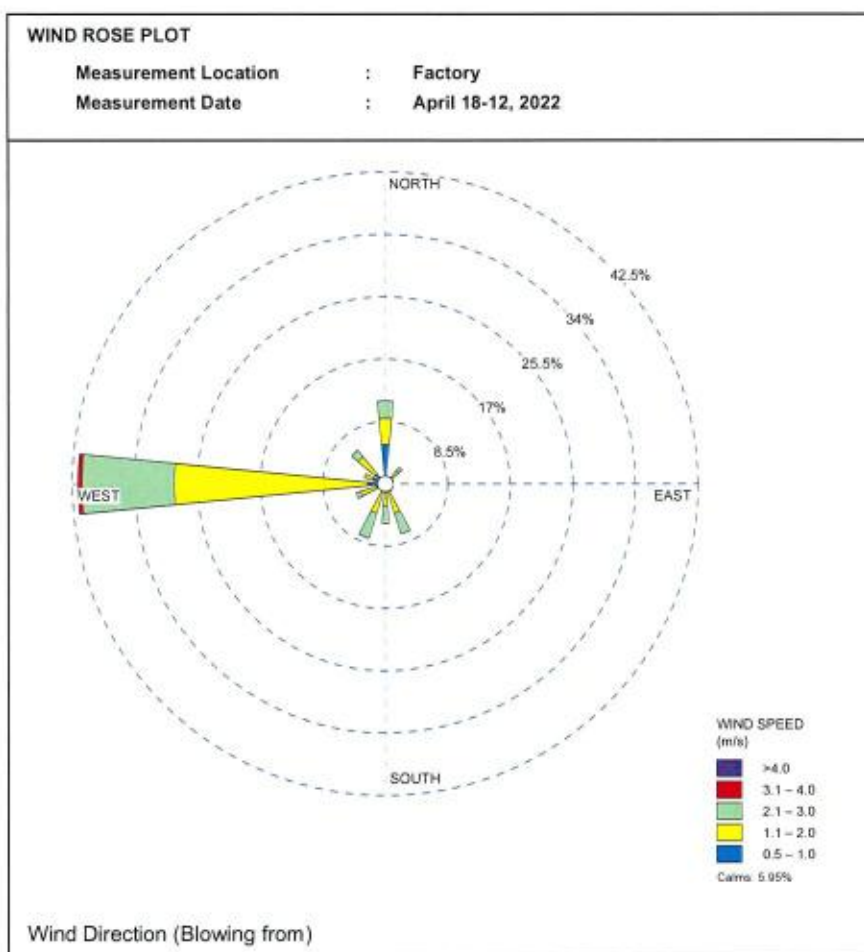
Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Factory

MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum



TY/NJ/MTM/MTM

SGS (THAILAND) LIMITED



Technical Manager

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E 245182

Report No. : 2022-5004114 / 001-2 (Page 1 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : Wat Nong Feab School

SAMPLING DATE : April 18-25, 2022
SAMPLING BY : Nopparut Jampakrum

Station	Date	Parameter	
		TSP (mg/m ³)	Formaldehyde (ppm)
Wat Nong Feab School	April 18-19, 2022	0.049	N.D.
	April 19-20, 2022	0.049	N.D.
	April 20-21, 2022	0.070	N.D.
	April 21-22, 2022	0.084	N.D.
	April 22-23, 2022	0.085	N.D.
	April 23-24, 2022	0.061	N.D.
	April 24-25, 2022	0.053	N.D.
Standard ^{1/}		≥0.33	-

Remarks :

- N.D. = Not Detected, detection limit of Formaldehyde <0.39 µg
- There is no relative standard for Formaldehyde.
- Sampling and analytical technique for TSP based on High Volume Air Sampler/Gravimetric Method
- Sampling and analytical technique for Formaldehyde based on HPLC/DAD

Source : ^{1/} The notification of the National Environment Board No. 24, B.E. 2547 (2004), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 121, Part 104D, dated September 22, B.E. 2547 (2004).

- Sampling and analytical technique for n-Heptane based on NIOSH 1500

TY/NJ/MTM/MTM



Technical Manager

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E 245171

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Report No. : 2022-5004114 / 001-2 (Page 2 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality

SAMPLING DATE : April 18-25, 2022

SAMPLING LOCATION : Wat Nong Feab School

SAMPLING BY : Nopparut Jampakrum

Time	NO ₂ Concentration (ppm)						
	April 18-19, 2022	April 19-20, 2022	April 20-21, 2022	April 21-22, 2022	April 22-23, 2022	April 23-24, 2022	April 24-25, 2022
10:00-11:00	0.005	0.006	0.005	0.009	0.010	0.004	0.006
11:00-12:00	0.005	0.006	0.006	0.006	0.006	0.004	0.004
12:00-13:00	0.007	0.008	0.008	0.006	0.006	0.004	0.009
13:00-14:00	0.005	0.006	0.006	0.006	0.005	0.005	0.006
14:00-15:00	0.005	0.004	0.006	0.005	0.007	0.007	0.005
15:00-16:00	0.006	0.008	0.007	0.004	0.005	0.004	0.006
16:00-17:00	0.008	0.008	0.008	0.006	0.005	0.006	0.007
17:00-18:00	0.005	0.006	0.004	0.005	0.006	0.005	0.004
18:00-19:00	0.007	0.006	0.005	0.009	0.005	0.007	0.005
19:00-20:00	0.004	0.008	0.008	0.008	0.003	0.005	0.010
20:00-21:00	0.008	0.005	0.004	0.006	0.006	0.011	0.009
21:00-22:00	0.005	0.003	0.004	0.005	0.007	0.007	0.008
22:00-23:00	0.006	0.007	0.007	0.006	0.006	0.005	0.010
23:00-00:00	0.007	0.006	0.009	0.008	0.005	0.005	0.005
00:00-01:00	0.005	0.006	0.005	0.004	0.006	0.007	0.004
01:00-02:00	0.007	0.009	0.010	0.011	0.004	0.004	0.009
02:00-03:00	0.005	0.004	0.009	0.008	0.009	0.006	0.010
03:00-04:00	0.005	0.004	0.005	0.010	0.008	0.004	0.011
04:00-05:00	0.009	0.005	0.005	0.006	0.006	0.012	0.006
05:00-06:00	0.006	0.006	0.011	0.007	0.008	0.006	0.007
06:00-07:00	0.009	0.005	0.008	0.009	0.009	0.006	0.004
07:00-08:00	0.008	0.007	0.011	0.011	0.005	0.007	0.005
08:00-09:00	0.009	0.005	0.006	0.010	0.007	0.004	0.004
09:00-10:00	0.006	0.008	0.004	0.010	0.005	0.005	0.006
1 hr Minimum	0.004	0.003	0.004	0.004	0.003	0.004	0.004
1 hr Maximum	0.009	0.009	0.011	0.011	0.010	0.012	0.011
Standard ^u (avg. 1 hr)	≤0.17						

Analytical Method : - Chemiluminescence Method.

Source : ^u The notification of the National Environment Board No. 33, B.E. 2552 (2009), subjected "The nitrogen dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 126, Special part 114D, dated August 14, B.E. 2552 (2009).



Technical Manager

TY/NJ/MTM/MTM

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E 245172

Report No. : 2022-5004114 / 001-2 (Page 3 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Wat Nong Feab School
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Time	SO ₂ Concentration (ppm)						
	April 18-19, 2022	April 19-20, 2022	April 20-21, 2022	April 21-22, 2022	April 22-23, 2022	April 23-24, 2022	April 24-25, 2022
10:00-11:00	0.002	0.003	0.001	0.001	0.002	0.001	0.003
11:00-12:00	0.002	0.002	0.001	0.001	0.002	0.002	0.002
12:00-13:00	0.002	0.001	0.000	0.001	0.001	0.002	0.002
13:00-14:00	0.003	0.002	0.002	0.002	0.003	0.002	0.001
14:00-15:00	0.002	0.003	0.002	0.002	0.003	0.001	0.003
15:00-16:00	0.003	0.002	0.002	0.005	0.004	0.002	0.003
16:00-17:00	0.002	0.002	0.003	0.003	0.001	0.002	0.002
17:00-18:00	0.004	0.002	0.002	0.001	0.001	0.003	0.002
18:00-19:00	0.002	0.003	0.002	0.002	0.002	0.002	0.001
19:00-20:00	0.001	0.001	0.001	0.000	0.001	0.003	0.002
20:00-21:00	0.002	0.002	0.002	0.003	0.003	0.004	0.002
21:00-22:00	0.003	0.003	0.003	0.002	0.002	0.002	0.004
22:00-23:00	0.004	0.002	0.002	0.002	0.002	0.000	0.002
23:00-00:00	0.004	0.002	0.001	0.002	0.003	0.003	0.002
00:00-01:00	0.002	0.003	0.002	0.001	0.004	0.003	0.001
01:00-02:00	0.002	0.003	0.001	0.004	0.003	0.003	0.002
02:00-03:00	0.003	0.002	0.001	0.002	0.001	0.001	0.002
03:00-04:00	0.003	0.002	0.002	0.002	0.001	0.001	0.002
04:00-05:00	0.003	0.003	0.002	0.002	0.001	0.002	0.002
05:00-06:00	0.003	0.002	0.003	0.003	0.002	0.000	0.002
06:00-07:00	0.004	0.003	0.004	0.002	0.002	0.002	0.001
07:00-08:00	0.002	0.002	0.003	0.001	0.003	0.002	0.000
08:00-09:00	0.002	0.003	0.002	0.002	0.001	0.002	0.002
09:00-10:00	0.003	0.003	0.002	0.002	0.001	0.001	0.001
1 hr Minimum	0.001	0.001	0.000	0.000	0.001	0.000	0.000
1 hr Maximum	0.004	0.003	0.004	0.005	0.004	0.004	0.004
Avg. 24 hr	0.003	0.002	0.002	0.002	0.002	0.002	0.002
Standard ¹⁾ (avg. 1 hr)	≥0.30						
Standard ²⁾ (avg. 24 hr)	≥0.12						

Analytical Method : - UV Fluorescence Method.

Sources :
¹⁾ The notification of the National Environment Board No. 21, B.E. 2544 (2001), subjected "The sulfur dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 118, Part 39D, dated April 30, B.E. 2544 (2001).
²⁾ The notification of the National Environment Board No. 24, B.E. 2547 (2004), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 121, Part 104D, dated September 22, B.E. 2547 (2004).



Technical Manager

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E 245173

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Report No. : 2022-5004114 / 001-2 (Page 4 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Wat Nong Feab School
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

TIME	April 18-19, 2022		April 19-20, 2022		April 20-21, 2022		April 21-22, 2022		April 22-23, 2022		April 23-24, 2022		April 24-25, 2022	
	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)
10:00-11:00	NW	0.9	N	0.9	ESE	1.3	SSW	1.8	SW	1.3	SW	1.3	SSW	1.8
11:00-12:00	S	1.3	-	Calm	SE	1.3	SSW	1.8	SW	1.8	SSW	2.2	SSW	2.2
12:00-13:00	SSE	0.9	-	Calm	SSW	2.2	SSW	2.2	SSW	2.7	SSW	1.8	SSW	2.7
13:00-14:00	-	Calm	SSW	0.9	SSW	2.7	SSW	2.2	SSW	2.2	SSW	2.2	SSW	2.7
14:00-15:00	-	Calm	SW	1.3	SW	2.2	SSW	2.2	SSW	2.2	SSW	2.7	SSW	2.7
15:00-16:00	-	Calm	SSW	1.3	SSW	2.2	SSW	2.7	SSW	2.2	SSW	2.2	SSW	2.7
16:00-17:00	SSW	0.9	SSW	1.3	SSW	2.2	SSW	2.2	SSW	1.3	SSW	1.8	SSW	2.2
17:00-18:00	SW	0.9	W	0.9	SW	1.3	SSW	1.8	SSE	2.2	SSW	1.8	SSW	1.8
18:00-19:00	-	Calm	W	0.9	SSW	1.3	SSW	1.3	SSE	1.8	SSW	1.3	SSW	1.8
19:00-20:00	-	Calm	-	Calm	SSW	1.3	S	1.3	SSE	1.3	SSW	1.8	SSW	1.3
20:00-21:00	-	Calm	-	Calm	SW	0.9	S	1.3	SSE	1.3	SSW	1.8	S	1.3
21:00-22:00	SE	1.8	-	Calm	SW	0.9	SSE	1.3	S	1.3	SSW	1.3	S	1.3
22:00-23:00	ESE	1.8	-	Calm	SSW	0.9	SSE	1.3	SSE	1.3	SSW	1.8	SSE	1.8
23:00-00:00	NNE	0.9	-	Calm	SSW	0.9	SSE	0.9	SE	0.9	SSW	1.8	SSE	1.8
00:00-01:00	-	Calm	-	Calm	SW	0.9	SSW	1.3	SSE	1.3	SSW	1.3	SSW	1.8
01:00-02:00	-	Calm	-	Calm	SSW	0.9	SSW	1.3	SSE	0.9	SSW	1.8	SSW	1.8
02:00-03:00	NE	0.9	-	Calm	SSW	0.9	SSW	1.3	SSW	0.9	SSW	1.3	SSW	2.2
03:00-04:00	-	Calm	-	Calm	-	Calm	-	Calm	SSW	1.3	SSW	1.3	SSW	2.2
04:00-05:00	-	Calm	-	Calm	-	Calm	-	Calm	SSW	0.9	SW	0.9	SW	1.3
05:00-06:00	-	Calm	-	Calm	-	Calm	-	Calm	SSW	0.9	SW	0.9	SSW	1.8
06:00-07:00	NNE	0.9	-	Calm	SW	0.9	-	Calm	-	Calm	-	Calm	SSW	1.8
07:00-08:00	NNE	1.3	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	SSW	1.3
08:00-09:00	NNE	1.3	NW	0.9	-	Calm	-	Calm	-	Calm	-	Calm	SSW	1.3
09:00-10:00	NE	0.9	NNE	1.3	S	0.9	SW	0.9	WSW	0.9	WSW	1.3	SSW	1.8

Measurement Method : - Wind Speed and Wind Direction recording meter
Remarks : - WS = Wind Speed
 - WD = Wind Direction

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(Signature)
 Technical Manager

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E 245174

Report No. : 2022-5004114 / 001-2 (Page 5 of 6)

Issued date : May 11, 2022

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 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Wat Nong Feab School

MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	0.60	-	-	-	-
NNE	1.19	1.79	-	-	-
NE	1.19	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	1.19	-	-	-
SE	0.60	1.19	-	-	-
SSE	1.79	5.36	0.60	-	-
S	0.60	3.57	-	-	-
SSW	5.36	22.02	14.88	-	-
SW	4.76	3.57	0.60	-	-
WSW	0.60	0.60	-	-	-
W	1.19	-	-	-	-
WNW	-	-	-	-	-
NW	1.19	-	-	-	-
NNW	-	-	-	-	-
CALM	25.60				

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E 245175

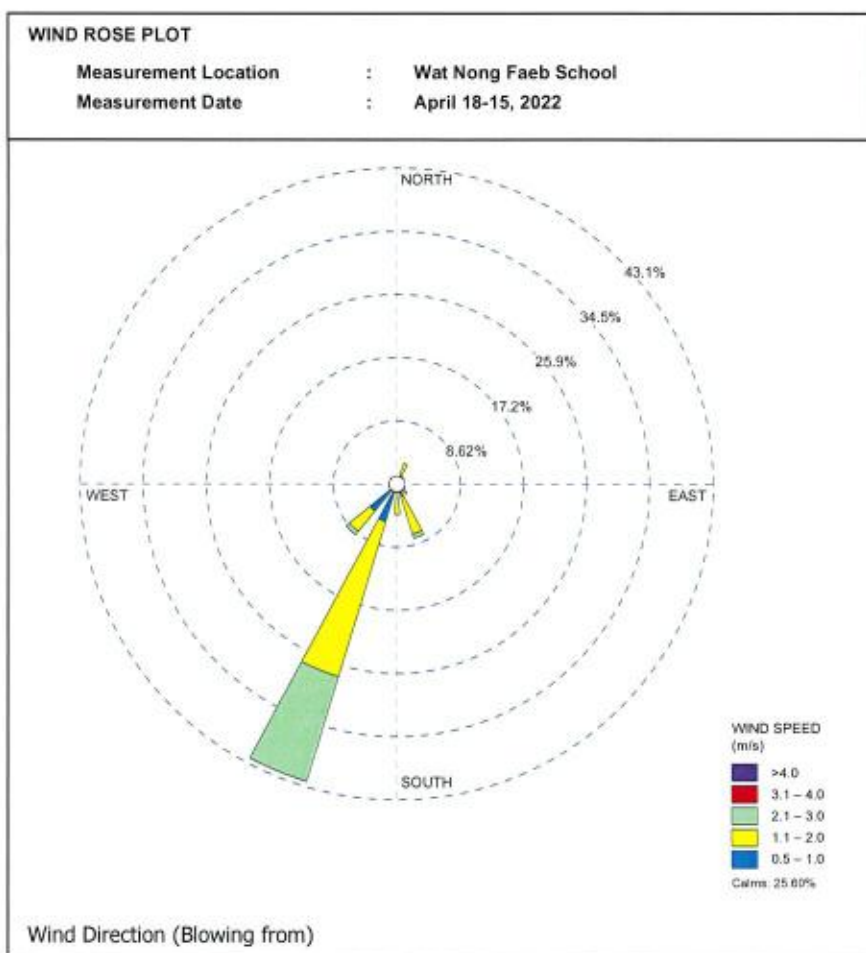
Report No. : 2022-5004114 / 001-2 (Page 6 of 6)

Issued date : May 11, 2022

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 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Wat Nong Faeb School
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum



SGS (THAILAND) LIMITED

Technical Manager

TY/NJ/MTM/MTM

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E 245176

Report No. : 2022-5004114 / 001-3 (Page 1 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : Ban Chak Klang

SAMPLING DATE : April 18-25, 2022
SAMPLING BY : Nopparut Jampakrum

Station	Date	Parameter	
		TSP (mg/m ³)	Formaldehyde (ppm)
Ban Chak Klang	April 18-19, 2022	0.084	N.D.
	April 19-20, 2022	0.109	N.D.
	April 20-21, 2022	0.124	N.D.
	April 21-22, 2022	0.082	N.D.
	April 22-23, 2022	0.084	N.D.
	April 23-24, 2022	0.076	N.D.
	April 24-25, 2022	0.076	N.D.
Standard ^{1/}		≥0.33	-

- Remarks :**
- N.D. = Not Detected, detection limit of Formaldehyde <0.39 µg
 - There is no relative standard for Formaldehyde.
 - Sampling and analytical technique for TSP based on High Volume Air Sampler/Gravimetric Method
 - Sampling and analytical technique for Formaldehyde based on HPLC/DAD
- Source :** ^{1/} The notification of the National Environment Board No. 24, B.E. 2547 (2004), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 121, Part 104D, dated September 22, B.E. 2547 (2004).
- Sampling and analytical technique for n-Heptane based on NIOSH 1500

TY/NJ/MTM/MTM

SGS (THAILAND) LIMITED



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E 245165

Report No. : 2022-5004114 / 001-3 (Page 2 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : Ban Chak Klang

SAMPLING DATE : April 18-25, 2022
SAMPLING BY : Nopparut Jampakrum

Time	NO ₂ Concentration (ppm)						
	April 18-19, 2022	April 19-20, 2022	April 20-21, 2022	April 21-22, 2022	April 22-23, 2022	April 23-24, 2022	April 24-25, 2022
11:00-12:00	0.005	0.007	0.007	0.004	0.003	0.008	0.008
12:00-13:00	0.004	0.008	0.008	0.003	0.002	0.006	0.006
13:00-14:00	0.010	0.007	0.011	0.004	0.005	0.006	0.009
14:00-15:00	0.004	0.007	0.011	0.008	0.003	0.007	0.007
15:00-16:00	0.006	0.010	0.007	0.005	0.002	0.008	0.006
16:00-17:00	0.003	0.009	0.003	0.006	0.007	0.005	0.005
17:00-18:00	0.004	0.008	0.004	0.005	0.007	0.003	0.003
18:00-19:00	0.007	0.009	0.006	0.004	0.019	0.005	0.005
19:00-20:00	0.014	0.010	0.007	0.004	0.015	0.007	0.009
20:00-21:00	0.010	0.010	0.006	0.006	0.004	0.007	0.003
21:00-22:00	0.007	0.016	0.006	0.012	0.006	0.013	0.008
22:00-23:00	0.007	0.014	0.009	0.010	0.015	0.005	0.006
23:00-00:00	0.006	0.013	0.008	0.004	0.014	0.003	0.007
00:00-01:00	0.006	0.007	0.013	0.009	0.016	0.007	0.006
01:00-02:00	0.008	0.004	0.017	0.006	0.010	0.003	0.005
02:00-03:00	0.007	0.006	0.011	0.003	0.007	0.006	0.010
03:00-04:00	0.007	0.013	0.004	0.009	0.003	0.002	0.006
04:00-05:00	0.009	0.013	0.008	0.012	0.006	0.006	0.003
05:00-06:00	0.009	0.010	0.009	0.007	0.009	0.003	0.007
06:00-07:00	0.006	0.015	0.016	0.009	0.010	0.006	0.009
07:00-08:00	0.014	0.007	0.010	0.013	0.010	0.006	0.006
08:00-09:00	0.012	0.009	0.021	0.012	0.011	0.003	0.007
09:00-10:00	0.012	0.007	0.011	0.012	0.008	0.006	0.011
10:00-11:00	0.010	0.006	0.006	0.011	0.004	0.003	0.007
1 hr Minimum	0.003	0.004	0.003	0.003	0.002	0.002	0.003
1 hr Maximum	0.014	0.016	0.021	0.013	0.019	0.013	0.011
Standard ¹⁾ (avg. 1 hr)	>0.17						

Analytical Method : - Chemiluminescence Method.
Source : ¹⁾ The notification of the National Environment Board No. 33, B.E. 2552 (2009), subjected "The nitrogen dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 126, Special part 114D, dated August 14, B.E. 2552 (2009).

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Technical Manager

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Report No. : 2022-5004114 / 001-3 (Page 3 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Ban Chak Klang

MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Time	SO ₂ Concentration (ppm)						
	April 18-19, 2022	April 19-20, 2022	April 20-21, 2022	April 21-22, 2022	April 22-23, 2022	April 23-24, 2022	April 24-25, 2022
11:00-12:00	0.003	0.003	0.003	0.002	0.003	0.002	0.004
12:00-13:00	0.004	0.002	0.002	0.004	0.002	0.003	0.004
13:00-14:00	0.004	0.002	0.004	0.004	0.002	0.003	0.001
14:00-15:00	0.002	0.003	0.002	0.003	0.003	0.002	0.001
15:00-16:00	0.002	0.003	0.002	0.003	0.003	0.002	0.003
16:00-17:00	0.001	0.003	0.003	0.001	0.002	0.002	0.003
17:00-18:00	0.002	0.003	0.002	0.002	0.002	0.003	0.003
18:00-19:00	0.003	0.001	0.003	0.002	0.001	0.003	0.003
19:00-20:00	0.003	0.003	0.002	0.001	0.001	0.002	0.002
20:00-21:00	0.004	0.002	0.002	0.001	0.001	0.002	0.001
21:00-22:00	0.002	0.002	0.002	0.003	0.004	0.001	0.001
22:00-23:00	0.003	0.003	0.004	0.002	0.002	0.001	0.001
23:00-00:00	0.004	0.002	0.004	0.002	0.002	0.001	0.003
00:00-01:00	0.004	0.002	0.002	0.002	0.002	0.005	0.002
01:00-02:00	0.003	0.003	0.001	0.004	0.004	0.004	0.002
02:00-03:00	0.002	0.004	0.002	0.004	0.004	0.004	0.003
03:00-04:00	0.001	0.002	0.001	0.003	0.002	0.003	0.002
04:00-05:00	0.003	0.002	0.001	0.002	0.002	0.002	0.003
05:00-06:00	0.003	0.003	0.001	0.002	0.001	0.002	0.002
06:00-07:00	0.003	0.003	0.004	0.003	0.002	0.002	0.002
07:00-08:00	0.002	0.001	0.003	0.002	0.002	0.003	0.002
08:00-09:00	0.001	0.002	0.003	0.002	0.003	0.001	0.001
09:00-10:00	0.002	0.003	0.002	0.002	0.002	0.001	0.003
10:00-11:00	0.002	0.003	0.002	0.003	0.002	0.001	0.001
1 hr Minimum	0.001	0.001	0.001	0.001	0.001	0.001	0.001
1 hr Maximum	0.004	0.004	0.004	0.004	0.004	0.005	0.004
Avg. 24 hr	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Standard ¹ (avg. 1 hr)	>0.30						
Standard ² (avg. 24 hr)	>0.12						

Analytical Method : UV Fluorescence Method.

Sources :
¹ The notification of the National Environment Board No. 21, B.E. 2544 (2001), subjected "The sulfur dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 118, Part 39D, dated April 30, B.E. 2544 (2001).
² The notification of the National Environment Board No. 24, B.E. 2547 (2004), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 121, Part 104D, dated September 22, B.E. 2547 (2004).



Technical Manager



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Report No. : 2022-5004114 / 001-3 (Page 4 of 6)

Issued date : May 11, 2022

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Analysis Report

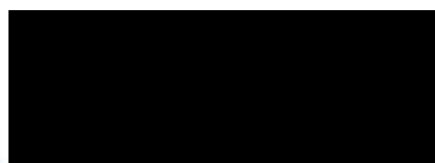
SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Ban Chak Klang

MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

TIME	April 18-19, 2022		April 19-20, 2022		April 20-21, 2022		April 21-22, 2022		April 22-23, 2022		April 23-24, 2022		April 24-25, 2022	
	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)
11:00-12:00	S	0.9	N	0.9	SW	2.7	SW	3.6	SW	3.6	SW	3.1	SW	3.6
12:00-13:00	-	Calm	NNE	0.9	SW	3.6	SW	4.0	SW	3.6	SW	3.6	SW	3.6
13:00-14:00	-	Calm	SW	0.9	SW	3.6	SW	4.0	SW	3.6	SW	3.6	SW	4.0
14:00-15:00	-	Calm	SW	2.2	SW	3.6	SW	4.0	SW	3.1	SW	3.1	SW	4.0
15:00-16:00	SW	1.3	SW	2.7	SW	3.6	SW	3.6	SW	1.3	SW	3.1	SW	3.1
16:00-17:00	WSW	1.3	-	Calm	SW	1.8	SW	3.1	SW	3.1	SW	2.7	SW	2.7
17:00-18:00	SW	1.3	-	Calm	SW	2.2	SW	3.1	S	3.1	SW	2.7	SW	2.7
18:00-19:00	SW	0.9	-	Calm	SW	1.3	SW	2.2	SSE	2.2	SW	2.2	SW	2.7
19:00-20:00	-	Calm	NW	0.9	WSW	0.9	SW	2.2	SW	1.8	SW	2.2	SW	1.8
20:00-21:00	ENE	0.9	NW	1.3	SW	0.9	S	2.2	SW	2.2	SW	3.1	SW	2.7
21:00-22:00	ENE	1.8	NW	2.2	-	Calm	S	1.8	SSE	1.3	SW	2.7	SSE	2.7
22:00-23:00	ENE	0.9	NW	2.2	-	Calm	SSW	1.8	SSE	1.3	SW	2.2	SSW	2.7
23:00-00:00	-	Calm	N	1.8	-	Calm	SW	2.2	-	Calm	SW	2.7	SW	2.7
00:00-01:00	-	Calm	N	1.3	-	Calm	SW	2.2	S	0.9	SW	2.7	SW	3.1
01:00-02:00	NE	1.3	N	1.3	-	Calm	SW	2.2	-	Calm	SW	1.3	SW	3.1
02:00-03:00	-	Calm	N	0.9	-	Calm	SW	1.3	SW	0.9	SW	0.9	SW	2.2
03:00-04:00	-	Calm	-	Calm	ENE	0.9	-	Calm	-	Calm	-	Calm	SW	1.3
04:00-05:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	SW	1.8
05:00-06:00	ENE	0.9	N	1.3	-	Calm	-	Calm	-	Calm	-	Calm	SW	2.2
06:00-07:00	NE	0.9	-	Calm	-	Calm	-	Calm	N	0.9	-	Calm	WSW	0.9
07:00-08:00	NE	1.3	N	1.3	-	Calm	NNE	0.9	-	Calm	-	Calm	SW	1.3
08:00-09:00	NNE	0.9	NNE	2.2	N	0.9	N	0.9	-	Calm	SW	1.8	SW	1.8
09:00-10:00	NE	0.9	ENE	1.8	N	0.9	E	0.9	SW	2.2	SW	2.2	SW	1.3
10:00-11:00	NNE	0.9	E	1.3	SW	2.2	ESE	1.3	SW	3.1	SW	3.1	SW	0.9

Measurement Method : - Wind Speed and Wind Direction recording meter

Remarks :
 - WS = Wind Speed
 - WD = Wind Direction



Technical Manager



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E 245168

Report No. : 2022-5004114 / 001-3 (Page 5 of 6)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
MEASUREMENT LOCATION : Ban Chak Klang

MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	3.57	2.98	-	-	-
NNE	2.38	-	0.60	-	-
NE	1.19	1.19	-	-	-
ENE	2.38	1.19	-	-	-
E	0.60	0.60	-	-	-
ESE	-	0.60	-	-	-
SE	-	-	-	-	-
SSE	-	1.19	1.19	-	-
S	1.19	0.60	0.60	0.60	-
SSW	-	0.60	0.60	-	-
SW	3.57	8.93	16.67	18.45	-
WSW	1.19	0.60	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	0.60	0.60	1.19	-	-
NNW	-	-	-	-	-
CALM	24.40				



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E 245169

Report No. : 2022-5003470 / 001-1 (Page 1 of 1)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** January 5-6, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Fence Line (North)	1. Acetaldehyde	5.80	10.46	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	1.00	3.19	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	7.36	25.59	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.H3982 and Regulator No.5799
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).


 Technical Manager



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E 242548

Report No. : 2022-5003470 / 001-3 (Page 1 of 1)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** January 5-6, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	1. Acetaldehyde	5.96	10.75	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	1.16	3.71	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	11.00	38.24	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.7097 and Regulator No.2243
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5003470 / 001-4 (Page 1 of 1)

Issued date : January 20, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** January 5-6, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	1. Acetaldehyde	5.36	9.67	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.64	2.04	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	11.36	39.49	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No. 7105 and Regulator No. 5804
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

TY/RS/MTM/MTM

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E 242551

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Member of the SGS Group

Report No. : 2022-5003470 / 002-1 (Page 1 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-684-821
 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin Sanglemngam

Time	Wind Direction	Wind Speed (m/s)
09:00-10:00	NE	1.8
10:00-11:00	NE	1.8
11:00-12:00	NNW	1.3
12:00-13:00	NNW	1.3
13:00-14:00	NE	1.3
14:00-15:00	SW	0.9
15:00-16:00	SSE	1.8
16:00-17:00	SSW	1.8
17:00-18:00	ENE	0.9
18:00-19:00	ESE	0.9
19:00-20:00	SE	0.9
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	WSW	0.9
00:00-01:00	NNW	1.3
01:00-02:00	NNE	1.3
02:00-03:00	NNE	1.8
03:00-04:00	N	1.8
04:00-05:00	N	1.8
05:00-06:00	NNE	2.2
06:00-07:00	N	2.2
07:00-08:00	N	2.2
08:00-09:00	N	2.2

Measurement Method : - Wind speed and Wind direction recording meter/ ISO

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Technical Manager

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E 242556

Report No. : 2022-5003470 / 002-1 (Page 2 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin Sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	8.33	12.50	-	-
NNE	-	8.33	4.17	-	-
NE	-	12.50	-	-	-
ENE	4.17	-	-	-	-
E	-	-	-	-	-
ESE	4.17	-	-	-	-
SE	4.17	-	-	-	-
SSE	-	4.17	-	-	-
S	-	-	-	-	-
SSW	-	4.17	-	-	-
SW	4.17	0	-	-	-
WSW	4.17	0	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	12.50	-	-	-
CALM	12.50				

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E 242557

Report No. : 2022-5003470 / 002-1 (Page 3 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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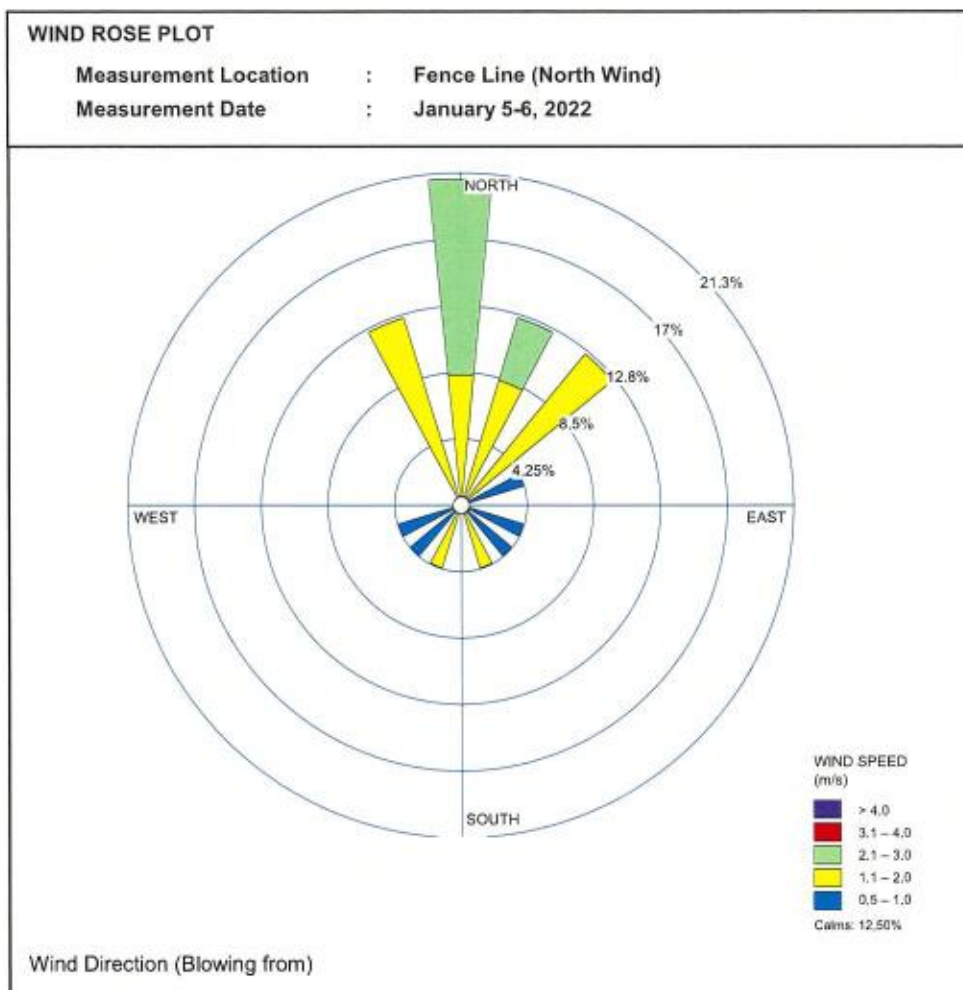
Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin Sanglemngam



Technical Manager

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E 242558

Report No. : 2022-5003470 / 002-3 (Page 1 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin Samglemngam

Time	Wind Direction	Wind Speed (m/s)
14:00-15:00	SSW	2.7
15:00-16:00	SSW	1.8
16:00-17:00	WNW	1.3
17:00-18:00	WNW	0.9
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	-	Calm
05:00-06:00	-	Calm
06:00-07:00	-	Calm
07:00-08:00	-	Calm
08:00-09:00	N	0.9
09:00-10:00	NE	1.8
10:00-11:00	NNE	2.2
11:00-12:00	N	2.7
12:00-13:00	N	2.7
13:00-14:00	N	1.8

Measurement Method : - Wind speed and Wind direction recording meter/ ISO

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Technical Manager

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E 242562

Report No. : 2022-5003470 / 002-3 (Page 2 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin Samglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	4.17	4.17	8.33	-	-
NNE	-	-	4.17	-	-
NE	-	4.17	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	-	-	-	-
SSW	-	4.17	4.17	-	-
SW	-	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	4.17	4.17	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	58.33				



Technical Manager

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E 242563

Report No. : 2022-5003470 / 002-3 (Page 3 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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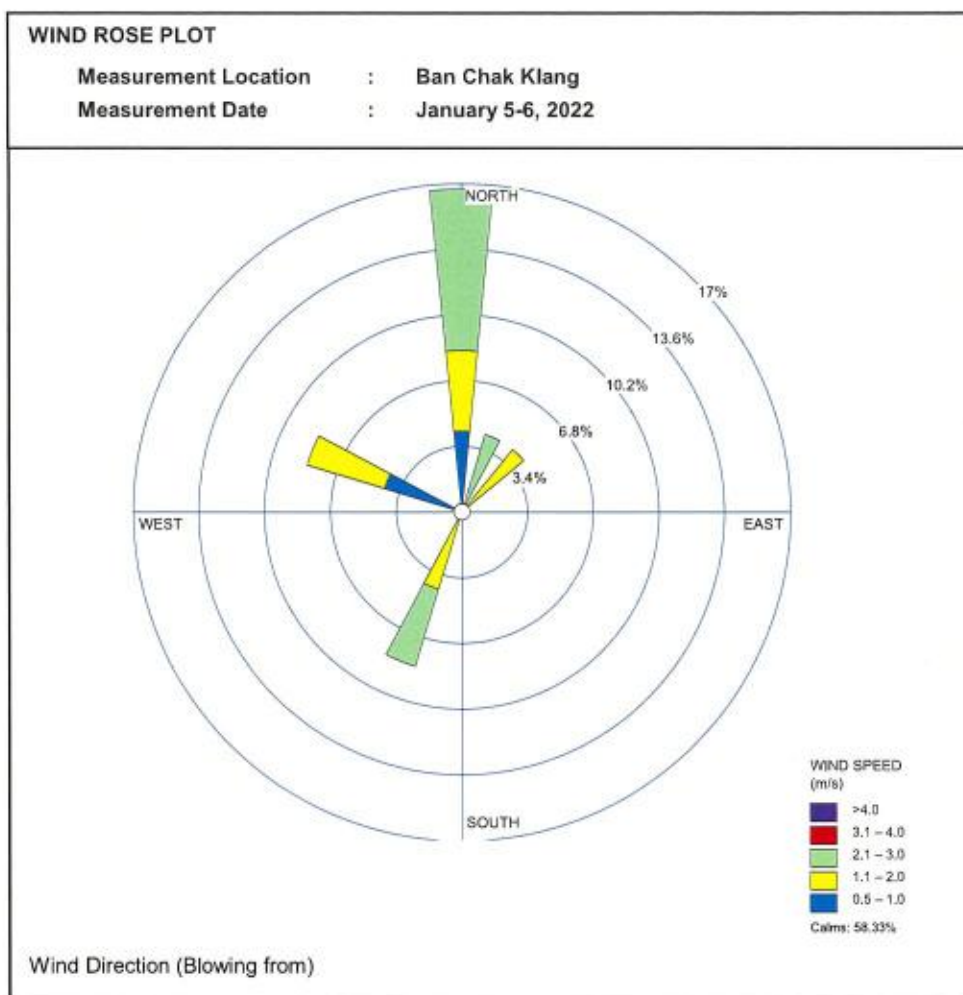
Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin Samglemngam



SGS (THAILAND) LIMITED



Technical Manager

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E 242564

Report No. : 2022-5003470 / 002-4 (Page 1 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin Sanglemngam

Time	Wind Direction	Wind Speed (m/s)
10:00-11:00	S	1.3
11:00-12:00	SSW	2.2
12:00-13:00	SW	2.7
13:00-14:00	SW	2.2
14:00-15:00	SW	2.7
15:00-16:00	SW	2.2
16:00-17:00	SW	1.8
17:00-18:00	W	0.9
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	N	0.9
05:00-06:00	NE	0.9
06:00-07:00	-	Calm
07:00-08:00	-	Calm
08:00-09:00	NNE	1.3
09:00-10:00	ENE	1.8

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager



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E 248208

Report No. : 2022-5003470 / 002-4 (Page 2 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin Sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	4.17	-	-	-	-
NNE	-	4.17	-	-	-
NE	4.17	-	-	-	-
ENE	-	4.17	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	4.17	-	-	-
SSW	-	-	4.17	-	-
SW	-	4.17	16.67	-	-
WSW	-	-	-	-	-
W	4.17	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	50.00				



Technical Manager

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E 248209

Report No. : 2022-5003470 / 002-4 (Page 3 of 3)

Issued date : January 20, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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 Tel. 038-684-816 Fax. 038-684-821
 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

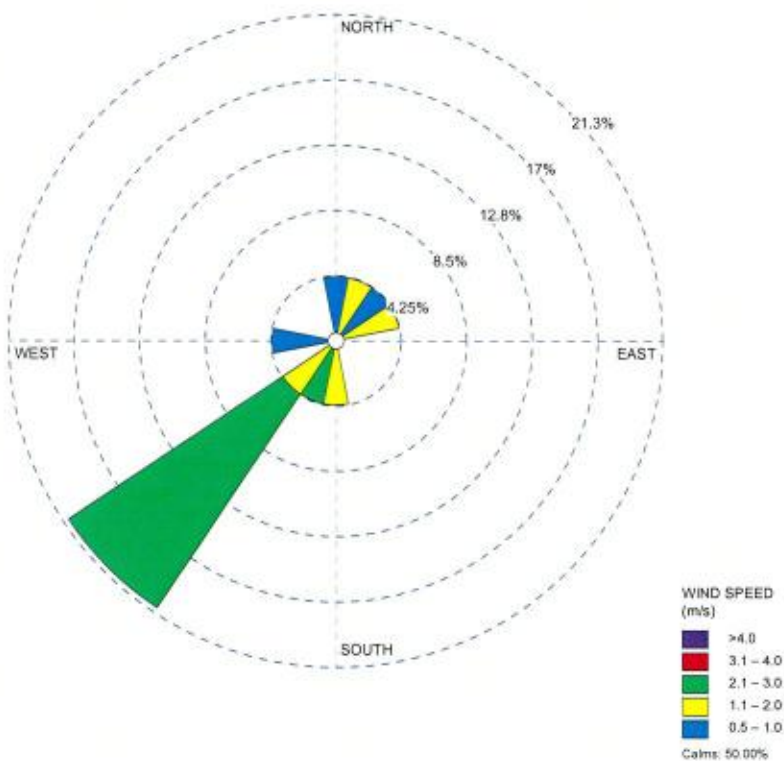
MEASUREMENT DATE : January 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin Sanglemngam

WIND ROSE PLOT

Measurement Location : Wat Nong Feab School
Measurement Date : January 5-6, 2022



Wind Direction (Blowing from)



SGS (THAILAND) LIMITED

[Redacted Signature]
 Technical Manager

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E 248210

Report No. : 2022-5003768 / 001-7 (Page 1 of 1)

Issued date : March 8, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** February 24-25, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	1. Acetaldehyde	2.40	4.33	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	1.16	3.71	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	0.32	1.11	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks: - Canister Tank No.8416 and Regulator No.1934.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source: ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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E 243599

Report No. : 2022-5003768 / 001-8 (Page 1 of 1)

Issued date : March 8, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** February 24-25, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	1. Acetaldehyde	2.28	4.11	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.20	0.64	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	0.64	2.22	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks: - Canister Tank No.24127 and Regulator No.5799.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source: ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 2019, published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 2020.



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E 243600

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Report No. : 2022-5003768 / 001-9 (Page 1 of 1)

Issued date : March 8, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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 Tel. 038-684-816 Fax. 038-684-821
 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** February 24-25, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	1. Acetaldehyde	3.56	6.42	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.56	1.79	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	0.60	2.09	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks: - Canister Tank No.7265 and Regulator No.5802.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source: ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 18, 2552 (2009).



Technical Manager

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E 243601

Report No. : 2022-5003768 / 001-16 (Page 1 of 1)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** February 24-25, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} ($\mu\text{g}/\text{m}^3$)
		ppb	$\mu\text{g}/\text{m}^3$	
Flag Station	Benzene	1.16	3.71	7.6

Remarks: - Canister Tank No.8416 and Regulator No.1934.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source: ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).




 Technical Manager

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E 243609

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Report No. : 2022-5003768 / 001-17 (Page 1 of 1)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : February 24-25, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	Benzene	0.20	0.64	7.6

Remarks: - Canister Tank No.24127 and Regulator No.5799.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source: ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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E 243610

Report No. : 2022-5003768 / 001-18 (Page 1 of 1)

Issued date : March 8, 2022

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Analysis Report

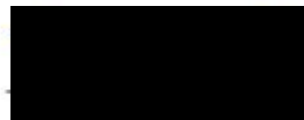
SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : February 24-25, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} ($\mu\text{g}/\text{m}^3$)
		ppb	$\mu\text{g}/\text{m}^3$	
Wat Nong Faeb School	Benzene	0.56	1.79	7.6

Remarks: - Canister Tank No.7265 and Regulator No.5802.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source: ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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E 243611

Report No. : 2022-5003768 / 002-7 (Page 1 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin Sanglemngam

Time	Wind Direction	Wind Speed (m/s)
09:00-10:00	NE	4.0
10:00-11:00	NE	3.6
11:00-12:00	NNE	2.7
12:00-13:00	NNE	2.2
13:00-14:00	NNE	1.3
14:00-15:00	SE	1.8
15:00-16:00	SW	2.2
16:00-17:00	SW	2.7
17:00-18:00	SSW	1.8
18:00-19:00	SSE	0.9
19:00-20:00	-	Calm
20:00-21:00	NNE	1.3
21:00-22:00	NNE	1.8
22:00-23:00	NNE	1.8
23:00-00:00	NNE	2.2
00:00-01:00	NNE	2.2
01:00-02:00	NE	2.2
02:00-03:00	NE	2.7
03:00-04:00	NNE	2.2
04:00-05:00	NNE	2.7
05:00-06:00	NNE	2.2
06:00-07:00	NNE	2.2
07:00-08:00	NNE	3.1
08:00-09:00	NNE	3.1

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 243615

Report No. : 2022-5003768 / 002-7 (Page 2 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (Wind Direction & Wind Speed)
MEASUREMENT DATE : February 24-25, 2022
MEASUREMENT LOCATION : Flag Station
MEASURED BY : Rawin Sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	16.67	33.33	8.33	-
NE	-	-	8.33	8.33	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	4.17	-	-	-
SSE	4.17	-	-	-	-
S	-	-	-	-	-
SSW	-	4.17	-	-	-
SW	-	-	8.33	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	4.17				



Technical Manager

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Report No. : 2022-5003768 / 002-7 (Page 3 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

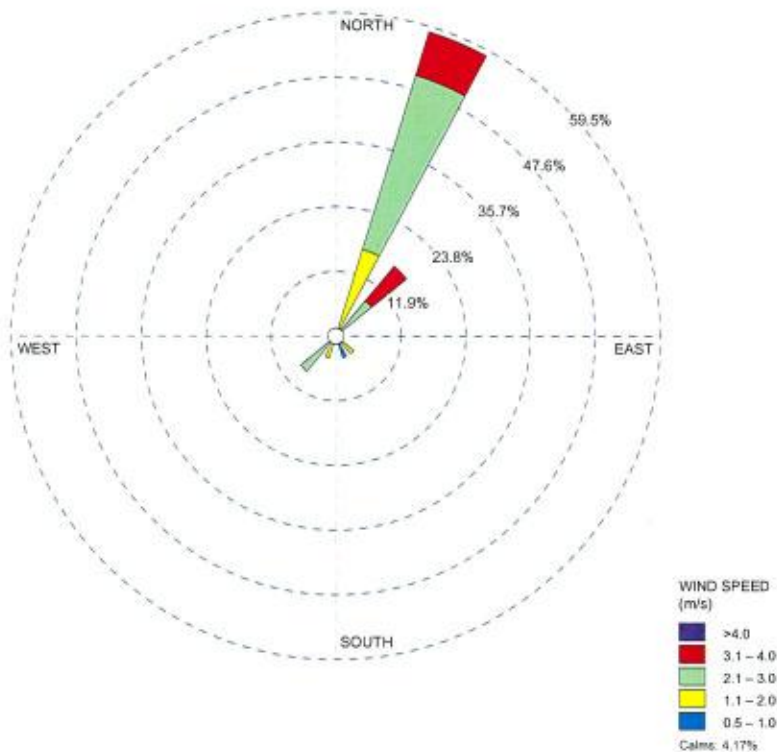
MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin Sanglemngam

WIND ROSE PLOT

Measurement Location : Flag Station
Measurement Date : February 24-25, 2022



Wind Direction (Blowing from)

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E 243684

Report No. : 2022-5003768 / 002-8 (Page 1 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin Sanglemngam

Time	Wind Direction	Wind Speed (m/s)
11:00-12:00	NE	2.7
12:00-13:00	NE	2.2
13:00-14:00	NE	2.2
14:00-15:00	N	1.8
15:00-16:00	SSW	3.6
16:00-17:00	SSW	3.1
17:00-18:00	SW	0.9
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	NNW	0.9
21:00-22:00	NNE	0.9
22:00-23:00	N	1.3
23:00-00:00	N	2.2
00:00-01:00	N	2.2
01:00-02:00	N	1.8
02:00-03:00	N	1.8
03:00-04:00	N	1.8
04:00-05:00	N	1.8
05:00-06:00	N	1.8
06:00-07:00	N	1.8
07:00-08:00	N	1.8
08:00-09:00	NE	3.1
09:00-10:00	NE	2.7
10:00-11:00	NE	3.1

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



(Thipsan Tommana)
 Technical Manager

TY/RS/MTM/MTM

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E 243618

Report No. : 2022-5003768 / 002-8 (Page 2 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (Wind Direction & Wind Speed) **MEASUREMENT DATE** : February 24-25, 2022

MEASUREMENT LOCATION : Bang Chak Klang **MEASURED BY** : Rawin Sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	37.50	8.33	-	-
NNE	4.17	-	-	-	-
NE	-	-	16.67	8.33	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	-	-	-	-
SSW	-	-	-	8.33	-
SW	4.17	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	4.17	-	-	-	-
CALM	8.33				



Technical Manager

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E 243619

Report No. : 2022-5003768 / 002-8 (Page 3 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

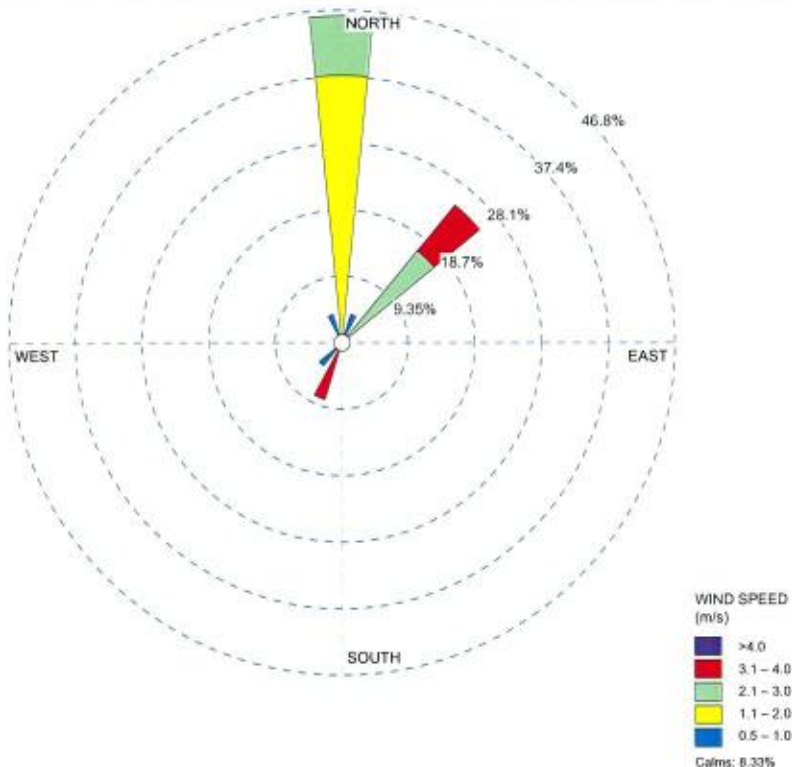
MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin Sanglemngam

WIND ROSE PLOT

Measurement Location : Ban Chak Klang
Measurement Date : February 24-25, 2022



Wind Direction (Blowing from)



Technical Manager

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Report No. : 2022-5003768 / 002-9 (Page 1 of 3)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin Sanglemngam

Time	Wind Direction	Wind Speed (m/s)
10:00-11:00	NE	2.2
11:00-12:00	ENE	2.2
12:00-13:00	NNE	1.8
13:00-14:00	NNE	1.8
14:00-15:00	SW	2.2
15:00-16:00	S	1.8
16:00-17:00	SSW	1.8
17:00-18:00	SW	1.3
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	NNE	0.9
21:00-22:00	NNE	1.8
22:00-23:00	NNE	1.8
23:00-00:00	NNE	1.3
00:00-01:00	NNE	1.8
01:00-02:00	NNE	2.2
02:00-03:00	NE	2.2
03:00-04:00	NNE	2.2
04:00-05:00	NNE	2.2
05:00-06:00	NNE	1.8
06:00-07:00	NNE	1.8
07:00-08:00	NNE	2.2
08:00-09:00	NNE	2.2
09:00-10:00	NE	2.7

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 243621

Report No. : 2022-5003768 / 002-9 (Page 2 of 3)

Issued date : March 8, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin Sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	4.17	33.33	20.83	-	-
NE	-	-	12.50	-	-
ENE	-	-	4.17	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	4.17	-	-	-
SSW	-	4.17	-	-	-
SW	-	4.17	4.17	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	8.33				



Technical Manager

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E 243622

Report No. : 2022-5003768 / 002-9 (Page 3 of 3)

Issued date : March 8, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

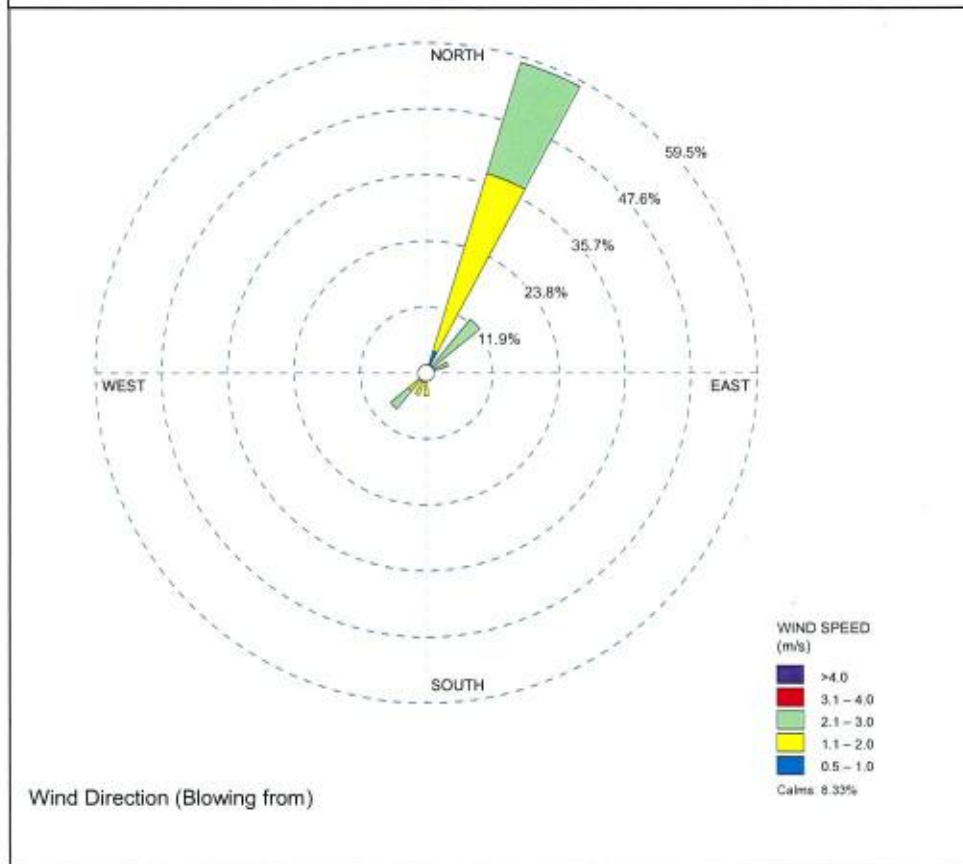
MEASUREMENT DATE : February 24-25, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin Sanglemngam

WIND ROSE PLOT

Measurement Location : Wat Nong Faeb School
Measurement Date : February 24-25, 2022



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E 243685

Report No. : 2022-5003910-1 / 001-2 (Page 1 of 1)

Issued date : March 15, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : March 7-8, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY** : Rawim Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	1. Acetaldehyde	3.38	6.10	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.68	2.17	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	6.17	21.45	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.1088 and Regulator No.5797.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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Technical Manager

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Report No. : 2022-5003910-1 / 001-3 (Page 1 of 1)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : March 7-8, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Ssnglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	1. Acetaldehyde	3.00	5.41	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.16	0.51	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	0.32	1.11	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.7103 and Regulator No.5802.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5003910-1 / 001-4 (Page 1 of 1)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** March 7-8, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} ($\mu\text{g}/\text{m}^3$)
		ppb	$\mu\text{g}/\text{m}^3$	
Wat Nong Faeb School	1. Acetaldehyde	1.67	3.01	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.40	1.28	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	0.08	0.28	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.24125 and Regulator No.5805.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).

Technical Manager



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Report No. : 2022-5003910-1 / 001-6 (Page 1 of 1)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : March 7-8, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	Benzene	0.68	2.17	7.6

Remarks : - Canister Tank No.1088 and Regulator No.5797.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5003910-1 / 001-7 (Page 1 of 1)

Issued date : March 15, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** March 7-8, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	Benzene	0.16	0.51	7.6

Remarks : - Canister Tank No.7103 and Regulator No.5802.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).




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Report No. : 2022-5003910-1 / 001-8 (Page 1 of 1)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** March 7-8, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} ($\mu\text{g}/\text{m}^3$)
		ppb	$\mu\text{g}/\text{m}^3$	
Wat Nong Faeb School	Benzene	0.40	1.28	7.6

Remarks : - Canister Tank No. 24125 and Regulator No.5805.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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Report No. : 2022-5003910-1 / 002-2 (Page 1 of 3)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
08:00-09:00	SW	2.2
09:00-10:00	SW	2.2
10:00-11:00	SW	2.2
11:00-12:00	SW	2.7
12:00-13:00	SSW	2.7
13:00-14:00	SW	2.2
14:00-15:00	SW	2.7
15:00-16:00	SW	2.7
16:00-17:00	SW	2.7
17:00-18:00	SW	1.3
18:00-19:00	WNW	1.3
19:00-20:00	W	1.3
20:00-21:00	WSW	1.3
21:00-22:00	WSW	0.9
22:00-23:00	WNW	0.9
23:00-00:00	N	2.7
00:00-01:00	N	3.1
01:00-02:00	NE	2.7
02:00-03:00	NE	2.2
03:00-04:00	NNE	1.8
04:00-05:00	N	1.8
05:00-06:00	NNE	1.8
06:00-07:00	N	2.2
07:00-08:00	NNE	2.2

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 244200

Report No. : 2022-5003910-1 / 002-2 (Page 2 of 3)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
(Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Wind Direction \ Wind Speed	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	4.17	8.33	4.17	-
NNE	-	8.33	4.17	-	-
NE	-	-	8.33	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	-	-	-	-
SSW	-	-	4.17	-	-
SW	-	4.17	33.33	-	-
WSW	4.17	4.17	-	-	-
W	-	4.17	-	-	-
WNW	4.17	4.17	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	0.00				



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E 244201

Report No. : 2022-5003910-1 / 002-2 (Page 3 of 3)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

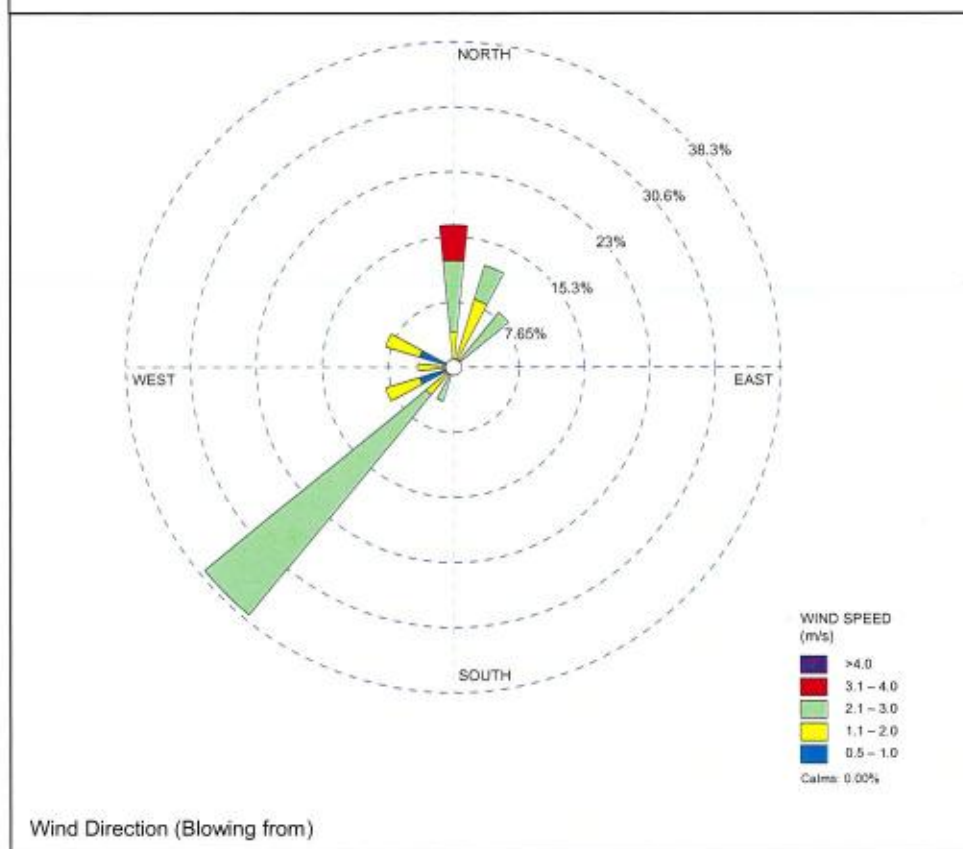
MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Flag Station
Measurement Date : March 7-8, 2022



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Technical Manager

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E 244202

Report No. : 2022-5003910-1 / 002-3 (Page 1 of 3)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
10:00-11:00	S	1.8
11:00-12:00	S	3.1
12:00-13:00	S	3.6
13:00-14:00	S	3.1
14:00-15:00	S	3.1
15:00-16:00	S	3.6
16:00-17:00	S	3.6
17:00-18:00	SSW	1.8
18:00-19:00	SSW	1.3
19:00-20:00	SSW	0.9
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	SSW	0.9
23:00-00:00	NNW	3.1
00:00-01:00	NNE	2.7
01:00-02:00	NNE	2.2
02:00-03:00	NNE	1.8
03:00-04:00	NNW	1.3
04:00-05:00	NNE	1.3
05:00-06:00	NE	0.9
06:00-07:00	NNW	1.3
07:00-08:00	NNW	0.9
08:00-09:00	NNW	1.8
09:00-10:00	NW	1.8

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 244203

Report No. : 2022-5003910-1 / 002-3 (Page 2 of 3)

Issued date : March 15, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	8.33	8.33	-	-
NE	4.17	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	4.17	-	25.00	-
SSW	8.33	8.33	-	-	-
SW	-	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	4.17	-	-	-
NNW	4.17	12.50	-	4.17	-
CALM	8.33				



[Redacted Signature]
 Technical Manager

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E 244204

Report No. : 2022-5003910-1 / 002-3 (Page 3 of 3)

Issued date : March 15, 2022

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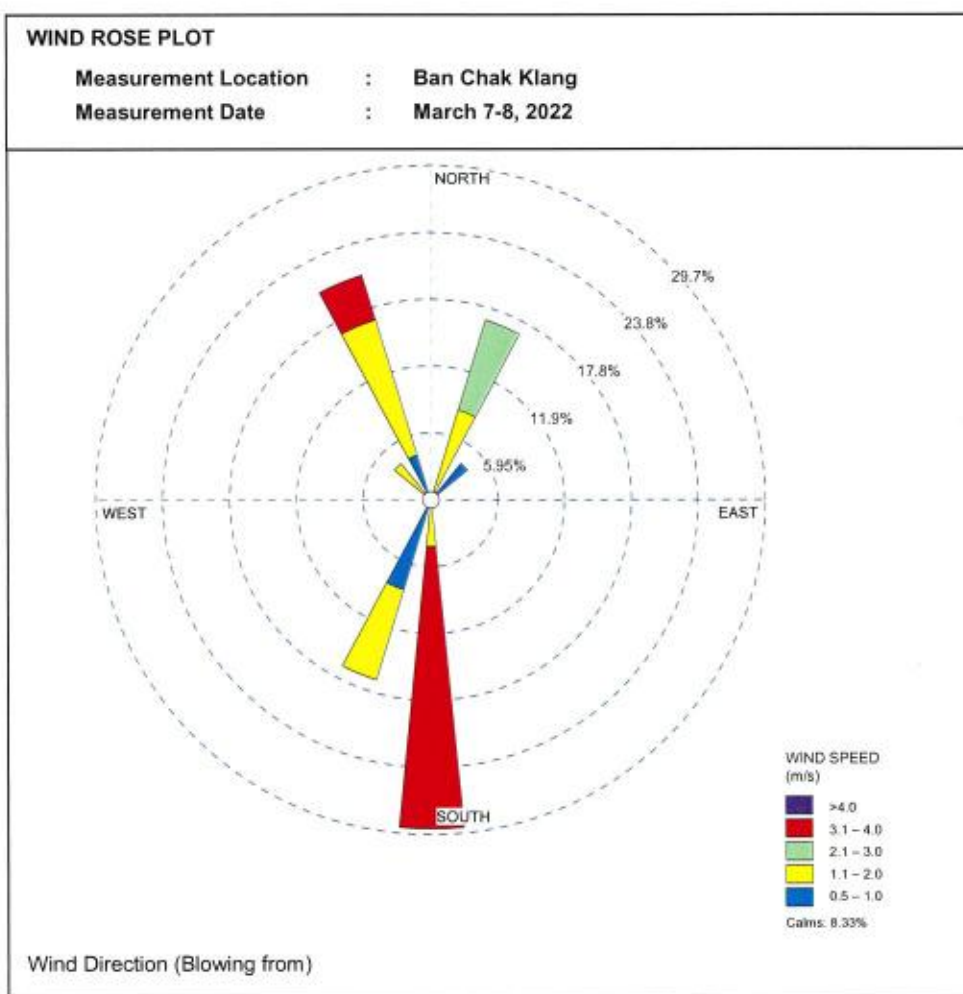
Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam



Technical Manager



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E 244205

Report No. : 2022-5003910-1 / 002-4 (Page 1 of 3)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
10:00-11:00	SW	2.2
11:00-12:00	SW	2.2
12:00-13:00	SSW	2.2
13:00-14:00	SW	2.2
14:00-15:00	SW	2.2
15:00-16:00	SSW	2.2
16:00-17:00	SW	2.2
17:00-18:00	SW	2.2
18:00-19:00	SW	1.8
19:00-20:00	SW	0.9
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	NNE	2.7
02:00-03:00	NNE	2.2
03:00-04:00	NNE	2.2
04:00-05:00	N	2.2
05:00-06:00	NNE	1.3
06:00-07:00	NNE	1.3
07:00-08:00	NNE	1.3
08:00-09:00	NNE	1.3
09:00-10:00	NNE	0.9

Measurement Method : - Wind speed and Wind direction recording meter/ ISO


 Technical Manager



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E 244206

Report No. : 2022-5003910-1 / 002-4 (Page 2 of 3)

Issued date : March 15, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	4.17	-	-
NNE	4.17	16.67	12.50	-	-
NE	-	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	-	-	-	-
SSW	-	-	8.33	-	-
SW	4.17	4.17	25.00	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	20.83				



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E 244207

Report No. : 2022-5003910-1 / 002-4 (Page 3 of 3)

Issued date : March 15, 2022

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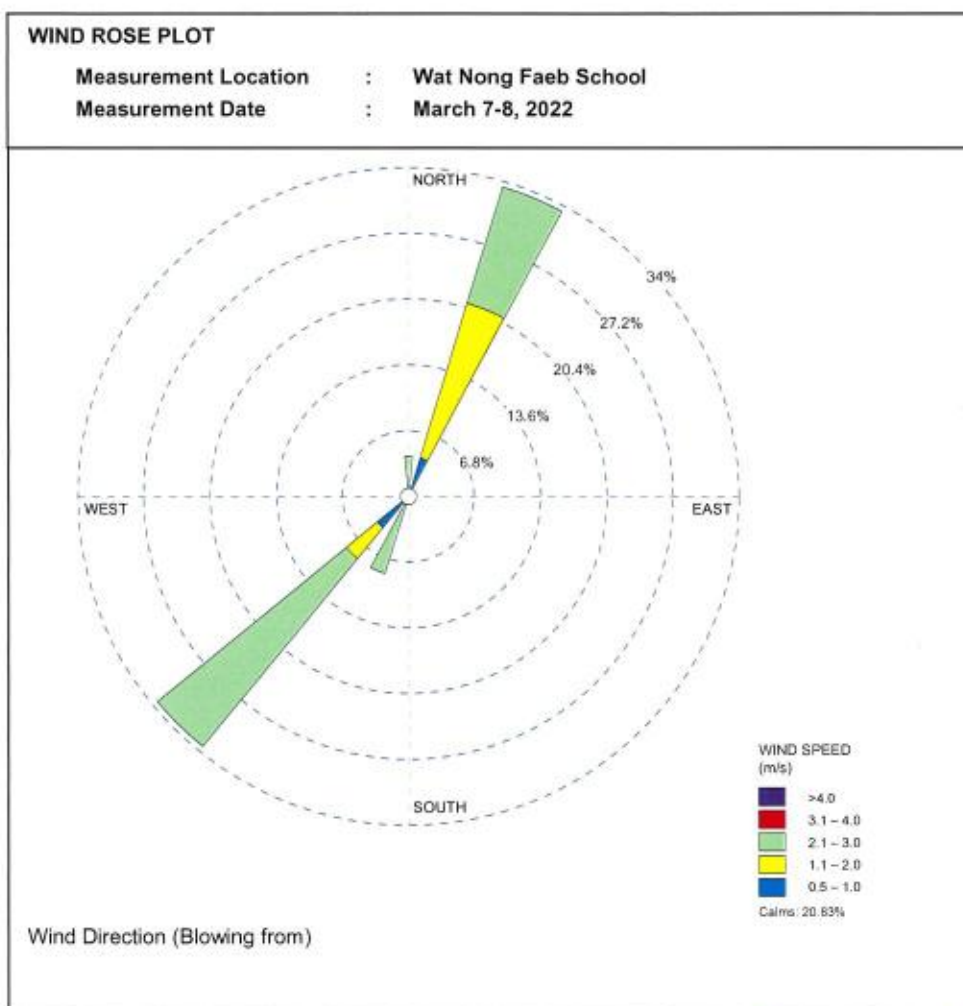
Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : March 7-8, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam



Technical Manager

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E 244208

Report No. : 2022-5004097 / 001-2 (Page 1 of 1)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** April 5-6, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY :** Rawim Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	1. Acetaldehyde	4.84	8.73	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.96	3.07	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	13.92	48.39	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.11592 and Regulator No.5797.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004097 / 001-3 (Page 1 of 1)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : April 5-6, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Snglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	1. Acetaldehyde	3.76	6.78	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.56	1.79	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	3.04	10.57	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.23850 and Regulator No.5800.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 12 January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004097 / 001-4 (Page 1 of 1)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** April 5-6, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	1. Acetaldehyde	3.88	7.00	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.72	2.30	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	5.96	20.72	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.10399 and Regulator No.5808.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 129, Special Part 129, dated January 27, B.E. 2552 (2009).



(Signature)
 Technical Manager

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Report No. : 2022-5004097 / 001-6 (Page 1 of 1)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : April 5-6, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	Benzene	0.96	3.07	7.6

Remarks : - Canister Tank No.11592 and Regulator No.5797.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004097 / 001-7 (Page 1 of 1)

Issued date : May 3, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** April 5-6, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	Benzene	0.56	1.79	7.6

Remarks : - Canister Tank No.23850 and Regulator No.5800.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004097 / 001-8 (Page 1 of 1)

Issued date : May 3, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** April 5-6, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	Benzene	0.72	2.30	7.6

Remarks : - Canister Tank No.10399 and Regulator No.5808.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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Report No. : 2022-5004097/ 002-2 (Page 1 of 3)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-684-821
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
09:00-10:00	NE	3.6
10:00-11:00	NE	3.1
11:00-12:00	ENE	2.2
12:00-13:00	NE	2.2
13:00-14:00	SE	1.3
14:00-15:00	SE	1.8
15:00-16:00	SW	2.2
16:00-17:00	WSW	1.8
17:00-18:00	WSW	1.3
18:00-19:00	SW	1.3
19:00-20:00	W	0.9
20:00-21:00	W	0.9
21:00-22:00	WNW	0.9
22:00-23:00	WNW	0.9
23:00-00:00	WNW	0.9
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	NE	0.9
04:00-05:00	NNE	1.3
05:00-06:00	NE	1.3
06:00-07:00	NNE	1.3
07:00-08:00	-	Calm
08:00-09:00	NE	1.8

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 245189

Report No. : 2022-5004097/ 002-2 (Page 2 of 3)

Issued date : May 3, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Wind Direction \ Wind Speed	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	8.33	-	-	-
NE	4.17	8.33	4.17	8.33	-
ENE	-	-	4.17	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	8.33	-	-	-
SSE	-	-	-	-	-
S	-	-	-	-	-
SSW	-	-	-	-	-
SW	-	4.17	4.17	-	-
WSW	-	8.33	-	-	-
W	8.33	-	-	-	-
WNW	12.50	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	16.67				



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Report No. : 2022-5004097/ 002-2 (Page 3 of 3)

Issued date : May 3, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

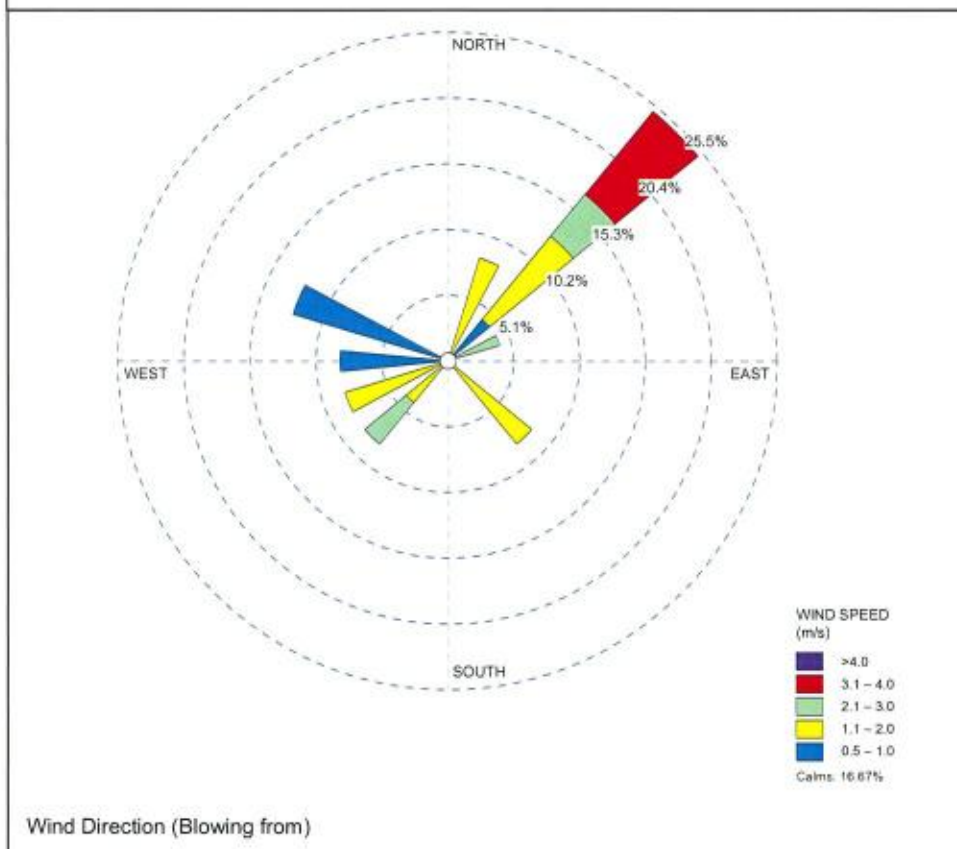
MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Flag Station
Measurement Date : April 5-6, 2022



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Technical Manager

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Report No. : 2022-5004097 / 002-3 (Page 1 of 3)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
10:00-11:00	-	Calm
11:00-12:00	-	Calm
12:00-13:00	-	Calm
13:00-14:00	NE	1.8
14:00-15:00	NE	1.8
15:00-16:00	SSW	2.7
16:00-17:00	SSW	2.7
17:00-18:00	SSW	2.7
18:00-19:00	SSW	0.9
19:00-20:00	-	Calm
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	-	Calm
05:00-06:00	-	Calm
06:00-07:00	-	Calm
07:00-08:00	NNW	0.9
08:00-09:00	NE	0.9
09:00-10:00	NNE	1.8

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



[Redacted Signature]
 Technical Manager

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Report No. : 2022-5004097 / 002-3 (Page 2 of 3)

Issued date : May 3, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	4.17	-	-	-
NE	4.17	8.33	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	-	-	-	-
SSW	4.17	-	12.50	-	-
SW	-	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	4.17	-	-	-	-
CALM	62.50				



SGS (THAILAND) LIMITED



Technical Manager

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Report No. : 2022-5004097 / 002-3 (Page 3 of 3)

Issued date : May 3, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

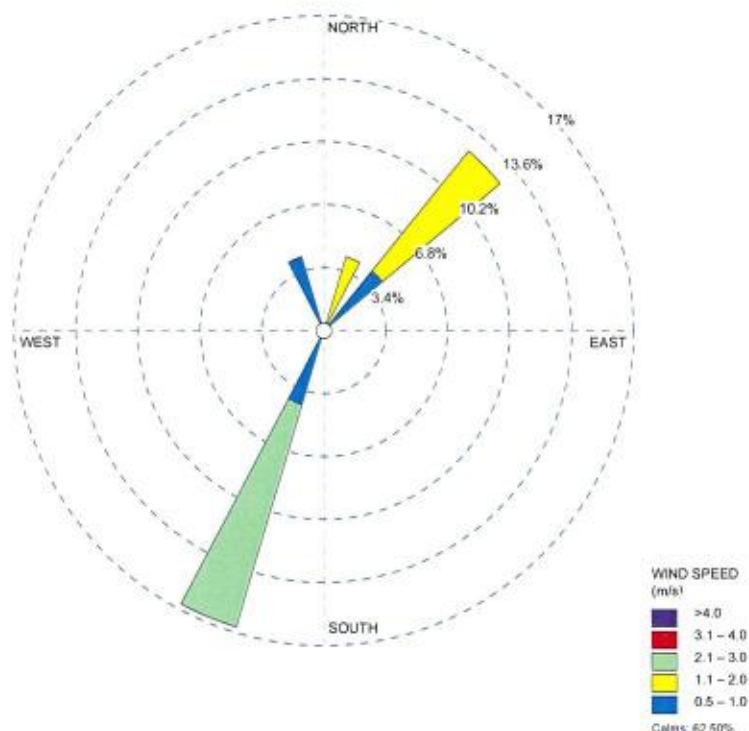
MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Ban Chak Klang
Measurement Date : April 5-6, 2022



Wind Direction (Blowing from)



Technical Manager

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Report No. : 2022-5004097 / 002-4 (Page 1 of 3)

Issued date : May 3, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
10:00-11:00	NE	1.3
11:00-12:00	-	Calm
12:00-13:00	-	Calm
13:00-14:00	-	Calm
14:00-15:00	-	Calm
15:00-16:00	S	2.7
16:00-17:00	SSW	1.8
17:00-18:00	SSW	1.8
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	-	Calm
05:00-06:00	-	Calm
06:00-07:00	-	Calm
07:00-08:00	-	Calm
08:00-09:00	SSW	0.9
09:00-10:00	NE	0.9

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



[Redacted Signature]
 (Thapan Sommai)
 Technical Manager

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E 245183

Report No. : 2022-5004097 / 002-4 (Page 2 of 3)

Issued date : May 3, 2022

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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	-	-	-	-
NE	4.17	4.17	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	-	4.17	-	-
SSW	4.17	8.33	-	-	-
SW	-	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	75.00				



Technical Manager

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Report No. : 2022-5004097 / 002-4 (Page 3 of 3)

Issued date : May 3, 2022

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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

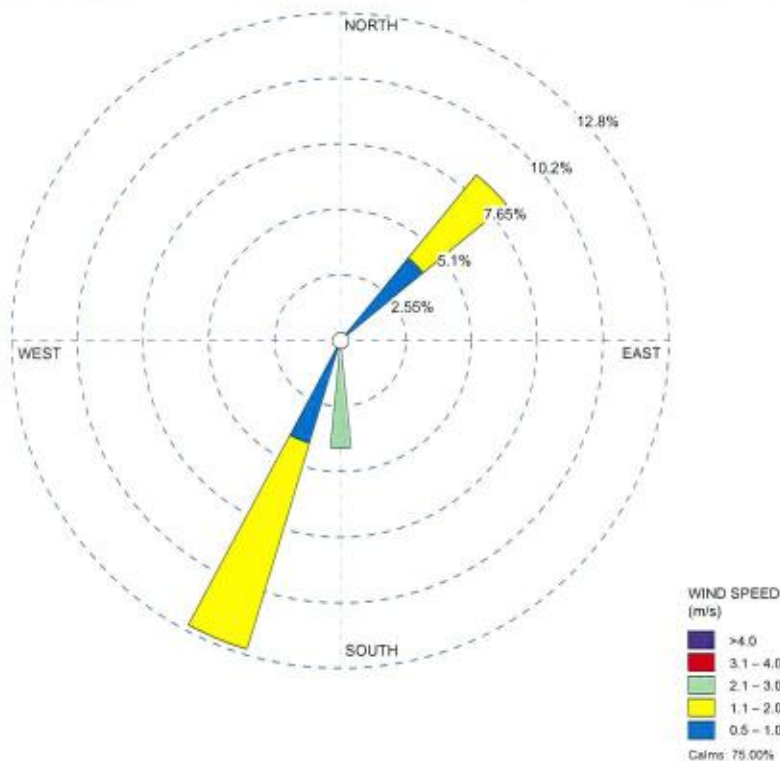
MEASUREMENT DATE : April 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Wat Nong Faeb School
Measurement Date : April 5-6, 2022



Wind Direction (Blowing from)



Technical Manager

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E 245185

Report No. : 2022-5004242 / 001-2 (Page 1 of 1)

Issued date : May 26, 2022

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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** May 5-6, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY :** Rawim Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	1. Acetaldehyde	5.44	9.81	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.44	1.41	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	13.48	46.86	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.8464 and Regulator No.14709.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).

Technical Manager

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Report No. : 2022-5004242 / 001-3 (Page 1 of 1)

Issued date : May 26, 2022

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 E-mail : Sommai.Srip@th.tpsc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : May 5-6, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Ssnglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	1. Acetaldehyde	6.52	11.76	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.12	0.38	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	9.48	32.96	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.9249 and Regulator No.5804.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 100, Extraordinary Part (1st Section), January 27, B.E. 2552 (2009).



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E 248019

Report No. : 2022-5004242 / 001-4 (Page 1 of 1)

Issued date : May 26, 2022

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 E-mail : Sommai.Srip@th.tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** May 5-6, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	1. Acetaldehyde	4.14	7.47	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.40	1.28	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	4.42	15.37	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.4874 and Regulator No.1283.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004242 / 001-6 (Page 1 of 1)

Issued date : May 26, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** May 5-6, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	Benzene	0.44	1.41	7.6

Remarks : - Canister Tank No.8464 and Regulator No.14709.
 - Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.
Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



(Thepsan Yommana)
 Technical Manager

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Report No. : 2022-5004242 / 001-7 (Page 1 of 1)

Issued date : May 26, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : May 5-6, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	Benzene	0.12	0.38	7.6

Remarks : - Canister Tank No.9249 and Regulator No.5804.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



Technical Manager

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Report No. : 2022-5004242 / 001-8 (Page 1 of 1)

Issued date : May 26, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE :** May 5-6, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY :** Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} ($\mu\text{g}/\text{m}^3$)
		ppb	$\mu\text{g}/\text{m}^3$	
Wat Nong Faeb School	Benzene	0.40	1.28	7.6

Remarks : - Canister Tank No.4874 and Regulator No.1283.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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E 248014

Report No. : 2022-5004242 / 002-2 (Page 1 of 3)

Issued date : May 26, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)
MEASUREMENT LOCATION : Flag Station

MEASUREMENT DATE : May 5-6, 2022

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
09:00-10:00	NE	1.3
10:00-11:00	NE	1.3
11:00-12:00	ENE	0.9
12:00-13:00	SE	0.9
13:00-14:00	SE	1.3
14:00-15:00	SE	1.8
15:00-16:00	SSE	1.3
16:00-17:00	WSW	1.8
17:00-18:00	SW	0.9
18:00-19:00	W	0.9
19:00-20:00	WNW	0.9
20:00-21:00	W	0.9
21:00-22:00	-	Calm
22:00-23:00	WNW	0.9
23:00-00:00	WNW	0.9
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	NE	0.9
03:00-04:00	NE	0.9
04:00-05:00	NE	1.3
05:00-06:00	ENE	1.3
06:00-07:00	NNE	1.3
07:00-08:00	NE	1.3
08:00-09:00	E	0.9

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



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E 248008

Report No. : 2022-5004242 / 002-2 (Page 2 of 3)

Issued date : May 26, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : May 5-6, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	4.17	-	-	-
NE	8.33	16.67	-	-	-
ENE	4.17	4.17	-	-	-
E	4.17	-	-	-	-
ESE	-	-	-	-	-
SE	4.17	8.33	-	-	-
SSE	-	4.17	-	-	-
S	-	-	-	-	-
SSW	-	-	-	-	-
SW	4.17	-	-	-	-
WSW	-	4.17	-	-	-
W	8.33	-	-	-	-
WNW	12.50	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	12.50				



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E 248009

Report No. : 2022-5004242 / 002-2 (Page 3 of 3)

Issued date : May 26, 2022

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Analysis Report

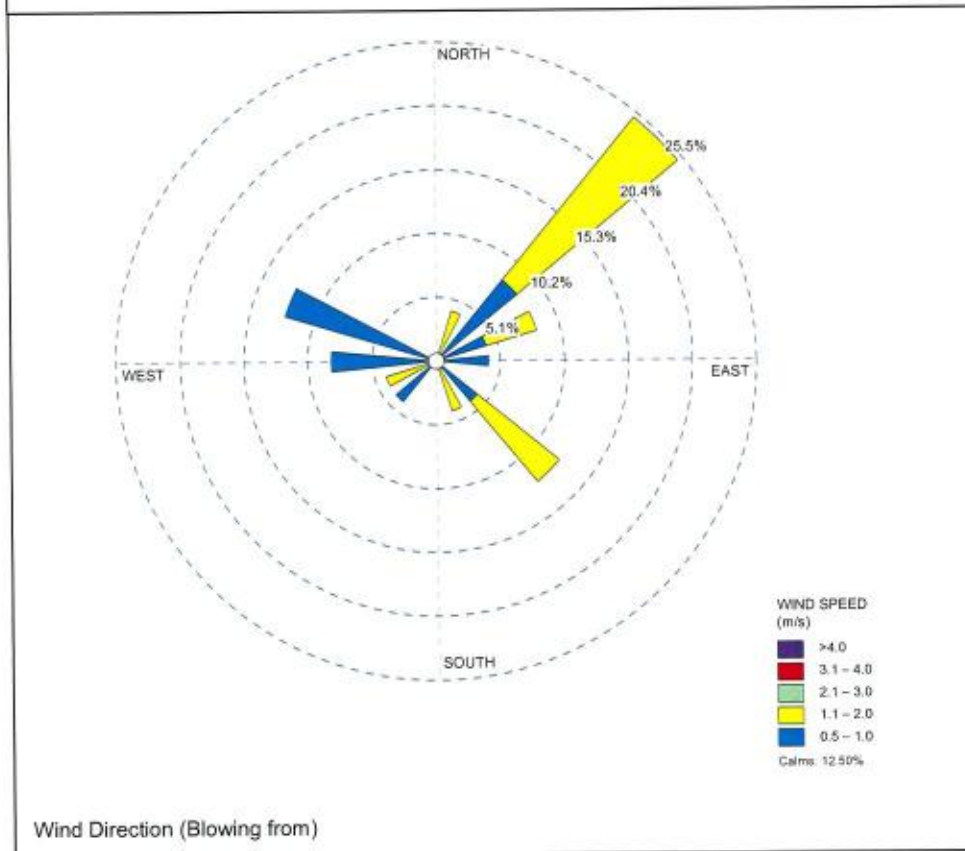
SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)
MEASUREMENT LOCATION : Flag Station

MEASUREMENT DATE : May 5-6, 2022

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Flag Station
Measurement Date : May 5-6, 2022



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Report No. : 2022-5004242 / 002-3 (Page 1 of 3)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : May 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
12:00-13:00	-	Calm
13:00-14:00	SW	1.3
14:00-15:00	S	2.7
15:00-16:00	SW	2.7
16:00-17:00	SW	1.8
17:00-18:00	-	Calm
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	-	Calm
05:00-06:00	-	Calm
06:00-07:00	-	Calm
07:00-08:00	NE	0.9
08:00-09:00	NE	1.3
09:00-10:00	ENE	1.8
10:00-11:00	SE	1.8
11:00-12:00	SSE	3.6

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 248005

Report No. : 2022-5004242 / 002-3 (Page 2 of 3)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : May 5-6, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	-	-	-	-
NE	4.17	4.17	-	-	-
ENE	-	4.17	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	4.17	-	-	-
SSE	-	-	-	4.17	-
S	-	-	4.17	-	-
SSW	-	-	-	-	-
SW	-	8.33	4.17	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	62.50				



Technical Manager

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E 248006

Report No. : 2022-5004242 / 002-3 (Page 3 of 3)

Issued date : May 26, 2022

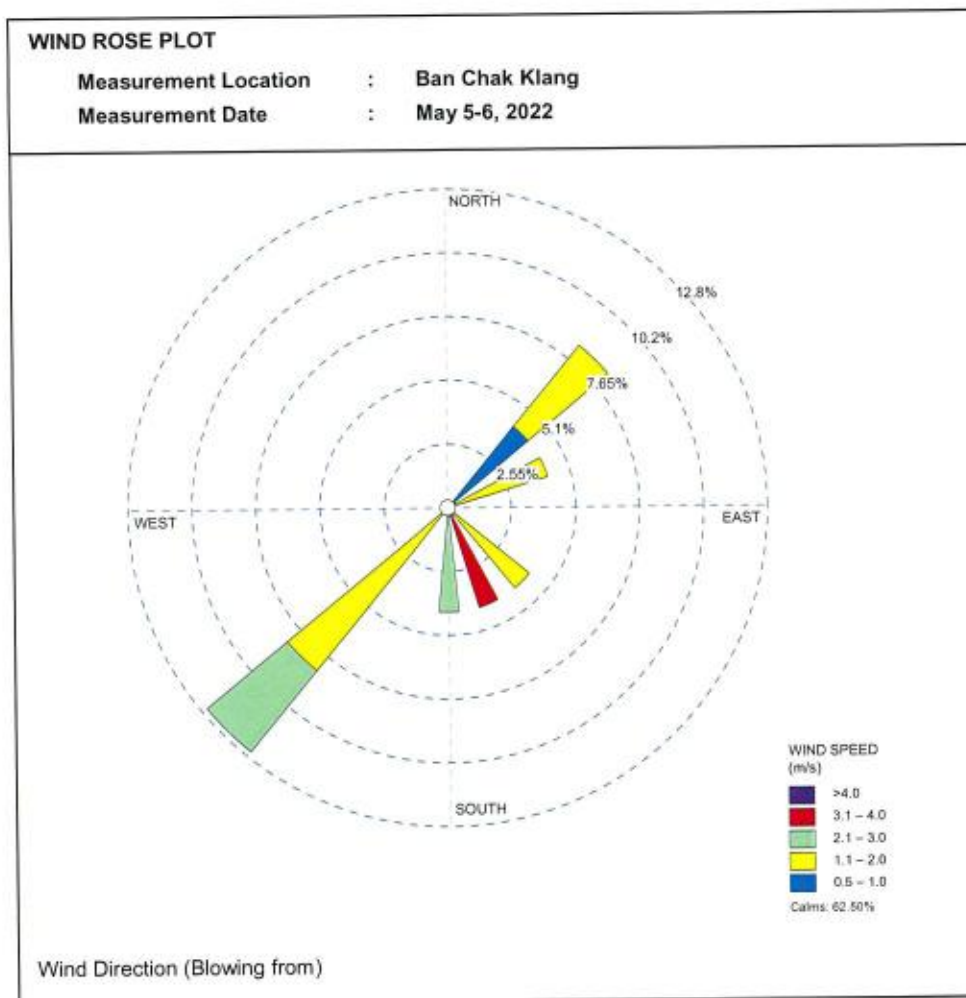
CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)
MEASUREMENT LOCATION : Bang Chak Klang

MEASUREMENT DATE : May 5-6, 2022

MEASURED BY : Rawin sanglemngam



Technical Manager

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E 248007

Report No. : 2022-5004242 / 002-4 (Page 1 of 3)

Issued date : May 26, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : May 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
11:00-12:00	W	0.9
12:00-13:00	SW	1.8
13:00-14:00	SSE	1.8
14:00-15:00	SE	2.2
15:00-16:00	SE	1.8
16:00-17:00	SSW	1.3
17:00-18:00	-	Calm
18:00-19:00	-	Calm
19:00-20:00	-	Calm
20:00-21:00	-	Calm
21:00-22:00	-	Calm
22:00-23:00	-	Calm
23:00-00:00	-	Calm
00:00-01:00	-	Calm
01:00-02:00	-	Calm
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	NNE	0.9
05:00-06:00	-	Calm
06:00-07:00	-	Calm
07:00-08:00	-	Calm
08:00-09:00	NNE	0.9
09:00-10:00	-	Calm
10:00-11:00	NNE	0.9

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



Technical Manager

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E 248002

Report No. : 2022-5004242 / 002-4 (Page 2 of 3)

Issued date : May 26, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : May 5-6, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	12.50	-	-	-	-
NE	-	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	4.17	4.17	-	-
SSE	-	4.17	-	-	-
S	-	-	-	-	-
SSW	-	4.17	-	-	-
SW	-	4.17	-	-	-
WSW	-	-	-	-	-
W	4.17	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	62.50				



Technical Manager



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E 248003

Report No. : 2022-5004242 / 002-4 (Page 3 of 3)

Issued date : May 26, 2022

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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

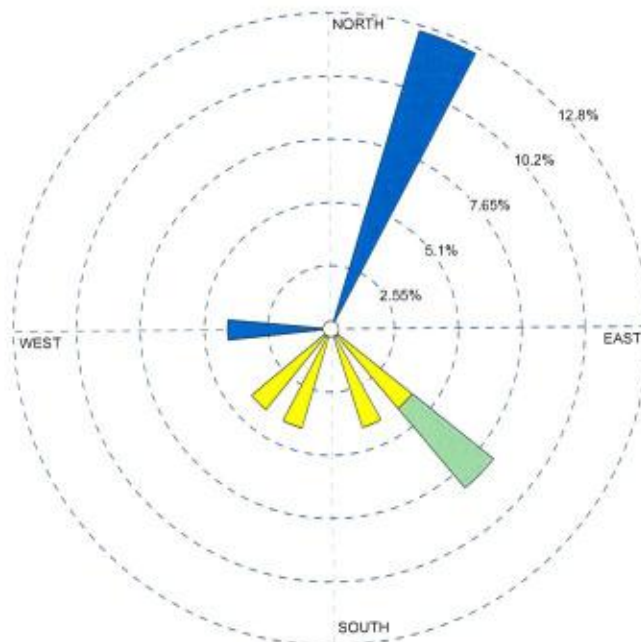
SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)
MEASUREMENT LOCATION : Wat Nong Feab School

MEASUREMENT DATE : May 5-6, 2022

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Wat Nong Faeb School
Measurement Date : May 5-6, 2022



WIND SPEED
(m/s)
 >4.0
 3.1 - 4.0
 2.1 - 3.0
 1.1 - 2.0
 0.5 - 1.0
 Calms: 62.50%

Wind Direction (Blowing from)

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Technical Manager

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Report No. : 2022-5004242-1 / 001-2 (Page 1 of 1)

Issued date : June 16, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : June 1-2, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY** : Rawim Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	1. Acetaldehyde	3.79	6.84	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	0.42	1.34	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	21.41	74.43	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.H4017 and Regulator No.5794.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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Report No. : 2022-5004242-1 / 001-3 (Page 1 of 1)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : June 1-2, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Ssnglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	1. Acetaldehyde	4.30	7.76	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	<0.05	<0.16	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	5.81	20.20	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.7103 and Regulator No.5803.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 129, dated January 27, B.E. 2552 (2009).



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Report No. : 2022-5004242-1 / 001-4 (Page 1 of 1)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : June 1-2, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} ($\mu\text{g}/\text{m}^3$)
		ppb	$\mu\text{g}/\text{m}^3$	
Wat Nong Faeb School	1. Acetaldehyde	7.24	13.06	860
	2. Acrolein	<0.10	<0.23	0.55
	3. Acrylonitrile	<0.05	<0.11	10
	4. Benzene	<0.05	<0.16	7.6
	5. Benzyl Chloride	<0.05	<0.26	12
	6. 1,3-butadiene	<0.05	<0.11	5.3
	7. Bromomethane	<0.05	<0.19	190
	8. Carbon Tetrachloride	<0.05	<0.31	150
	9. Chloroform	<0.05	<0.24	57
	10. 1,2 Dibromoethane	<0.05	<0.38	370
	11. 1,4 Dichlorobenzene	<0.05	<0.30	1,100
	12. 1,2-dichloroethane (EDC)	<0.05	<0.20	48
	13. Dichloromethane	2.52	8.76	210
	14. 1,2-dichloropropane	<0.05	<0.23	82
	15. 1,4 Dioxane	<0.05	<0.18	860
	16. Tetrachloroethylene	<0.05	<0.34	400
	17. 1,1,2,2 -Tetrachloroethane	<0.05	<0.34	83
	18. Trichloroethylene	<0.05	<0.27	130
	19. Vinyl Chloride	<0.05	<0.13	20

Remarks : - Canister Tank No.1085 and Regulator No.1283.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).

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Report No. : 2022-5004242-1 / 001-6 (Page 1 of 1)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : June 1-2, 2022
SAMPLING LOCATION : Flag Station **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Flag Station	Benzene	0.42	1.34	7.6

Remarks : - Canister Tank No.H4017 and Regulator No.5794.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).




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Report No. : 2022-5004242-1 / 001-7 (Page 1 of 1)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : June 1-2, 2022
SAMPLING LOCATION : Ban Chak Klang **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Ban Chak Klang	Benzene	<0.05	<0.16	7.6

Remarks : - Canister Tank No.7103 and Regulator No.5803.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



[Redacted Signature]
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Report No. : 2022-5004242-1 / 001-8 (Page 1 of 1)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality (VOCs by Canister) **SAMPLING DATE** : June 1-2, 2022
SAMPLING LOCATION : Wat Nong Faeb School **SAMPLING BY** : Rawin Sanglemngam

Sampling Location	Parameter	Value (24-hr)		Surveillant Value ^{1/} (µg/m ³)
		ppb	µg/m ³	
Wat Nong Faeb School	Benzene	<0.05	<0.16	7.6

Remarks : - Canister Tank No.1085 and Regulator No.1283.

- Sampling and analytical technique based on EPA TO-15 by Canister and GC-MS.

Source : ^{1/} Notification of the Pollution Control Department, subjected 'The surveillant values of volatile organic compounds (VOCs) in ambient air for 24 hours period', dated December 18, B.E. 2551 (2008), published in the Royal Government Gazette Vol. 126, Special Part 13D, dated January 27, B.E. 2552 (2009).



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Report No. : 2022-5004242-1 / 002-2 (Page 1 of 3)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
13:00-14:00	SW	2.7
14:00-15:00	SW	2.2
15:00-16:00	S	2.2
16:00-17:00	SW	2.2
17:00-18:00	SW	1.8
18:00-19:00	SW	1.8
19:00-20:00	SW	1.3
20:00-21:00	SW	1.8
21:00-22:00	SW	1.8
22:00-23:00	WSW	1.3
23:00-00:00	W	1.3
00:00-01:00	SW	1.3
01:00-02:00	W	1.3
02:00-03:00	SW	0.9
03:00-04:00	WSW	0.9
04:00-05:00	WSW	0.9
05:00-06:00	SW	1.3
06:00-07:00	W	1.3
07:00-08:00	S	1.3
08:00-09:00	SW	1.8
09:00-10:00	SW	2.2
10:00-11:00	SW	2.2
11:00-12:00	SW	2.7
12:00-13:00	SW	2.7

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



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Report No. : 2022-5004242-1 / 002-2 (Page 2 of 3)

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	-	-	-	-
NE	-	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	4.17	4.17	-	-
SSW	-	-	-	-	-
SW	4.17	33.33	29.17	-	-
WSW	8.33	4.17	-	-	-
W	-	12.50	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	0.00				



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Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

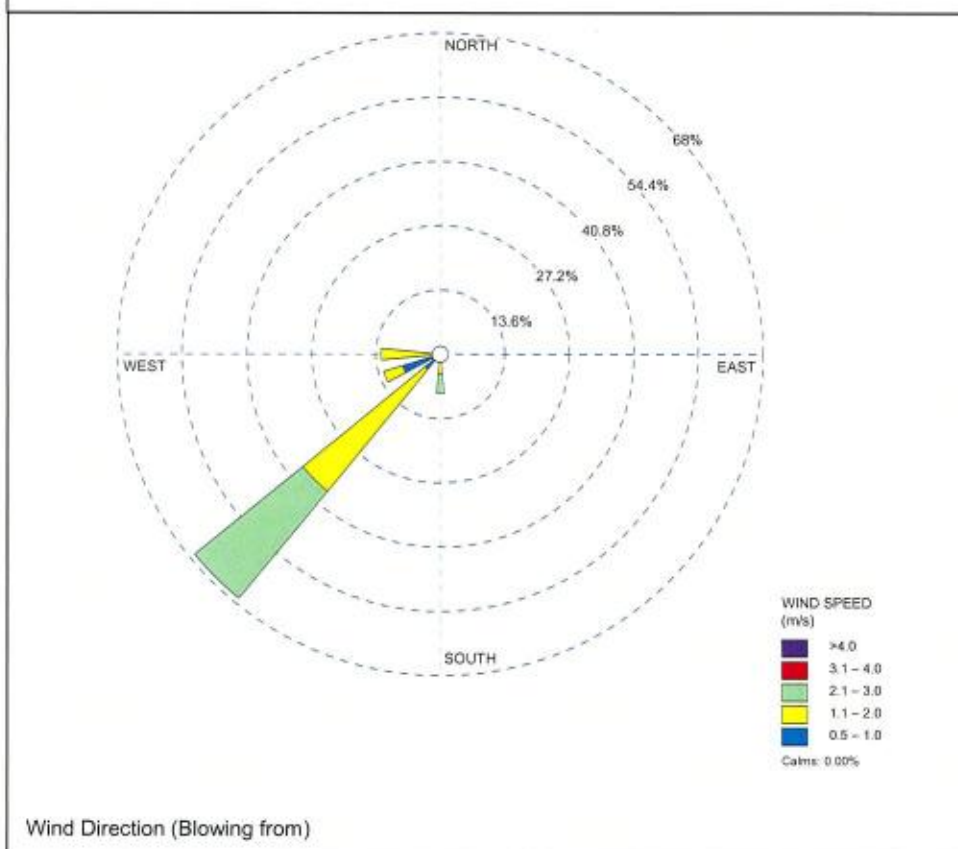
MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Flag Station

MEASURED BY : Rawin sanglemngam

WIND ROSE PLOT

Measurement Location : Flag Station
Measurement Date : June 1-2, 2022



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Report No. : 2022-5004242-1 / 002-3 (Page 1 of 3)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
14:00-15:00	S	2.7
15:00-16:00	S	3.6
16:00-17:00	S	3.6
17:00-18:00	SSW	2.2
18:00-19:00	SSW	1.8
19:00-20:00	SSW	1.8
20:00-21:00	SSW	2.2
21:00-22:00	S	1.8
22:00-23:00	S	1.3
23:00-00:00	S	0.9
00:00-01:00	SSW	0.9
01:00-02:00	-	Calm
02:00-03:00	SSW	0.9
03:00-04:00	-	Calm
04:00-05:00	SSW	0.9
05:00-06:00	SSW	1.3
06:00-07:00	S	1.3
07:00-08:00	SSW	1.3
08:00-09:00	S	1.8
09:00-10:00	S	2.2
10:00-11:00	S	3.1
11:00-12:00	S	3.6
12:00-13:00	S	3.6
13:00-14:00	S	4.0

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



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Report No. : 2022-5004242-1 / 002-3 (Page 2 of 3)

Issued date : June 16, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	-	-	-	-
NE	-	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	4.17	16.67	8.33	25.00	-
SSW	12.50	16.67	8.33	-	-
SW	-	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	8.33				



Technical Manager

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Report No. : 2022-5004242-1 / 002-3 (Page 3 of 3)

Issued date : June 16, 2022

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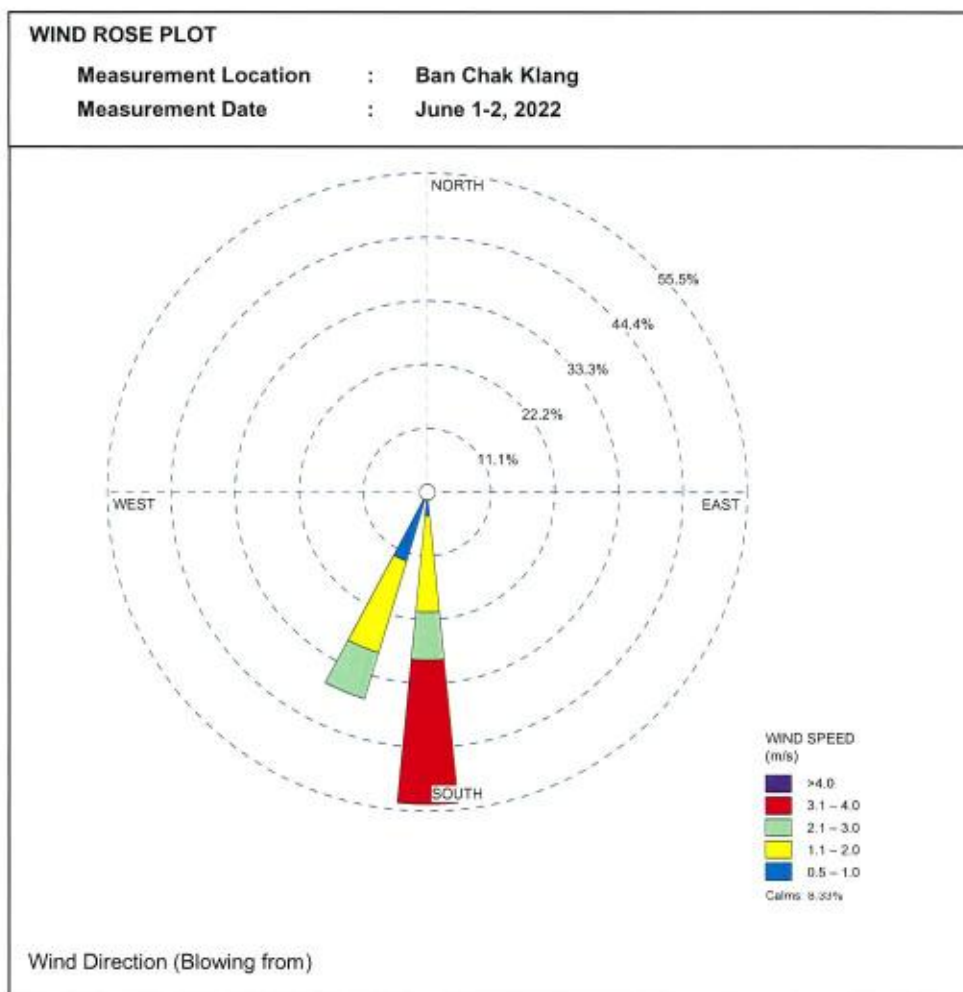
Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Bang Chak Klang

MEASURED BY : Rawin sanglemngam



Technical Manager

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Report No. : 2022-5004242-1 / 002-4 (Page 1 of 3)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Time	Wind Direction	Wind Speed (m/s)
14:00-15:00	S	2.7
15:00-16:00	S	2.7
16:00-17:00	S	3.6
17:00-18:00	S	2.7
18:00-19:00	SSW	2.2
19:00-20:00	SSW	1.8
20:00-21:00	SSW	2.2
21:00-22:00	SSW	2.2
22:00-23:00	S	1.8
23:00-00:00	SSW	1.3
00:00-01:00	SSW	0.9
01:00-02:00	SSW	0.9
02:00-03:00	-	Calm
03:00-04:00	-	Calm
04:00-05:00	SSW	0.9
05:00-06:00	SSW	0.9
06:00-07:00	SSW	1.3
07:00-08:00	SSW	1.3
08:00-09:00	S	1.8
09:00-10:00	S	2.2
10:00-11:00	S	3.1
11:00-12:00	SSW	3.1
12:00-13:00	SSW	3.6
13:00-14:00	SSW	3.6

Measurement Method : - Wind speed and Wind direction recording meter/ ISO



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Report No. : 2022-5004242-1 / 002-4 (Page 2 of 3)

Issued date : June 16, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam

Wind Speed Wind Direction	Percent of Wind Speed (%)				
	0.5-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	-	-	-	-
NE	-	-	-	-	-
ENE	-	-	-	-	-
E	-	-	-	-	-
ESE	-	-	-	-	-
SE	-	-	-	-	-
SSE	-	-	-	-	-
S	-	8.33	16.67	8.33	-
SSW	16.67	16.67	12.50	12.50	-
SW	-	-	-	-	-
WSW	-	-	-	-	-
W	-	-	-	-	-
WNW	-	-	-	-	-
NW	-	-	-	-	-
NNW	-	-	-	-	-
CALM	8.33				



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Report No. : 2022-5004242-1 / 002-4 (Page 3 of 3)

Issued date : June 16, 2022

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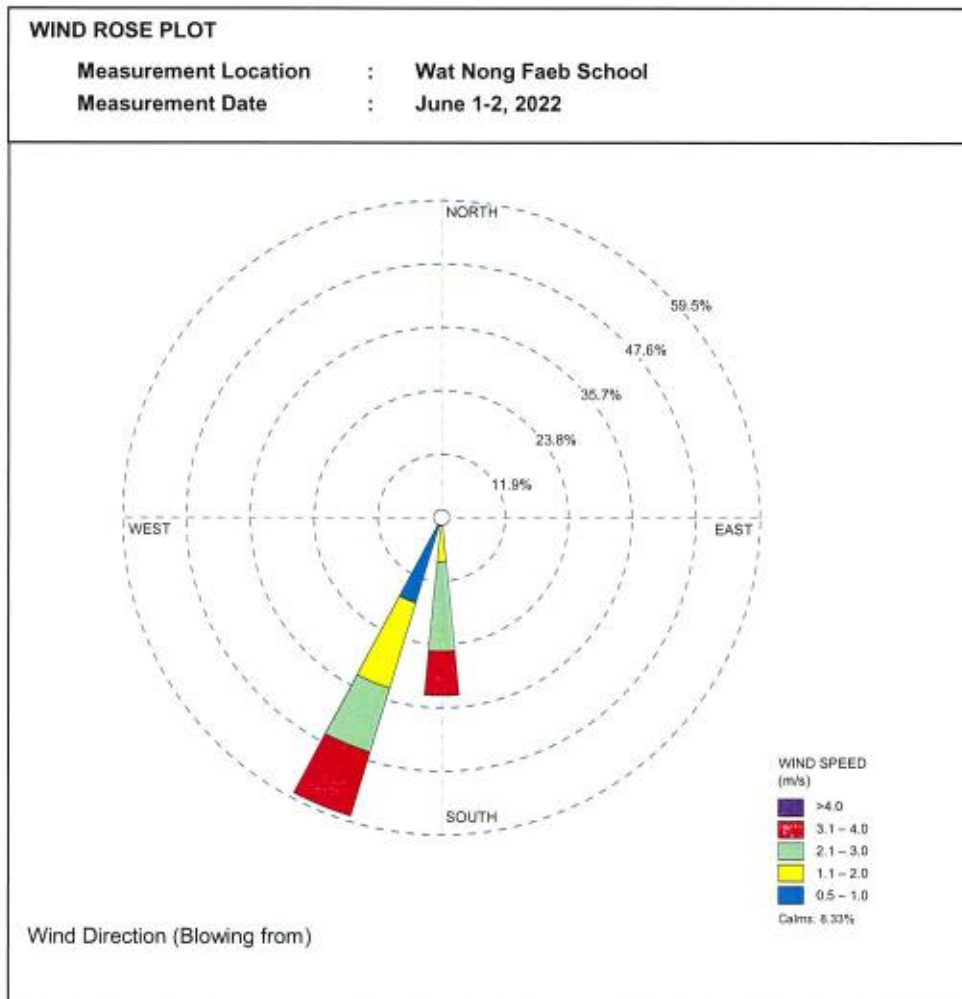
Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
 (Wind Direction & Wind Speed)

MEASUREMENT DATE : June 1-2, 2022

MEASUREMENT LOCATION : Wat Nong Feab School

MEASURED BY : Rawin sanglemngam



Technical Manager

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ภาคผนวก ก2

ผลการตรวจวัดคุณภาพอากาศจากปล่องระบาย

Report No. : 2022-5004114 / 002-1 (Page 1 of 1)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Hot Medium Heater (E-624T), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 20, 2022
SAMPLING TIME : 11:05-11:20 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Natural gas	-	-	-
Stack Diameter	cm.	60	-	-	-
Stack Temperature	°C	82.0	-	-	-
Dry Gas Temperature	°C	35.0	-	-	-
Air Velocity	m/s	1.48	-	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	1,098	-	-	
Moisture	%	12.63	-	-	U.S. EPA Method 4
O ₂	%	13.59	-	-	U.S. EPA Method 3
CO ₂	%	4.35	-	-	
NO _x (as NO ₂)	at actual O ₂	ppm	11.60	-	U.S. EPA Method 7E
	at 7 % O ₂	ppm	22.06	>60	
	emission rate	g/s	0.0067	0.028	Calculation
CO	at actual O ₂	ppm	N.D.	-	U.S. EPA Method 10
	at 7 % O ₂	ppm	N.D.	>200	
	emission rate	g/s	N.D.	0.057	Calculation

Remarks :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for CO at actual O₂ <0.1 ppm, CO at 7% O₂ <0.19 ppm and emission rate <0.0001 g/s.

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
- ^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5004114 / 002-2 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Hot Medium Heater (E-624U), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 20, 2022
SAMPLING TIME : 11:45-12:00 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Natural gas	-	-	-
Stack Diameter	cm.	60	-	-	-
Stack Temperature	°C	99.0	-	-	-
Dry Gas Temperature	°C	36.0	-	-	-
Air Velocity	m/s	1.64	-	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	1,220	-	-	
Moisture	%	8.46	-	-	U.S. EPA Method 4
O ₂	%	12.38	-	-	U.S. EPA Method 3
CO ₂	%	5.04	-	-	
NO _x (as NO ₂)	at actual O ₂	ppm	14.11	-	U.S. EPA Method 7E
	at 7 % O ₂	ppm	23.02	>60	
	emission rate	g/s	0.0090	0.035	Calculation
CO	at actual O ₂	ppm	4.49	-	U.S. EPA Method 10
	at 7 % O ₂	ppm	7.33	>200	
	emission rate	g/s	0.0017	0.072	Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).



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Report No. : 2022-5004114 / 002-3 (Page 1 of 1)

Issued date : May 11, 2022

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 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Hot Medium Heater (E-624W), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 18, 2022
SAMPLING TIME : 13:20-13:35 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Natural gas	-	-	-
Stack Diameter	cm.	58	-	-	-
Stack Temperature	°C	171.5	-	-	-
Dry Gas Temperature	°C	30.0	-	-	-
Air Velocity	m/s	1.13	-	-	-
Volumetric Flow Rate	Nm ³ /hr	595	-	-	U.S. EPA Method 2
Moisture	%	17.20	-	-	U.S. EPA Method 4
O ₂	%	4.13	-	-	U.S. EPA Method 3
CO ₂	%	9.76	-	-	-
NO _x (as NO ₂)	at actual O ₂	ppm	37.73	-	U.S. EPA Method 7E
	at 7 % O ₂	ppm	31.27	>60	>200
	emission rate	g/s	0.0117	0.035	Calculation
CO	at actual O ₂	ppm	N.D.	-	U.S. EPA Method 10
	at 7 % O ₂	ppm	N.D.	>200	>690
	emission rate	g/s	N.D.	0.072	Calculation

Remarks :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for CO at actual O₂ <0.1 ppm, CO at 7% O₂ <0.08 ppm and emission rate <0.00002 g/s.

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
- ^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5004114 / 002-4 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Sludge Incinerator (Z-1123T), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 20, 2022
SAMPLING TIME : 09:50-10:56 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Natural gas	-	-	-
Stack Diameter	cm.	44	-	-	-
Stack Temperature	°C	351.8	-	-	-
Dry Gas Temperature	°C	30.8	-	-	-
Air Velocity	m/s	5.03	-	-	-
Volumetric Flow Rate	Nm ³ /hr	1,186	-	-	U.S.EPA Method 2
Moisture	%	9.28	-	-	U.S.EPA Method 4
O ₂	%	11.89	-	-	U.S.EPA Method 3
CO ₂	%	4.55	-	-	-
TSP	at actual O ₂	mg/Nm ³	1.43	-	U.S.EPA Method 5
	at 7 % O ₂	mg/Nm ³	2.21	>215	>320
	emission rate	g/s	0.0005	0.052	-
NO _x (as NO ₂)	at actual O ₂	ppm	23.71	-	-
	at 7 % O ₂	ppm	36.58	>90	>200
	emission rate	g/s	0.0147	0.041	-
CO	at actual O ₂	ppm	10.91	-	-
	at 7 % O ₂	ppm	16.83	>200	>690
	emission rate	g/s	0.0041	0.055	-

Remark : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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E 245161

Report No. : 2022-5004114 / 002-5 (Page 1 of 2)
Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Effluent Incinerator (G-920U), TPAC Plant
SAMPLING BY : Nawat Chailed (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 19, 2022
SAMPLING TIME : 09:20-10:44 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	waste methanol liquid	-	-	-
Stack Diameter	cm.	65	-	-	-
Stack Temperature	°C	205.7	-	-	-
Dry Gas Temperature	°C	28.8	-	-	-
Air Velocity	m/s	12.80	-	-	-
Volumetric Flow Rate	Nm ³ /hr	8,346	-	-	U.S.EPA Method 2
Moisture	%	12.04	-	-	U.S.EPA Method 4
O ₂	%	10.03	-	-	U.S.EPA Method 3
CO ₂	%	7.23	-	-	-
TSP	at actual O ₂	mg/Nm ³	3.57	-	U.S.EPA Method 5
	at 7 % O ₂	mg/Nm ³	4.57	>100	>320
	emission rate	g/s	0.0083	0.099	-
NO _x (as NO ₂)	at actual O ₂	ppm	11.09	-	-
	at 7 % O ₂	ppm	14.18	>35	>200
	emission rate	g/s	0.0484	0.065	-
CO	at actual O ₂	ppm	N.D.	-	-
	at 7 % O ₂	ppm	N.D.	>50	>690
	emission rate	g/s	N.D.	0.056	-

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for CO at actual O₂ <0.1 ppm, CO at 7% O₂ <0.13 ppm and emission rate <0.0003 g/s.

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5003545 / 002-5 (Page 2 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Effluent Incinerator (G-920U), TPAC Plant
SAMPLING BY : Nawat Chailed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 19, 2022
SAMPLING TIME : 09:20-10:44 hrs.

Parameter	Unit	Value	EIA Criteria ¹⁾	Standard ²⁾	Analytical Method
Fuel Type	-	waste methanol liquid	-	-	-
Stack Diameter	cm.	65	-	-	-
Stack Temperature	°C	205.7	-	-	-
Dry Gas Temperature	°C	28.8	-	-	-
Air Velocity	m/s	12.80	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	8,346	-	-	U.S.EPA Method 4
Moisture	%	12.04	-	-	U.S.EPA Method 3
O ₂	%	10.03	-	-	U.S.EPA Method 3
CO ₂	%	7.23	-	-	U.S.EPA Method 3
Benzene	at actual O ₂	ppm	N.D.	-	U.S.EPA Method 18
	at 7 % O ₂	ppm	N.D.	-	U.S.EPA Method 18
	emission rate	g/s	N.D.	-	Calculation

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Benzene at actual O₂ <0.53 ppm, Benzene at 7% O₂ <0.68 ppm and emission rate <0.0039 g/s.

Sources : ¹⁾ The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
²⁾ Notification of the Ministry of Industry, B.E. 2549 (2006).



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Report No. : 2022-5004114 / 002-6 (Page 1 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Effluent Incinerator (G-920W), TPAC Plant
SAMPLING BY : Natwat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 18, 2022
SAMPLING TIME : 12:05-12:50 hrs.

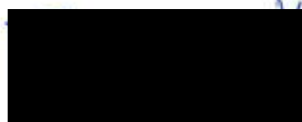
Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	waste methanol liquid	-	-	-
Stack Diameter	cm.	100	-	-	-
Stack Temperature	°C	195.8	-	-	-
Dry Gas Temperature	°C	31.0	-	-	-
Air Velocity	m/s	5.13	-	-	-
Volumetric Flow Rate	Nm ³ /hr	7,898	-	-	U.S.EPA Method 2
Moisture	%	14.03	-	-	U.S.EPA Method 4
O ₂	%	10.46	-	-	U.S.EPA Method 3
CO ₂	%	7.43	-	-	-
TSP	at actual O ₂	mg/Nm ³	0.50	-	U.S.EPA Method 5
	at 7 % O ₂	mg/Nm ³	0.67	> 100	> 320
	emission rate	g/s	0.0011	0.099	-
NO _x (as NO ₂)	at actual O ₂	ppm	11.25	-	-
	at 7 % O ₂	ppm	14.98	> 50	> 200
	emission rate	g/s	0.0464	0.093	-
CO	at actual O ₂	ppm	N.D.	-	-
	at 7 % O ₂	ppm	N.D.	> 50	> 690
	emission rate	g/s	N.D.	> 0.056	-

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for CO at actual O₂ < 0.1 ppm, CO at 7% O₂ < 0.13 ppm and emission rate < 0.000025 g/s.

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5004114 / 002-6 (Page 2 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Effluent Incinerator (G-920W), TPAC Plant
SAMPLING BY : Nawat Chaiload
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE April 18, 2022
SAMPLING TIME : 12:05-12:50 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	waste methanol liquid	-	-	-
Stack Diameter	cm.	100	-	-	-
Stack Temperature	°C	195.8	-	-	-
Dry Gas Temperature	°C	31.0	-	-	-
Air Velocity	m/s	5.13	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	7,898	-	-	U.S.EPA Method 4
Moisture	%	14.03	-	-	U.S.EPA Method 3
O ₂	%	10.46	-	-	U.S.EPA Method 3
CO ₂	%	7.43	-	-	U.S.EPA Method 3
Benzene	at actual O ₂	ppm	N.D.	-	U.S.EPA Method 18
	at 7 % O ₂	ppm	N.D.	-	U.S.EPA Method 18
	emission rate	g/s	N.D.	-	Calculation

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Benzene at actual O₂ <0.54 ppm, Benzene at 7% O₂ <0.72 ppm and emission rate <0.0038 g/s.

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).



[Redacted Signature]
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Report No. : 2022-5004114 / 002-7 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-701T), TPAC Plant
SAMPLING BY : Nawat Chailloed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 22, 2022
SAMPLING TIME : 14.35-15.50 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter	cm.	25	-	-	-
Stack Temperature	°C	35.0	-	-	-
Air Velocity	m/s	19.86	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	3,169	-	-	
O ₂	%	20.80	-	-	U.S.EPA Method 3
CO ₂	%	0.00	-	-	
Benzene	at actual O ₂	ppm	N.D.	≥2.19	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	-	Calculation
Formaldehyde	at actual O ₂	ppm	N.D.	≥12*	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	≥0.008*	Calculation

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Benzene at actual O₂ <0.54 ppm and emission rate <0.0015 g/s, Detection Limit for Formaldehyde at actual O₂ <1.42 ppm and emission rate <0.0015 g/s
 * The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).

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Report No. : 2022-5004114 / 002-8 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-701U), TPAC Plant,
SAMPLING BY : Nawat Challoed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 22, 2022
SAMPLING TIME : 11:10-12:25 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter	cm.	30	-	-	-
Stack Temperature	°C	36.0	-	-	-
Air Velocity	m/s	17.02	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	3,986	-	-	
O ₂	%	20.80	-	-	U.S.EPA Method 3
CO ₂	%	0.00	-	-	
Benzene	at actual O ₂	ppm	N.D.	≥ 2.19	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	-	Calculation
Formaldehyde	at actual O ₂	ppm	N.D.	≥ 12*	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	≥ 0.013*	Calculation

Remarks :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for Benzene at actual O₂ <0.54 ppm and emission rate <0.0019 g/s, Detection Limit for Formaldehyde at actual O₂ <1.40 ppm and emission rate <0.0019 g/s.
- * The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021)

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021)
- ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).



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Report No. : 2022-5004114 / 002-9 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-701W), TPAC Plant
SAMPLING BY : Nawet Chaoled
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 22, 2022
SAMPLING TIME : 09:45-11:00 hr.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter	cm.	48	-	-	-
Stack Temperature	°C	35.0	-	-	-
Air Velocity	m/s	4.45	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	2,667	-	-	
O ₂	%	20.80	-	-	U.S.EPA Method 3
CO ₂	%	0.00	-	-	
Benzene	at actual O ₂	ppm	N.D.	≥ 2.19	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	-	Calculation
Formaldehyde	at actual O ₂	ppm	N.D.	≥ 12*	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	≥ 0.013*	Calculation

Remarks :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for Benzene at actual O₂ < 0.53 ppm and emission rate < 0.0013 g/s, Detection Limit for Formaldehyde at actual O₂ < 1.38 ppm and emission rate < 0.0013 g/s
- * The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
- ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).

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Report No. : 2022-5004114 / 002-10 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-903T), TPAC Plant
SAMPLING BY : Nawat Chailoed
 Sample No.1
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 21, 2022
SAMPLING TIME : 09:25-10:40 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter	cm.	26	-	-	-
Stack Temperature	°C	35.0	-	-	-
Air Velocity	m/s	2.56	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	452	-	-	
O ₂	%	20.80	-	-	U.S.EPA Method 3
CO ₂	%	0.00	-	-	
Benzene	at actual O ₂	ppm	1.64	≥40*	U.S.EPA Method 18
	Emission Rate	g/sec	0.0007	≥0.065*	Calculation
Formaldehyde	at actual O ₂	ppm	0.59	-	U.S.EPA Method 18
	Emission Rate	g/sec	0.00009	-	Calculation

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.

* The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).

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Report No. : 2022-5004114 / 002-10 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-903T), TPAC Plant
SAMPLING BY : Nawat Chailoed
 Sample No.2
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 21, 2022
SAMPLING TIME : 10:45-12:00 hrs.

Parameter		Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter		cm.	26	-	-	-
Stack Temperature		°C	38.0	-	-	-
Air Velocity		m/s	2.67	-	-	U.S.EPA Method 2
Volumetric Flow Rate		Nm ³ /hr	464	-	-	
O ₂		%	20.80	-	-	U.S.EPA Method 3
CO ₂		%	0.00	-	-	
Benzene	at actual O ₂	ppm	1.62	≥40*	≥2.19	U.S.EPA Method 18
	Emission Rate	g/sec	0.0007	≥0.065*	-	Calculation
Formaldehyde	at actual O ₂	ppm	4.79	-	-	U.S.EPA Method 18
	Emission Rate	g/sec	0.0008	-	-	Calculation

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 * The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).

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Report No. : 2022-5004114 / 002-11 (Page 1 of 1)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-903U), TPAC Plant
SAMPLING BY : Nawat Chailoed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 21, 2022
SAMPLING TIME : 12:00-12:15 hrs.

Parameter		Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter		cm.	25	-	-	-
Stack Temperature		°C	35.0	-	-	-
Air Velocity		m/s	7.92	-	-	U.S.EPA Method 2
Volumetric Flow Rate		Nm ³ /hr	1,301	-	-	
O ₂		%	20.80	-	-	U.S.EPA Method 3
CO ₂		%	0.00	-	-	
Benzene	at actual O ₂	ppm	N.D.	≧40*	≧2.19	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	≧0.066*	-	Calculation
Formaldehyde	at actual O ₂	ppm	1.47	-	-	U.S.EPA Method 18
	Emission Rate	g/sec	0.0007	-	-	Calculation

Remark :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for Benzene at actual O₂ < 0.16 ppm and emission rate < 0.0018 g/s.
- * The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
- ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).



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E 245151

Report No. : 2022-5004114 / 002-12 (Page 1 of 1)
Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Vent Scrubber (T-903W), TPAC Plant
SAMPLING BY : Nawat Chailoed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 21, 2022
SAMPLING TIME : 13:15-14:30 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Stack Diameter	cm.	26	-	-	-
Stack Temperature	°C	36.0	-	-	-
Air Velocity	m/s	4.85	-	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	853	-	-	
O ₂	%	20.80	-	-	U.S.EPA Method 3
CO ₂	%	0.00	-	-	
Benzene	at actual O ₂	ppm	N.D.	≥45*	U.S.EPA Method 18
	Emission Rate	g/sec	N.D.	≥0.075*	Calculation
Formaldehyde	at actual O ₂	ppm	0.41	-	U.S.EPA Method 18
	Emission Rate	g/sec	0.0001	-	Calculation

Remarks : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Benzene at actual O₂ <0.54 ppm and emission rate <0.0004 g/s.
 * The emission air criteria at 7% O₂ according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
^{2/} Notification of the Ministry of Natural Resources and Environment, B.E. 2557 (2014).

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Report No. : 2022-5004114 / 002-13 (Page 1 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Off-Gas Incinerator (G-960T), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 19, 2022
SAMPLING TIME : 10:30-11:15 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Waste Gas	-	-	-
Stack Diameter	cm.	80	-	-	-
Stack Temperature	°C	141.6	-	-	-
Air Velocity	m/s	7.05	-	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	7,784	-	-	
Moisture	%	14.79	-	-	U.S. EPA Method 4
O ₂	%	3.58	-	-	U.S. EPA Method 3
CO ₂	%	3.35	-	-	
NO _x (as NO ₂)	at actual O ₂	ppm	0.95	-	U.S. EPA Method 7E
	at 7 % O ₂	ppm	0.76	>21	
	emission rate	g/s	0.0039	0.101	Calculation
CO	at actual O ₂	ppm	N.D.	-	U.S. EPA Method 10
	at 7 % O ₂	ppm	N.D.	>611	
	emission rate	g/s	N.D.	1.788	Calculation

Remark :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for CO at actual O₂ <0.1 ppm, CO at 7% O₂ <0.08 ppm and emission rate <0.0002 g/s.

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
- ^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5004114 / 002-13 (Page 2 of 2)

Issued date : May 11, 2022

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Analysis Report

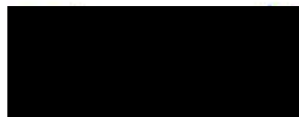
SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Off-Gas Incinerator (G-960T), TPAC Plant
SAMPLING BY : Nawat Chailloed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 19, 2022
SAMPLING TIME : 10:30-11:15 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Analytical Method
Fuel Type	-	Waste Gas	-	-
Stack Diameter	cm.	80	-	-
Stack Temperature	°C	141.6	-	-
Air Velocity	m/s	7.05	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	7,784	-	U.S. EPA Method 4
Moisture	%	14.79	-	U.S. EPA Method 4
O ₂	%	3.58	-	U.S. EPA Method 3
CO ₂	%	3.35	-	U.S. EPA Method 3
Formaldehyde	at actual O ₂	ppm	N.D.	U.S. EPA Method 18
	at 7 % O ₂	ppm	N.D.	U.S. EPA Method 18
	emission rate	g/s	N.D.	Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Formaldehyde at actual O₂ <0.84 ppm, Formaldehyde at 7% O₂ <0.67 ppm and emission rate <0.0022 g/s

Source : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).



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Report No. : 2022-5004114 / 002-14 (Page 1 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Off-Gas Incinerator (G-960U), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)

SAMPLING DATE : April 19, 2022
SAMPLING TIME : 11:30-12:15 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Waste Gas	-	-	-
Stack Diameter	cm.	115	-	-	-
Stack Temperature	°C	151.0	-	-	-
Air Velocity	m/s	6.34	-	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	13,589	-	-	
Moisture	%	18.30	-	-	U.S. EPA Method 4
O ₂	%	2.41	-	-	U.S. EPA Method 3
CO ₂	%	3.62	-	-	
NO _x (as NO ₂)	at actual O ₂	ppm	1.47	-	U.S. EPA Method 7E
	at 7 % O ₂	ppm	1.11	>21	
	emission rate	g/s	0.0104	0.206	Calculation
CO	at actual O ₂	ppm	39.51	-	U.S. EPA Method 10
	at 7 % O ₂	ppm	29.70	>611	
	emission rate	g/s	0.1708	3.649	Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.

Sources : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).

^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5004114 / 002-14 (Page 2 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Off-Gas Incinerator (G-960U), TPAC Plant
SAMPLING BY : Nawat Chailoed
LABORATORY NAME : SGS (Thailand) Limited

SAMPLING DATE : April 19, 2022
SAMPLING TIME : 11:30-12:15 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Analytical Method
Fuel Type	-	Waste Gas	-	-
Stack Diameter	cm.	115	-	-
Stack Temperature	°C	151.0	-	-
Air Velocity	m/s	6.34	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	13,589	-	U.S. EPA Method 4
Moisture	%	18.30	-	U.S. EPA Method 3
O ₂	%	2.41	-	U.S. EPA Method 3
CO ₂	%	3.62	-	U.S. EPA Method 3
Formaldehyde	at actual O ₂	ppm	N.D.	U.S. EPA Method 18
	at 7 % O ₂	ppm	N.D.	U.S. EPA Method 18
	emission rate	g/s	N.D.	Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Formaldehyde at actual O₂ <1.38 ppm Formaldehyde at 7% O₂ <1.04 ppm and emission rate <0.0064 g/s.

Source : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).



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Report No. : 2022-5004114 / 002-15 (Page 1 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Off-Gas Treating Unit (G-960W), TPAC Plant
SAMPLING BY : Nawat Chaiload (๓-197-๙-8541)
LABORATORY NAME : SGS (Thailand) Limited (๓-197)
SAMPLING DATE : April 18, 2022
SAMPLING TIME : 12:05-12:50 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Standard ^{2/}	Analytical Method
Fuel Type	-	Waste Gas	-	-	-
Stack Diameter	cm.	50	-	-	-
Stack Temperature	°C	108.0	-	-	-
Air Velocity	m/s	29.10	-	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	15,328	-	-	U.S. EPA Method 4
Moisture	%	4.60	-	-	U.S. EPA Method 3
O ₂	%	4.32	-	-	U.S. EPA Method 7E
CO ₂	%	2.74	-	-	U.S. EPA Method 7E
NO _x (as NO ₂)	at actual O ₂	ppm	N.D.	-	U.S. EPA Method 7E
	at 7 % O ₂	ppm	N.D.	>18	>200
	emission rate	g/s	N.D.	0.141	Calculation
CO	at actual O ₂	ppm	N.D.	-	U.S. EPA Method 10
	at 7 % O ₂	ppm	N.D.	>607	>690
	emission rate	g/s	N.D.	2.848	Calculation

Remarks :

- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
- N.D. = Not Detected, Detection Limit for NO_x (as NO₂) at actual O₂ <0.2 ppm, NO_x (as NO₂) at 7% O₂ <0.17 ppm and emission rate <0.0016 g/s, Detection Limit for CO at actual O₂ <0.1 ppm, CO at 7% O₂ <0.08 ppm and emission rate <0.0005 g/s

Sources :

- ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).
- ^{2/} Notification of the Ministry of Industry, B.E. 2549 (2006).

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Report No. : 2022-5004114 / 002-15 (Page 2 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Off-Gas Treating Unit (G-960W), TPAC Plant
SAMPLING BY : Nawat Chaiload
LABORATORY NAME : SGS (Thailand) Limited
SAMPLING DATE : April 18, 2022
SAMPLING TIME : 12:05-12:50 hrs.

Parameter	Unit	Value	EIA Criteria ^{1/}	Analytical Method
Fuel Type	-	Waste Gas	-	-
Stack Diameter	cm.	50	-	-
Stack Temperature	°C	108.0	-	-
Air Velocity	m/s	29.10	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm ³ /hr	15,328	-	U.S. EPA Method 4
Moisture	%	4.60	-	U.S. EPA Method 3
O ₂	%	4.32	-	U.S. EPA Method 3
CO ₂	%	2.74	-	U.S. EPA Method 3
Formaldehyde	at actual O ₂	ppm	N.D.	U.S. EPA Method 18
	at 7 % O ₂	ppm	N.D.	U.S. EPA Method 18
	emission rate	g/s	N.D.	Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg and dry basis.
 - N.D. = Not Detected, Detection Limit for Formaldehyde at actual O₂ <1.39 ppm Formaldehyde at 7% O₂ <1.16 ppm and emission rate <0.0073 g/s

Source : ^{1/} The emission air criteria according to EIA study of TPAC Project (Amendment No.3) as approval letter AorKor 5106.2/1682 dated June 21, B.E. 2564 (2021).



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Report No. : 2022-5004114 / 003-2 (Page 1 of 2)

Issued date : May 11, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level
MEASUREMENT LOCATION : Wat Nong Faeb School
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 77273, Calibration Value Reference : 94.2 dB(A),
 Pre Cal : 94.0 dB(A), Post Cal : 94.0 dB(A)
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum
SOUND LEVEL METER NO. : Model CR:161B, Serial No. G079772

Time	Noise Level [dB(A)]								Standard ^U
	April 18-19, 2022		April 19-20, 2022		April 20-21, 2022		April 21-22, 2022		
	Leq	L90	Leq	L90	Leq	L90	Leq	L90	
09:34-10:34	71.2	51.9	56.7	53.8	65.9	50.9	54.2	48.6	
10:34-11:34	80.3	58.1	55.3	51.6	56.1	49.6	55.4	48.8	
11:34-12:34	60.5	54.3	59.1	51.5	58.3	49.9	58.4	49.7	
12:34-13:34	55.0	51.4	55.9	49.0	55.4	48.8	53.9	48.2	
13:34-14:34	57.4	51.1	56.0	50.2	53.2	48.6	53.7	49.5	
14:34-15:34	55.6	52.0	56.3	50.7	52.5	48.7	54.0	49.5	
15:34-16:34	58.8	53.2	55.6	49.9	56.0	48.3	52.9	49.0	
16:34-17:34	58.2	50.9	58.0	50.8	59.4	49.7	56.9	50.3	
17:34-18:34	59.8	52.2	54.8	50.5	53.9	48.9	54.9	49.2	
18:34-19:34	55.7	52.4	59.5	51.0	55.9	49.0	58.1	49.2	
19:34-20:34	54.5	52.7	52.9	50.8	51.2	48.3	52.6	49.6	
20:34-21:34	56.0	54.5	53.8	51.7	50.4	48.2	51.4	49.3	
21:34-22:34	55.5	54.1	53.8	52.7	50.2	48.8	50.0	48.4	
22:34-23:34	55.8	54.4	52.2	51.1	52.2	48.8	49.6	48.1	
23:34-00:34	54.5	53.5	52.8	51.7	49.6	47.2	48.8	47.4	
00:34-01:34	56.2	54.7	52.4	51.5	49.6	48.4	48.5	47.0	
01:34-02:34	54.5	52.7	52.1	50.9	49.3	47.6	48.3	47.2	
02:34-03:34	54.4	52.1	52.4	51.2	50.0	48.6	49.2	47.2	
03:34-04:34	55.2	53.2	54.2	51.8	50.9	48.1	49.6	47.6	
04:34-05:34	55.0	53.3	54.7	52.4	50.2	47.4	50.7	47.4	
05:34-06:34	59.6	56.0	58.0	52.7	57.6	50.1	56.9	50.1	
06:34-07:34	58.7	56.3	58.4	53.6	56.4	52.0	56.6	51.9	
07:34-08:34	59.9	56.2	59.1	53.1	56.5	50.1	56.3	49.7	
08:34-09:34	58.7	55.7	57.7	51.6	57.4	49.8	58.8	48.2	
Leq 24 hr	67.4	-	56.1	-	56.5	-	54.5	-	≥70
L90 (min-max)	-	50.9-58.1	-	49.0-53.8	-	47.2-52.0	-	47.0-51.9	-

Source : ^u Notification of the National Environment Board No.15, B.E. 2540 (1997)

Technical Manager

TY/NJ/MTM/MTM

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E 248450

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Member of the SGS Group

Report No. : 2022-5004114 / 003-2 (Page 2 of 2)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level
MEASUREMENT LOCATION : Wat Nong Faeb School
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 77273, Calibration Value Reference : 94.2 dB(A),
 Pre Cal : 94.0 dB(A), Post Cal : 94.0 dB(A)
SOUND LEVEL METER NO. : Model CR:161B, Serial No. G079772
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Time	Noise Level [dB(A)]						Standard ¹⁾
	April 22-23, 2022		April 23-24, 2022		April 24-25, 2022		
	Leq	L90	Leq	L90	Leq	L90	
09:34-10:34	54.2	48.3	54.7	48.7	54.9	47.9	
10:34-11:34	54.8	49.4	57.7	49.6	55.2	48.8	
11:34-12:34	59.5	54.2	56.4	53.4	55.1	48.3	
12:34-13:34	58.2	53.4	56.6	53.4	54.9	48.0	
13:34-14:34	56.2	53.3	55.3	53.6	56.0	50.8	
14:34-15:34	54.7	48.8	55.6	53.6	56.0	50.0	
15:34-16:34	54.2	49.1	56.1	53.5	57.7	50.0	
16:34-17:34	58.3	51.8	56.7	50.4	54.5	49.4	
17:34-18:34	54.9	50.7	56.1	48.8	54.1	47.8	
18:34-19:34	57.2	50.0	54.8	49.2	54.3	49.2	
19:34-20:34	51.3	49.2	52.3	50.5	52.2	48.9	
20:34-21:34	51.7	49.7	51.9	50.1	51.1	49.2	
21:34-22:34	52.1	50.0	52.4	51.1	50.7	49.5	
22:34-23:34	51.5	49.9	52.3	50.8	51.8	47.5	
23:34-00:34	51.8	49.5	51.5	50.1	49.4	47.4	
00:34-01:34	49.8	47.7	50.1	46.7	48.5	47.2	
01:34-02:34	47.3	46.3	48.6	46.6	48.1	47.0	
02:34-03:34	47.6	46.5	48.6	46.0	47.1	45.7	
03:34-04:34	48.3	46.9	47.0	45.4	47.4	46.1	
04:34-05:34	50.3	47.7	48.1	45.9	49.1	46.6	
05:34-06:34	55.9	50.2	62.9	48.8	54.6	49.1	
06:34-07:34	56.6	50.8	57.2	50.0	59.4	50.8	
07:34-08:34	56.2	49.1	60.6	48.6	56.5	49.5	
08:34-09:34	52.9	48.1	57.4	48.0	57.4	49.4	
Leq 24 hr	54.8	-	55.9	-	54.4	-	≥70
L90 (min-max)	-	46.3-54.2	-	45.4-53.6	-	45.7-50.8	-

Source : ¹⁾ Notification of the National Environment Board No.15, B.E. 2540 (1997).

TY/NJ/MTM/MTM



Technical Manager

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Report No. : 2022-5004114 / 003-1 (Page 1 of 2)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level
MEASUREMENT LOCATION : Flag Station
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 77273, Calibration Value Reference : 94.2 dB(A),
 Pre Cal : 94.0 dB(A), Post Cal : 94.1 dB(A)
SOUND LEVEL METER NO. : Model CR:161B, Serial No. G300759
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum

Time	Noise Level [dB(A)]								Standard ¹⁾
	April 18-19, 2022		April 19-20, 2022		April 20-21, 2022		April 21-22, 2022		
	Leq	L90	Leq	L90	Leq	L90	Leq	L90	
08:51-09:51	65.2	59.9	64.8	59.3	62.1	57.1	62.2	56.4	
09:51-10:51	81.3	61.3	64.3	58.9	62.0	56.8	62.0	57.5	
10:51-11:51	66.5	59.8	64.7	58.6	62.2	56.8	62.0	55.3	
11:51-12:51	64.1	57.9	63.0	56.5	61.7	56.2	60.1	54.5	
12:51-13:51	66.0	59.1	64.1	59.0	61.7	56.6	62.4	57.5	
13:51-14:51	65.6	59.3	64.3	58.5	61.4	57.3	62.4	58.3	
14:51-15:51	65.2	59.9	63.5	57.9	60.7	54.9	60.7	55.1	
15:51-16:51	65.4	58.5	64.0	56.4	61.2	53.5	62.5	56.7	
16:51-17:51	66.6	57.6	64.9	57.0	63.0	54.4	63.6	57.6	
17:51-18:51	65.6	56.8	64.5	55.9	64.3	53.9	63.7	57.2	
18:51-19:51	63.7	56.0	62.4	55.1	62.3	55.0	62.1	54.6	
19:51-20:51	62.5	56.0	61.9	54.8	63.8	54.1	60.9	54.2	
20:51-21:51	59.9	55.1	59.6	54.4	59.5	53.9	59.3	54.2	
21:51-22:51	59.0	54.9	58.4	53.5	59.3	53.9	58.8	53.7	
22:51-23:51	58.6	54.9	57.6	53.4	57.9	53.6	59.3	53.8	
23:51-00:51	57.7	54.6	58.5	54.6	54.0	50.3	56.6	53.5	
00:51-01:51	57.6	54.9	58.7	55.1	55.0	50.4	56.9	54.3	
01:51-02:51	56.6	54.4	56.4	54.0	55.3	52.9	56.0	54.4	
02:51-03:51	56.2	54.5	55.9	53.4	55.1	53.1	56.8	54.2	
03:51-04:51	57.5	54.7	56.4	53.7	55.5	52.8	56.6	53.5	
04:51-05:51	58.6	53.6	58.3	51.1	57.9	53.7	57.5	54.0	
05:51-06:51	66.4	54.7	66.3	52.8	64.4	54.2	64.6	54.7	
06:51-07:51	69.1	60.8	68.1	60.0	67.1	60.1	67.6	59.9	
07:51-08:51	66.7	58.8	64.5	57.9	64.1	58.8	65.0	59.5	
Leq 24 hr	69.1	-	63.1	-	61.7	-	61.9	-	≥70
L90 (min-max)	-	53.6-61.3	-	51.1-60.0	-	50.3-60.1	-	53.5-59.9	-

Source : ¹⁾ Notification of the National Environment Board No.15, B.E. 2540 (1997)

Technical Manager

TY/NJ/MTM/MTM

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E 248452

Report No. : 2022-5004114 / 003-1 (Page 2 of 2)

Issued date : May 11, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
ADDRESS : Padaeng Industrial Estate, 1 Padaeng Rd., Map Ta Phut, Rayong 21150
 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpcc-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level
MEASUREMENT LOCATION : Flag Station
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 77273, Calibration Value Reference : 94.2 dB(A),
 Pre Cal : 94.0 dB(A), Post Cal : 94.1 dB(A)
MEASUREMENT DATE : April 18-25, 2022
MEASURED BY : Nopparut Jampakrum
SOUND LEVEL METER NO. : Model CR:161B, Serial No. G300759

Time	Noise Level [dB(A)]						Standard ^{1/}
	April 22-23, 2022		April 23-24, 2022		April 24-25, 2022		
	Leq	L90	Leq	L90	Leq	L90	
08:51-09:51	62.4	58.0	72.9	58.0	61.7	57.4	
09:51-10:51	62.0	56.9	61.5	57.4	61.2	56.2	
10:51-11:51	63.5	57.0	61.3	56.8	61.9	56.8	
11:51-12:51	61.7	55.1	61.8	56.8	61.6	56.7	
12:51-13:51	63.2	57.3	61.8	56.1	63.6	57.2	
13:51-14:51	62.0	57.5	59.7	53.2	61.5	57.1	
14:51-15:51	61.6	56.6	60.2	55.3	62.4	56.8	
15:51-16:51	62.9	56.3	60.5	53.2	63.1	55.8	
16:51-17:51	63.7	55.7	61.3	54.0	62.6	53.4	
17:51-18:51	63.4	55.2	62.5	54.3	63.0	53.4	
18:51-19:51	63.3	55.4	60.9	55.0	60.4	53.8	
19:51-20:51	61.0	54.6	60.5	54.8	58.3	53.6	
20:51-21:51	60.3	54.2	58.4	54.5	58.3	53.6	
21:51-22:51	58.0	53.9	57.1	54.3	56.8	53.7	
22:51-23:51	58.1	54.3	56.5	54.3	56.6	53.6	
23:51-00:51	57.2	53.9	56.2	53.8	55.8	53.6	
00:51-01:51	56.2	53.8	56.0	53.9	55.3	53.4	
01:51-02:51	56.2	53.2	55.8	54.2	55.3	52.6	
02:51-03:51	55.1	53.4	54.9	50.2	55.1	53.8	
03:51-04:51	55.7	53.6	55.8	53.7	56.0	54.0	
04:51-05:51	58.1	53.8	56.8	53.8	57.9	54.0	
05:51-06:51	64.7	54.5	63.5	54.8	64.5	55.0	
06:51-07:51	66.2	58.5	65.5	56.5	67.8	61.1	
07:51-08:51	69.9	59.0	62.8	58.7	64.5	58.3	
Leq 24 hr	62.6	-	62.8	-	61.6	-	≥70
L90 (min-max)	-	53.2-59.0	-	50.2-58.7	-	52.6-61.1	-

Source : ^{1/} Notification of the National Environment Board No.15, B.E. 2540 (1997).

Technical Manager

TY/NJ/MTM/MTM

SGS (THAILAND) LIMITED



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E 248453

ภาคผนวก ก4

ผลการตรวจวัดคุณภาพอากาศภายในสถานประกอบการ

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 1 of 14

TEST REPORT

Job no.: 5003979
 Sample type: Workplace air sample
 Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)
 Location: Monomer Plant Area/TPAC 1
 Sampling date: March 30, 2022
 Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-1	Benzene	NIOSH 1501	09:10-11:12 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:10-11:12 a.m.	0.01	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected
 Limit of Quantitation (LOQ) of Benzene = 0.03 ppm
 - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Customer: THAI POLYACETAL CO., LTD.

Report no. : 5003979

Issued date : 05/05/2022

Page : 2 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Polymer Plant Area/TPAC 1

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-2	Benzene	NIOSH 1501	09:14-11:15 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:14-11:15 a.m.	ND.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks:

ND. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.03 ppm

Limit of Quantitation (LOQ) of Formaldehyde = 0.006 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Watcharapon Saikaew / Phitchayut Subanna
Environmental Technician

Niwat Siangdee
Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 3 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Formalin Plant Area/TPAC 1

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-3	Benzene	NIOSH 1501	09:11-11:13 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:11-11:13 a.m.	0.01	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.03 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager



Envi Care Monitoring Co., Ltd.

4 SoiBangwaek 53, Bangwaek, Phasicharoen, Bangkok 10160

Tel: 02-0424053 Fax: 02-0402944 Email: customer.ecm@gmail.com

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 4 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Packing Area/TPAC 1

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-4	Total dust	NIOSH 0500	08:57-11:48 a.m.	0.11	-	mg/m ³

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 5 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Waste Water Treatment/TPAC 1

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-5	Formaldehyde by HPLC	NIOSH 2016	09:16-11:18 a.m.	ND.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected

Limit of Quantitation (LOQ) of Formaldehyde = 0.006 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 6 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Monomer Plant Area/TPAC 2

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-6	Benzene	NIOSH 1501	09:18-11:20 a.m.	0.04	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:18-11:20 a.m.	0.01	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 7 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Polymer Plant Area/TPAC 2

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-7	Benzene	NIOSH 1501	09:20-11:23 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:20-11:23 a.m.	0.01	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks:

ND. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.03 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022
Page : 8 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Formalin Plant Area/TPAC 2

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-8	Benzene	NIOSH 1501	09:22-11:24 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:22-11:24 a.m.	0.01	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks:

ND. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.03 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 9 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Packing Area/TPAC 2

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-9	Total dust	NIOSH 0500	08:55-11:48 a.m.	0.05	-	mg/m ³

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 10 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Waste Water Treatment/TPAC 2

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-10	Formaldehyde by HPLC	NIOSH 2016	09:24-11:26 a.m.	ND.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected

Limit of Quantitation (LOQ) of Formaldehyde = 0.006 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 11 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Monomer Plant Area/TPAC 3

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-11	Benzene	NIOSH 1501	09:35-11:35 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:35-11:35 a.m.	0.01	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.03 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 12 of 14

TEST REPORT

Job no.: 5003979

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: Polymer Plant Area/TPAC 3

Sampling date: March 30, 2022

Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-12	Benzene	NIOSH 1501	09:34-11:36 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:34-11:36 a.m.	ND.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.03 ppm

Limit of Quantitation (LOQ) of Formaldehyde = 0.006 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 13 of 14

TEST REPORT

Job no.: 5003979
 Sample type: Workplace air sample
 Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)
 Location: Formalin Plant Area/TPAC 3
 Sampling date: March 30, 2022
 Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-13	Benzene	NIOSH 1501	09:36-11:38 a.m.	ND.	1	ppm
	Formaldehyde by HPLC	NIOSH 2016	09:36-11:38 a.m.	ND.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected
 Limit of Quantitation (LOQ) of Benzene = 0.03 ppm
 Limit of Quantitation (LOQ) of Formaldehyde = 0.006 ppm
 - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager



Envi Care Monitoring Co., Ltd.

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Report no. : 5003979

Customer: THAI POLYACETAL CO., LTD.

Issued date : 05/05/2022

Page : 14 of 14

TEST REPORT

Job no.: 5003979
Sample type: Workplace air sample
Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)
Location: Waste Water Treatment/TPAC 3
Sampling date: March 30, 2022
Analyzed date: April 12, 2022-May 3, 2022

Completed date: May 5, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result*	Standards (TWA)	Unit
					Thai ^{1/}	
5003979/WP-14	Formaldehyde by HPLC	NIOSH 2016	09:28-11:30 a.m.	ND.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

* Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: ND. = Not Detected
Limit of Quantitation (LOQ) of Formaldehyde = 0.006 ppm
- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager



Envi Care Monitoring Co., Ltd.

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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 12 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC3/Waste Water Treatment

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-14	Formaldehyde	NIOSH 2541	09:08-11:10 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Wacharaporn Sankae W. Pichayak Subanna
Environmental Technician

Niwat Sankae W.
Environmental Manager



Envi Care Monitoring Co., Ltd.

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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 11 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC3/Formalin Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-13	Benzene	NIOSH 1501	09:26-11:28 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:26-11:28 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager

Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022
Page : 10 of 12

TEST REPORT

Job no.: 5004544
Sample type: Workplace air sample
Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)
Location: TPAC3/Polymer Plant Area
Sampling date: June 15, 2022
Analyzed date: June 28, 2022-July 14, 2022
Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-12	Benzene	NIOSH 1501	09:21-11:23 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:21-11:23 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected
Limit of Quantitation (LOQ) of Benzene = 0.02 ppm
- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Environmental Technician

Environmental Manager



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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 9 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC3/Monomer Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-11	Benzene	NIOSH 1501	09:23-11:26 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:23-11:26 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:

Wacharaporn Sankawit Phiphanyat Subanna
Environmental Technician

Niwat Sangdee
Environmental Manager



Envi Care Monitoring Co., Ltd.

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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 8 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC2/Waste Water Treatment

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-10	Formaldehyde	NIOSH 2541	09:07-11:09 a.m.	N.D.	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Formaldehyde = 0.09 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



[Redacted signature area]

Environmental Technician

Environmental Manager

Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 7 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC2/Formalin Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-8	Benzene	NIOSH 1501	09:05-11:07 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:05-11:07 a.m.	0.04	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



[Redacted signature area]

Environmental Technician

Environmental Manager

Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 6 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC2/Polymer Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-7	Benzene	NIOSH 1501	09:09-11:11 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:09-11:11 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager

Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 5 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC2/Monomer Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-6	Benzene	NIOSH 1501	09:04-11:06 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:04-11:06 a.m.	0.008	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager

Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 4 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC1/Waste Water Treatment

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-5	Formaldehyde	NIOSH 2541	09:00-11:03 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: - TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager



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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 3 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC1/Formalin Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-3	Benzene	NIOSH 1501	09:01-11:04 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	09:01-11:04 a.m.	0.02	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager



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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 2 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC1/Polymer Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-2	Benzene	NIOSH 1501	08:53-10:55 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	08:53-10:55 a.m.	0.04	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager



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Report no. : 5004544

Customer: THAI POLYCARBONATE Co., Ltd.

Issued date : 18/07/2022

Page : 1 of 12

TEST REPORT

Job no.: 5004544

Sample type: Workplace air sample

Sampling by: Envi Care Monitoring (ใบอนุญาตเลขที่ 0201-03-2564-0007)

Location: TPAC1/Monomer Plant Area

Sampling date: June 15, 2022

Analyzed date: June 28, 2022-July 14, 2022

Completed date: July 18, 2022

Test Results:

Sample ID	Parameter	Test method	Sampling time	Result ^{2/}	Standards (TWA)	Unit
					Thai ^{1/}	
5004544/WP-1	Benzene	NIOSH 1501	08:57-11:00 a.m.	N.D.	1	ppm
	Formaldehyde	NIOSH 2541	08:57-11:00 a.m.	0.03	0.75	ppm

Standards: ^{1/} Notification of the Department of Labor Protection and Welfare, Subject Limitation of Hazardous Chemical Concentration, Vol.134, Special Part 198 D, dated August 3, B.E. 2560 (2017).

^{2/} Analyzed by Emex Association Co., Ltd. (ใบอนุญาตเลขที่ 0202-03-2565-0022)

Remarks: N.D. = Not Detected

Limit of Quantitation (LOQ) of Benzene = 0.02 ppm

- TLV-TWA = Threshold Limit Value-Time Weighted Average

Sampling by:

Approved by:



Environmental Technician

Environmental Manager

ภาคผนวก ก5

ผลการตรวจวัดระดับเสียงภายในสถานประกอบการ

Report No. : 2022-5003979 / 002-1 (Page 1 of 2)

Issued date : April 27, 2022

CLIENT : THAI POLYACETAL CO., LTD.
CONTACT : Khun Sommai Sriprom
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 Tel. 038-684-816 Fax. 038-687-776
 E-mail : Sommai.Srip@th.tpac-tpac.com

Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE** : March 30, 2022
MEASUREMENT LOCATION : TPAC 1 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88350, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.8 dB(A), Post Cal : 93.7 dB(A)
SOUND LEVEL METER NO. : Pelletizing Unit Model CR:515 Serial No. 00965939

Period	Sound Level [dB(A)]
	Pelletizing Unit
Sampling time	09.15-21.15 hr.
1 st hr	82.7
2 nd hr	82.8
3 rd hr	82.5
4 th hr	82.5
5 th hr	82.7
6 th hr	82.4
7 th hr	82.3
8 th hr	91.0
9 th hr	83.6
10 th hr	83.5
11 th hr	83.1
12 th hr	83.4
Leq 12 hrs.	84.5
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5003979 / 002-1 (Page 2 of 2)

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE** : March 30, 2022
MEASUREMENT LOCATION : TPAC 1 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88350, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.8 dB(A), Post Cal : 93.6 dB(A)
SOUND LEVEL METER NO. : Packing Area Model CR:515 Serial No. 00965939

Period	Sound Level [dB(A)]
	Packing Area
Sampling time	09.00-21.00 hr.
1 st hr	77.9
2 nd hr	79.0
3 rd hr	80.5
4 th hr	76.9
5 th hr	81.3
6 th hr	81.1
7 th hr	79.9
8 th hr	72.9
9 th hr	72.0
10 th hr	69.0
11 th hr	67.8
12 th hr	67.9
Leq 12 hrs.	77.8
Standard^{1/}	≥87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5003979 / 002-2 (Page 1 of 2)

Issued date : April 27, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE :** March 30, 2022
MEASUREMENT LOCATION : TPAC 2 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88350, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.8 dB(A), Post Cal : 93.8 dB(A)
SOUND LEVEL METER NO. : Pelletizing Unit Model NL-21 Serial No. 00398390

Period	Sound Level [dB(A)]
	Pelletizing Unit
Sampling time	09.15-21.15 hr.
1 st hr	83.6
2 nd hr	87.8
3 rd hr	84.5
4 th hr	84.1
5 th hr	84.3
6 th hr	83.5
7 th hr	83.7
8 th hr	83.7
9 th hr	95.1
10 th hr	82.7
11 th hr	83.2
12 th hr	83.4
Leq 12 hrs.	87.1
Standard^{1/}	≧87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5003979 / 002-2 (Page 2 of 2)

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE :** March 30, 2022
MEASUREMENT LOCATION : TPAC 2 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88350, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.8 dB(A), Post Cal : 93.7 dB(A) frg
SOUND LEVEL METER NO. : Packing Area Model NL-21, Serial No. 00922234

Period	Sound Level [dB(A)]
	Packing Area
Sampling time	08.55-20.55 hr.
1 st hr	81.3
2 nd hr	82.3
3 rd hr	82.6
4 th hr	81.6
5 th hr	82.5
6 th hr	81.2
7 th hr	75.7
8 th hr	72.0
9 th hr	71.8
10 th hr	67.1
11 th hr	66.5
12 th hr	66.3
Leq 12 hrs.	79.3
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5003979 / 002-3 (Page 1 of 1)

Issued date : April 27, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE :** March 30, 2022
MEASUREMENT LOCATION : TPAC 3 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88350, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.8 dB(A), Post Cal : 93.8 dB(A)
SOUND LEVEL METER NO. : Model NL-21 Serial No. 00243242

Period	Sound Level [dB(A)]
	Pelletizing Unit
Sampling time	09.35 – 21.35 hr.
1 st hr	80.4
2 nd hr	80.6
3 rd hr	80.2
4 th hr	80.4
5 th hr	80.5
6 th hr	80.3
7 th hr	80.1
8 th hr	80.2
9 th hr	80.0
10 th hr	80.0
11 th hr	80.1
12 th hr	80.4
Leq 12 hrs.	80.3
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5004544 / 002-1 (Page 1 of 2)

Issued date : June 28, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE** : June 15, 2022
MEASUREMENT LOCATION : TPAC 1 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88373, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.7 dB(A), Post Cal : 93.7 dB(A)
SOUND LEVEL METER NO. : Pelletizing Unit Model CR:161B Serial No. G080136

Period	Sound Level [dB(A)]
	Pelletizing Unit
Sampling time	08.50-20.50 hr.
1 st hr	82.5
2 nd hr	82.7
3 rd hr	83.1
4 th hr	81.9
5 th hr	82.3
6 th hr	82.1
7 th hr	82.3
8 th hr	82.1
9 th hr	81.9
10 th hr	82.1
11 th hr	82.1
12 th hr	82.1
Leq 12 hrs.	82.3
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5004544 / 002-1 (Page 2 of 2)

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE** : June 15, 2022
MEASUREMENT LOCATION : TPAC 1 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88373, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.7 dB(A), Post Cal : 93.7 dB(A)
SOUND LEVEL METER NO. : Packing Area Model NL-21 Serial No. 00965939

Period	Sound Level [dB(A)]
	Packing Area
Sampling time	09.07-21.07 hr.
1 st hr	80.1
2 nd hr	79.9
3 rd hr	80.0
4 th hr	77.2
5 th hr	78.7
6 th hr	80.7
7 th hr	77.8
8 th hr	75.3
9 th hr	74.9
10 th hr	72.5
11 th hr	70.0
12 th hr	69.6
Leq 12 hrs.	77.7
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5004544 / 002-2 (Page 1 of 2)

Issued date : June 28, 2022

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE :** June 15, 2022
MEASUREMENT LOCATION : TPAC 2 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88373, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.7 dB(A), Post Cal : 93.6 dB(A)
SOUND LEVEL METER NO. : Pelletizing Unit Model CR:161B Serial No. G300759

Period	Sound Level [dB(A)]
	Pelletizing Unit
Sampling time	09.08-21.08 hr.
1 st hr	82.7
2 nd hr	83.0
3 rd hr	82.2
4 th hr	82.2
5 th hr	82.3
6 th hr	82.6
7 th hr	82.3
8 th hr	82.2
9 th hr	81.9
10 th hr	82.1
11 th hr	82.0
12 th hr	82.1
Leq 12 hrs.	82.3
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Report No. : 2022-5004544 / 002-2 (Page 2 of 2)

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE** : June 15, 2022

MEASUREMENT LOCATION : TPAC 2 Plant, Rayong Province

CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88373, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.7 dB(A), Post Cal : 93.8 dB(A) frg

SOUND LEVEL METER NO. : Packing Area Model CR:161B, Serial No. G300764

Period	Sound Level [dB(A)]
	Packing Area
Sampling time	09.08-21.08 hr.
1 st hr	79.7
2 nd hr	79.5
3 rd hr	79.8
4 th hr	76.8
5 th hr	78.3
6 th hr	80.3
7 th hr	77.4
8 th hr	74.9
9 th hr	74.5
10 th hr	72.1
11 th hr	69.8
12 th hr	69.2
Leq 12 hrs.	77.3
Standard^{1/}	>87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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Analysis Report

SAMPLE DESIGNATED AS : Workplace Noise Level **MEASUREMENT DATE :** June 15, 2022
MEASUREMENT LOCATION : TPAC 3 Plant, Rayong Province
CALIBRATOR DATA : Model CR:515, Cirrus, Serial : 88373, Calibration Value Reference : 94.1 dB(A),
 Pre Cal : 93.7 dB(A), Post Cal : 93.7 dB(A)
SOUND LEVEL METER NO. : Model CR:161B Serial No. G300763

Period	Sound Level [dB(A)]
	Pelletizing Unit
Sampling time	09.19 – 21.19 hr.
1 st hr	81.7
2 nd hr	82.2
3 rd hr	81.5
4 th hr	81.4
5 th hr	81.1
6 th hr	81.2
7 th hr	81.5
8 th hr	81.6
9 th hr	81.8
10 th hr	81.6
11 th hr	83.3
12 th hr	81.5
Leq 12 hrs.	81.7
Standard^{1/}	≧87

Source : ^{1/} Notification of the Ministry of Industry, Subjected "Safety Protection Measure for Industry about Working Condition", B.E. 2546 (2003) dated December 3, B.E. 2546 (2003).

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ภาคผนวก ก6


ผลการตรวจวิเคราะห์คุณภาพน้ำทิ้ง

 บริษัท ไทยโพลีเอซีตัล จำกัด THAI POLYACETAL CO.,LTD.													
TPAC Waste Water Analysis Report.													
Month : Jan'22													
Sampling Point	Sampling Date	Time	Analysis Item.										
			Temp. (^o C)	pH	Oil & grease (mg/l)	SS (mg/l)	TDS (mg/l)	COD (mg/l)	BOD (mg/l)	Formaldehyde (mg/l)	Cu (mg/l)	Pb (mg/l)	Remark
1. Water outlet after treatment (P918T)	12-Jan-22	9:00	30.8	8.3	1.2	9	1,283	78	3	<0.2	0.06	<0.01	
2. Water outlet after treatment (P918-2T)	12-Jan-22	9:00	32.4	8.2	1.3	5	892	88	3	<0.2	-	-	
3. Water outlet after treatment (P918U)	12-Jan-22	9:00	30.6	8.2	1.5	4	774	83	4	<0.2	-	-	
4. Water outlet after treatment (P918W)	12-Jan-22	9:00	31.8	8.3	1.5	6	619	65	2	<0.2	-	-	
5. Water inlet before treatment (V1101T)	12-Jan-22	9:00	36.2	3.4	2.2	6	1,815	1,950	984	390	-	-	
6. Water inlet before treatment (V1101U)	12-Jan-22	9:00	32.2	3.2	1.9	10	1,139	1,945	969	365	-	-	
7. Water inlet before treatment (V1101W)	12-Jan-22	9:00	31.4	3.8	3.6	23	2,953	2,045	984	170	-	-	
8. Far from intersection between main drain and lateral drain about 50 m (point B)	12-Jan-22	9:00	34.4	8.4	1.8	5	27,812	51	3	<0.2	-	-	
Specification			≤ 40	5.5-9.0	≤ 5	≤ 50	≤ 3000	≤ 120	≤ 20	≤ 1	≤ 2.0	≤ 0.2	
SS : Suspended Solids TDS : Total Dissolved Solid COD : Chemical Oxygen Demand BOD : Biochemical oxygen Demand X : Non Detect			Analyzed By : ...Nattaya S. ...Surangrat TH. Date :12/01/2022..... Checked By : ...[Redacted]... Date :19-Jan-22..... Approved By : Date : 2022.01.19 17:52:23 +07'00'										


1QC-F451[3]

 บริษัท ไทยโพลีเอซีตัล จำกัด THAI POLYACETAL CO.,LTD.													
TPAC Waste Water Analysis Report.													
Month : Feb'22													
Sampling Point	Sampling Date	Time	Analysis Item.										
			Temp. (^o C)	pH	Oil & grease (mg/l)	SS (mg/l)	TDS (mg/l)	COD (mg/l)	BOD (mg/l)	Formaldehyde (mg/l)	Cu (mg/l)	Pb (mg/l)	Remark
1. Water outlet after treatment (P918T)	23-Feb-22	9:30	36.1	8.5	<3	<5	664	52	<2	0.1	0.06	<0.01	
2. Water outlet after treatment (P918-2T)	23-Feb-22	9:30	29.3	8.4	<3	<5	412	40	<2	0.1	-	-	
3. Water outlet after treatment (P918U)	23-Feb-22	9:30	31.1	8.5	<3	16	728	64	3	0.2	-	-	
4. Water outlet after treatment (P918W)	23-Feb-22	9:30	32.7	8.5	<3	<5	1,024	57	<2	0.2	-	-	
5. Water inlet before treatment (V1101T)	23-Feb-22	9:30	37.7	3.6	<3	12	1,196	1,814	714	247	-	-	
6. Water inlet before treatment (V1101U)	23-Feb-22	9:30	31.5	3.6	<3	6	1,330	1,903	849	275	-	-	
7. Water inlet before treatment (V1101W)	23-Feb-22	9:30	31.7	3.4	<3	9	1,940	1,869	966	102	-	-	
8. Far from intersection between main drain and lateral drain about 50 m (point B)	23-Feb-22	9:30	33.7	8.4	<3	13	21,650	30	<2	<0.1	-	-	
Specification			≤ 40	5.5-9.0	≤ 5	≤ 50	≤ 3000	≤ 120	≤ 20	≤ 1	≤ 2.0	≤ 0.2	
SS : Suspended Solids TDS : Total Dissolved Solid COD : Chemical Oxygen Demand BOD : Biochemical oxygen Demand X : Non Detect			Analyzed By : ...ALS (third party). Date :23/02/2022..... Checked By : ...[Redacted]... Date :8-Mar-22..... Approved By : Date : 2022.03.09 18:24:39 +07'00'										
Note: the result of wastewater in Feb'22 from third party (ALS & SGS). Cu & Pb resulted by SGS													

1QC-F451[3]

<div>  <div> บริษัท ไทยโพลีเอซีตัล จำกัด THAI POLYACETAL CO.,LTD. </div> </div>													
TPAC Waste Water Analysis Report.													
Month : Mar'22													
Sampling Point	Sampling Date	Time	Analysis Item.										
			Temp. (^o C)	pH	Oil & grease (mg/l)	SS (mg/l)	TDS (mg/l)	COD (mg/l)	BOD (mg/l)	Formaldehyde (mg/l)	Cu (mg/l)	Pb (mg/l)	Remark
1. Water outlet after treatment (P918T)	14-Mar-22	9:30	34.1	8.4	<3	<5	1,132	63	5	0.3	0.04	0.0007	
2. Water outlet after treatment (P918-2T)	14-Mar-22	9:30	30.0	8.5	<3	<5	860	51	<2	<0.1	-	-	
3. Water outlet after treatment (P918U)	14-Mar-22	9:30	32.1	8.6	<3	<5	820	49	<2	0.2	-	-	
4. Water outlet after treatment (P918W)	14-Mar-22	9:30	34.5	8.5	<3	8	964	59	<2	0.1	-	-	
5. Water inlet before treatment (V1101T)	14-Mar-22	9:30	33.4	3.6	<3	10	1,160	1,510	675	203	-	-	
6. Water inlet before treatment (V1101U)	14-Mar-22	9:30	34.6	3.5	<3	13	1,540	1,405	783	192	-	-	
7. Water inlet before treatment (V1101W)	14-Mar-22	9:30	33.3	3.5	<3	10	2,580	2,778	1278	104	-	-	
8. Far from intersection between main drain and lateral drain about 50 m (point B)	14-Mar-22	9:30	36.4	8.3	<3	9	31,000	27	<2	0.1	-	-	
Specification			≤ 40	5.5-9.0	≤ 5	≤ 50	≤ 3000	≤ 120	≤ 20	≤ 1	≤ 2.0	≤ 0.2	
หมายเหตุ SS : Suspended Solids TDS : Total Dissolved Solid COD : Chemical Oxygen Demand BOD : Biochemical oxygen Demand X : Non Detect			Analyzed By : ...ALS (third party)..... Date :14/03/2022..... Checked By : Date :23/03/2022..... Approved By : 2022.03.25..... Date : 08:43:09 +07'00' Note; the result of wastewater in Mar'22 from third party (ALS).										

1QC-F451[3]

<div>  <div> บริษัท ไทยโพลีเอซีตัล จำกัด THAI POLYACETAL CO.,LTD. </div> </div>													
TPAC Waste Water Analysis Report.													
Month : Apr'22													
Sampling Point	Sampling Date	Time	Analysis Item.										
			Temp. (^o C)	pH	Oil & grease (mg/l)	SS (mg/l)	TDS (mg/l)	COD (mg/l)	BOD (mg/l)	Formaldehyde (mg/l)	Cu (mg/l)	Pb (mg/l)	Remark
1. Water outlet after treatment (P918T)	08-Apr-22	9:00	30.7	8.2	<3	5	560	39	<2	<0.2	0.02	0.001	
2. Water outlet after treatment (P918-2T)	08-Apr-22	9:00	26.0	8.2	<3	<5	904	69	<2	<0.2	-	-	
3. Water outlet after treatment (P918U)	29-Apr-22	9:00	31.9	8.4	<3	<5	1,008	96	4	<0.1	-	-	
4. Water outlet after treatment (P918W)	08-Apr-22	9:00	31.3	8.2	3.0	<5	772	47	<2	<0.1	-	-	
5. Water inlet before treatment (V1101T)	08-Apr-22	9:00	33.1	3.7	5.0	10	1,470	1,774	687	175	-	-	
6. Water inlet before treatment (V1101U)	29-Apr-22	9:00	34.2	3.8	<3	12	1,870	1,979	858	210	-	-	
7. Water inlet before treatment (V1101W)	08-Apr-22	9:00	32.6	3.5	3	10	2,650	2,108	1047	62	-	-	
8. Far from intersection between main drain and lateral drain about 50 m (point B)	08-Apr-22	9:00	34.1	8.4	<3	<5	24,400	42	<2	<0.2	-	-	
Specification			≤ 40	5.5-9.0	≤ 5	≤ 50	≤ 3000	≤ 120	≤ 20	≤ 1	≤ 2.0	≤ 0.2	
หมายเหตุ SS : Suspended Solids TDS : Total Dissolved Solid COD : Chemical Oxygen Demand BOD : Biochemical oxygen Demand X : Non Detect			Analyzed By : ...ALS (third party)..... Date :08/04/2022..... Checked By : 11-May-22 2022.05.12 08:00:16 +07'00' Approved By : Date : Note; the result of wastewater in Apr'22 from third party (ALS).										

1QC-F451[3]

10C-F451[3]

1QC-F451[3]

ภาคผนวก ก7

ผลการตรวจวิเคราะห์คุณภาพน้ำใต้ดิน



Analysis / Test Report

Client : Thai Polyacetal Co., Ltd.

1, Padaeng Industrial Estate, Padaeng Road, Tambol Map Ta Phut, Amphur Muang,
Rayong Thailand 21150

P/O :

Project Name :

Project Location :

Lot ID: 2239239

Date Received : Mar 29, 2022

Date Reported : Apr 05, 2022

Report Number : 2272435-2

Page 1 of 1

Sample Number	2239239-1
Sampled Date	Mar 29, 2022 9:35 AM
Sample Description	Groundwater
Location	TPAC-3
Date Analysis Commenced	Mar 30, 2022
Condition of Sample	Contained in four glass vials and one plastic bottle, 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	0.03	0.1	Not Detected	No Standard	Wastewater Analysis	Rayong

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 : Paramet Sattayakun

Remark :

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

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Approved by



Supervisor

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Analysis / Test Report

Client : Thai Polyacetal Co., Ltd.

1, Padaeng Industrial Estate, Padaeng Road, Tambol Map Ta Phut, Amphur Muang,
Rayong Thailand 21150

P/O :

Project Name :

Project Location :

Lot ID: 2239239

Date Received : Mar 29, 2022

Date Reported : Apr 08, 2022

Report Number : 2272435-1

Page 1 of 1

Sample Number	2239239-1
Sampled Date	Mar 29, 2022 9:35 AM
Sample Description	Groundwater
Location	TPAC-3
Date Analysis Commenced	Mar 30, 2022
Condition of Sample	Contained in four glass vials and one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Organic Compounds							
Methanol	mg/L	-	2.0	<2.0	60	Based on APHA (2017), 6200B	Bangkok
Volatile Organics Compounds							
Benzene	mg/L	0.00003	0.0005	Not Detected	0.2	Based on APHA (2017), 6200B	Bangkok
Toluene	mg/L	0.00012	0.0005	Not Detected	5.0	Based on APHA (2017), 6200B	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 : Paramet Sattayakun

Remark :

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

Technical Management

Supervisor

ทะเบียนเลขที่ ว-204-จ-4720

Approved by

Senior Manager

ทะเบียนเลขที่ ว-204-ค-6111

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Analysis / Test Report

Client : Thai Polyacetal Co., Ltd.

1, Padaeng Industrial Estate, Padaeng Road, Tambol Map Ta Phut, Amphur Muang,
Rayong Thailand 21150

P/O : 4510055672

Project Name :

Project Location :

Lot ID: 2232159

Date Received : Mar 28, 2022

Date Reported : Apr 08, 2022

Report Number : 2279288-1

Page 1 of 1

Sample Number	2232159-1
Sampled Date	Mar 28, 2022 11:45 AM
Sample Description	Groundwater
Location	TPAC-1
Date Analysis Commenced	Mar 29, 2022
Condition of Sample	Contained in one plastic bottle and four glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Organic Compounds							
Methanol	mg/L	-	2.0	<2.0	60	Based on APHA (2017), 6200B	Bangkok
Volatile Organics Compounds							
Benzene	ug/L	0.03	0.5	Not Detected	No Standard	Based on APHA (2017), 6200B	Bangkok
Toluene	ug/L	0.04	0.5	Not Detected	No Standard	Based on APHA (2017), 6200B	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 : Paramet Sattayakun

Remark :

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

Technical Management

Supervisor

ทะเบียนเลขที่ ว-204-จ-4720

Approved by

Senior Manager

ทะเบียนเลขที่ ว-204-ค-6111

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Client : Thai Polyacetal Co., Ltd.

1, Padaeng Industrial Estate, Padaeng Road, Tambol Map Ta Phut, Amphur Muang,
Rayong Thailand 21150

P/O : 4510055672

Project Name :

Project Location :

Lot ID: 2232159

Date Received : Mar 28, 2022

Date Reported : Apr 05, 2022

Report Number : 2279288-2

Page 1 of 1

Sample Number	2232159-1
Sampled Date	Mar 28, 2022 11:45 AM
Sample Description	Groundwater
Location	TPAC-1
Date Analysis Commenced	Mar 30, 2022
Condition of Sample	Contained in one plastic bottle and four glass vials, 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	0.03	0.1	Not Detected	No Standard	Wastewater Analysis	Rayong

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

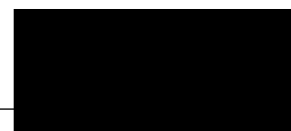
Sampled By : Paramet Sattayakun

Remark :

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Analysis / Test Report

Client : Thai Polyacetal Co., Ltd.

1, Padaeng Industrial Estate, Padaeng Road, Tambol Map Ta Phut, Amphur Muang,
Rayong Thailand 21150

P/O : 4510055672

Project Name :

Project Location :

Lot ID: 2232159

Date Received : Mar 28, 2022

Date Reported : Apr 08, 2022

Report Number : 2279289-1

Page 1 of 1

Sample Number	2232159-2
Sampled Date	Mar 28, 2022 10:55 AM
Sample Description	Groundwater
Location	TPAC-2
Date Analysis Commenced	Mar 29, 2022
Condition of Sample	Contained in one plastic bottle and four glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Organic Compounds							
Methanol	mg/L	-	2.0	<2.0	60	Based on APHA (2017), 6200B	Bangkok
Volatile Organics Compounds							
Benzene	ug/L	0.03	0.5	Not Detected	No Standard	Based on APHA (2017), 6200B	Bangkok
Toluene	ug/L	0.04	0.5	Not Detected	No Standard	Based on APHA (2017), 6200B	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 : Paramet Sattayakun

Remark :

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

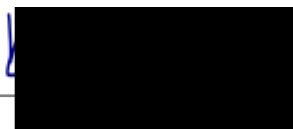
Technical Management



Supervisor

ทะเบียนเลขที่ ว-204-จ-4720

Approved by



Senior Manager

ทะเบียนเลขที่ ว-204-ค-6111

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Client : Thai Polyacetal Co., Ltd.

1, Padaeng Industrial Estate, Padaeng Road, Tambol Map Ta Phut, Amphur Muang,
Rayong Thailand 21150

P/O : 4510055672

Project Name :

Project Location :

Lot ID: 2232159

Date Received : Mar 28, 2022

Date Reported : Apr 05, 2022

Report Number : 2279289-2

Page 1 of 1

Sample Number	2232159-2						
Sampled Date	Mar 28, 2022 10:55 AM						
Sample Description	Groundwater						
Location	TPAC-2						
Date Analysis Commenced	Mar 30, 2022						
Condition of Sample	Contained in one plastic bottle and four glass vials, 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	0.03	0.1	Not Detected	No Standard	Wastewater Analysis	Rayong

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 : Paramet Sattayakun

Remark :

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

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Supervisor

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ภาคผนวก ข

- สำเนาหนังสือรับรองห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอสจีเอส (ประเทศไทย) จำกัด
 - สำเนาใบรับรองมาตรฐาน ISO 9001 : 2015
 - สำเนาหนังสือรับรองระบบงาน : ISO/IEC 17020 : 2005 -----
 - สำเนาหนังสือรับรองระบบงาน : ISO/IEC 17020 : 2012
-

ที่ อก ๐๓๓๐(๓)/ ๔๗๘ ๖



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐๐

๒๑ เมษายน ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ มกราคม ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอสจีเอส (ประเทศไทย) จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอสจีเอส (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๐๑๐-๑๖-๒๐ และ ๔๓/๒๓ ตรอกนอกเขต
ถนนพระราม ๓ แขวงทองนพนที เขตยานนาวา กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสจีเอส (ประเทศไทย) จำกัด ต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

- | | |
|----------------------------------|----------------------------|
| ๑) นางสาวฉิน เชาว์ถาวร | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๓ |
| ๒) นางสาวพัชรี ตรีพรเจริญ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๒ |
| ๓) นางสาวนภาพร ทองแท่ง | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๓ |
| ๔) นางสาวหัตถ์วรรณ ไพรอนันต์ถาวร | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๔ |
| ๕) นางสาวกรกฎ จันทน์สมบูรณ์ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๕ |
| ๖) นางสาวฐานันท์ ชิตเพชร | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๖ |
| ๗) นายพร ภูเพ็ชร | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๗ |
| ๘) นางสาวพัฒนภรณ์ เมืองแก้ว | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๘ |
| ๙) นางศิริพร อัมวิไลวรรณ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๙ |

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

- | | |
|--------------------------------|----------------------------|
| ๑) นางสาววิชนีย์ พิสิทธิ์ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๓ |
| ๒) นางสาวสุดิมา จารุวงศ์รังสี | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๒ |
| ๓) นางสาวสุกัญญา สุภานาม | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๓ |
| ๔) นางสาวเบญญาภา ชนิลกุล | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๔ |
| ๕) นางสาวสิริวรรณ เสนี่ยมโนมัย | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๕ |
| ๖) นางสาวนฤกร มีคำ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๖ |

๗) นายพันธุชัย...



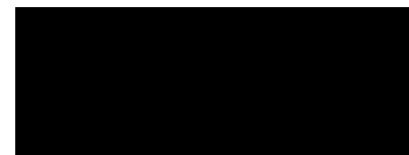
- | | |
|-----------------------------------|----------------------------|
| ๗) นายพันธุชัย ไตรเลิศสมุทร | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๗ |
| ๘) นายพุทธวิทย์ เกตุสุทธิ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๘ |
| ๙) นางสาวเด่นภา อรุณจิตต์ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๐๙ |
| ๑๐) นายวิฑูรย์ สุขะ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๐ |
| ๑๑) นายจิตรเทพ มีเงิน | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๑ |
| ๑๒) นายวีรพงษ์ เพ็งตระกูล | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๒ |
| ๑๓) นางสาวพนิดา บุญเจริญ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๓ |
| ๑๔) นางสาวสุพรรณษา แก้วพันธ์ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๔ |
| ๑๕) นางสาวมัลลิกา เกียรติประภากุล | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๕ |
| ๑๖) นายรัชพล มิ่งขวัญ | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๖ |
| ๑๗) นางสาวอรนุช ทองอุ่น | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๗ |
| ๑๘) นางสาวปรียาภรณ์ เสือเดช | ทะเบียนเลขที่ ๖-๐๑๐-๑-๐๐๑๘ |

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ความเสี่ยงสูงด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๓๐ มกราคม ๒๕๖๘ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้
ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ



ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเฝ้าระวังมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.mail.go.th



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอสจีเอส (ประเทศไทย) จำกัด
ที่ อก ๐๓๑๐(๑)/ ๕๗๘๖

เลขทะเบียน ๖-๐๑๐
ลงวันที่ ๒๑ เมษายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับการขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๐ รายการ

น้ำเสีย จำนวน 20 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method
2	α -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method
3	β -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method
4	δ -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method
5	γ -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method
6	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method
7	p,p'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method
8	p,p'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method
9	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method
10	p,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method
11	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method
12	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method
13	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method
14	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method
15	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method
16	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method
17	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method
18	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method
19	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method
20	Temperature	Laboratory and Field Methods

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater.
23rd ed. Washington, DC: APHA, 2017



ที่ อก ๐๓๑๐(๑)/ ๑๑๒๔๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๔ พฤศจิกายน ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๙ สิงหาคม ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์
บริษัท เอสจีเอส (ประเทศไทย) จำกัด จำนวน ๗ แผ่น

ตามที่อ้างถึง บริษัท เอสจีเอส (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน
๖-๑๙๗ สถานที่ตั้งเลขที่ ๑/๒๐๙ และ ๓/๒๑๑ หมู่ที่ ๓ ตำบลบ้านด่าง อำเภอบ้านด่าง จังหวัดระยอง
ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๘ ราย

๑) นายโอฬาร บุญพันธ์	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๒
๒) นายมีงแมน ศิริโชติ	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๓
๓) นายกิตติคุณ ทาสีเพชร	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๔
๔) นายเชาวลิต ศรีแนน	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๕
๕) นายณพรัตน์ จำปาแขม	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๖
๖) นายสุริยะ ศรีโหม	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๗
๗) นางสาวสิริรัตน์ แซ่ลิ้ม	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๘
๘) นางสาวหทัยรัตน์ ลีนจี้	ทะเบียนเลขที่	๖-๑๙๗-จ-๙๖๕๙

๒. ให้เพิ่มขอขยายสารมลพิษที่วิเคราะห์ในน้ำเสีย จำนวน ๓ รายการ น้ำใต้ดิน จำนวน
๒ รายการ อากาศเสีย (ปล่องระบาย) จำนวน ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๑๕ รายการ
และดิน จำนวน ๕ รายการ รวมทั้งสิ้นจำนวน ๖๓ รายการ ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชน ที่ อก ๐๓๑๐(๑)/๙๖๖๐ ลงวันที่ ๒๔ มีนาคม ๒๕๖๓ คือในวันที่ ๑๒ ตุลาคม ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน
ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์ einw@div.mail.go.th

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและชนิดสารมลพิษที่วิเคราะห์
บริษัท เอสจีเอส (ประเทศไทย) จำกัด เลขทะเบียน 7-๑๐๗
ที่ กก ๐๓๑๐(๓)/๑๑๒๕๖ ลงวันที่ ๑๘ พฤศจิกายน ๒๕๖๔

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๑ รายการ
น้ำเสีย จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[3]
2	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[3]
3	Temperature	Field Method ^[3]

น้ำใต้ดิน จำนวน 2 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[3]
2	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[3]

อากาศเสีย (ปล่องระบาย) จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
2	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
3	Carbon Monoxide	Instrumental Analyzer Method ^[6]
4	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
5	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
6	Hydrogen Fluoride	Isokinetic Sampling, Ion Chromatographic Method ^[5]
7	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]

ผู้อำนวยการ
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

8 Nickel...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
9	Opacity	Ringelmann's Method ^[11]
10	Oxide of Nitrogen	Instrumental Analyzer Method ^[4]
11	Selenium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
12	Sulfur Dioxide	Instrumental Analyzer Method ^[4]
13	Tellurium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
14	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
15	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[6]
16	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[5]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Gas Chromatographic Method ^[2,8] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[9,16]
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]

ผู้อำนวยการ
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,11) 2) Digestion, Inductively Coupled Plasma Method ^(6,11)
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,11) 2) Digestion, Inductively Coupled Plasma Method ^(6,11)
7	Chlordane	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
8	Chromium (VI)	1) Waste Extraction, Digestion, Colorimetric Method ^(2,13) 2) Alkaline Digestion, Colorimetric Method ^(7,13)
9	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,11) 2) Digestion, Inductively Coupled Plasma Method ^(6,11)
10	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,11) 2) Digestion, Inductively Coupled Plasma Method ^(6,11)
11	Dieldrin	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
12	DDD	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
13	DDE	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
14	DDT	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
15	2,4-D (2,4-Dichlorophenoxyacetic acid)	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,19)



ผู้อำนวยการ
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
16	Endrin	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
17	Heptachlor	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
18	Kepone	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,19)
19	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,11) 2) Digestion, Inductively Coupled Plasma Method ^(6,11)
20	Lindane	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
21	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(2,14) 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁴⁾
22	Methoxychlor	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
23	Mirex	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,16)
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,11) 2) Digestion, Inductively Coupled Plasma Method ^(6,11)
25	Polychlorinated Biphenyls (PCBs)	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,17)
26	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic Method ^(2,8) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(9,19)



ผู้อำนวยการ
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
28	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
29	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
30	Silvex; 2,4,5-Trichlorophenoxypropionic acid	1) Waste Extraction, Gas Chromatographic Method ^[2,8] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[9,19]
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
32	Toxaphene	1) Waste Extraction, Gas Chromatographic Method ^[2,8] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[9,19]
33	Trichloroethylene	Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[2,18] Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[10,18]
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,11] 2) Digestion, Inductively Coupled Plasma Method ^[6,11]

ผู้ดำเนินการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ดิน...

ดิน จำนวน 5 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Mercury	Digestion, Cold vapor Atomic Absorption Spectrometric Method ^[14]
2	Polychlorinated Biphenyls (PCBs)	Ultrasonic Extraction, Gas Chromatographic Method ^[9,16,17]
3	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic Mass Spectrometric Method ^[10,18]
4	TPH (C ₉ -C ₁₆)	Ultrasonic Extraction, Gas Chromatographic Mass Spectrometric Method ^[9,10,18]
5	TPH (C ₁₆ -C ₃₅)	Ultrasonic Extraction, Gas Chromatographic Mass Spectrometric Method ^[10,18]

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ผู้ดำเนินการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

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ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก



ที่ อก ๐๓๓๐(๓)/ ๔ ๖ ๖ ๐ ๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๔ มีนาคม ๒๕๖๓

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๑ กันยายน ๒๕๖๒

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอสจีเอส (ประเทศไทย) จำกัด จำนวน ๑๗ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอสจีเอส (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับ
ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๔๗ สถานที่ตั้งเลขที่ ๑/๒๐๔ และ ๑/๒๑๑
หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสจีเอส (ประเทศไทย) จำกัด ต่ออายุ
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นางสาวสายใจ เรืองสวัสดิ์	ทะเบียนเลขที่	๖-๑๔๗-ค-๕๖๕๕
๒) นางสาวพรณิภา สมจิตต์	ทะเบียนเลขที่	๖-๑๔๗-ค-๖๘๕๕
๓) นายณัฐวัฒน์ ศิริโชติ	ทะเบียนเลขที่	๖-๑๔๗-ค-๗๕๖๖
๔) นายภาสกร สุนทรวิภาต	ทะเบียนเลขที่	๖-๑๔๗-ค-๗๕๖๗
๕) นายเทพสัน ยมนา	ทะเบียนเลขที่	๖-๑๔๗-ค-๘๕๓๘

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวปริษา พิมพ์	ทะเบียนเลขที่	๖-๑๔๗-จ-๕๖๕๖
๒) นางสาวนิภาพร ปิโตทัย	ทะเบียนเลขที่	๖-๑๔๗-จ-๖๘๕๗
๓) นายราวิน เสี่ยมงาม	ทะเบียนเลขที่	๖-๑๔๗-จ-๕๖๕๘
๔) นายเศกสรร กลั่นเกษร	ทะเบียนเลขที่	๖-๑๔๗-จ-๗๕๗๐
๕) นายวัชรรัฐ ลิ่นจี	ทะเบียนเลขที่	๖-๑๔๗-จ-๗๕๗๒
๖) นายศุภฤกษ์ คล่องผจญกิจ	ทะเบียนเลขที่	๖-๑๔๗-จ-๗๕๗๓
๗) นางสาวพนิดา วรรณบุตร	ทะเบียนเลขที่	๖-๑๔๗-จ-๗๕๗๔
๘) นายสุรศักดิ์ อุดมุล	ทะเบียนเลขที่	๖-๑๔๗-จ-๘๕๓๙
๙) นายสมปอง เกตขุนทด	ทะเบียนเลขที่	๖-๑๔๗-จ-๘๕๔๐
๑๐) นายณวัฒน์ ชัยเลิศ	ทะเบียนเลขที่	๖-๑๔๗-จ-๘๕๔๑
๑๑) นายวินิจ ขวัญดี	ทะเบียนเลขที่	๖-๑๔๗-จ-๘๕๔๒

๑๒) นายอนันต์กร...

๑๒) นายอนันต์กร นันทแสง	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๓
๑๓) นายณัฐพล ตาปราบ	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๔
๑๔) นายเฉลิมวุฒิ ภูมิคม	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๕
๑๕) นายกรวิชัย มาลากุล ณ อยุธยา	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๖
๑๖) นายวีระเดช คนแรง	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๗
๑๗) นายวิบูลย์ ทองลาด	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๘
๑๘) นายฟ้าลั่น ศรีธาบุญ	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๔๙
๑๙) นายปรีดา เกษปทุม	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๐
๒๐) นางสาวธนัญญา โต๊ะเจ	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๑
๒๑) นายสถาพร ทองวงค์ญาติ	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๒
๒๒) นายศุภชัย พิศาลประชาธิ์	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๓
๒๓) นายปฏิวัฒน์ ทิพย์ชิต	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๔
๒๔) นายชัชวาล รื่นเหลย	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๕
๒๕) นายฉัตรชัย กิตติโชติตั้งสกุล	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๖
๒๖) นายนิรศ พงษ์วิรัชไชย	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๗
๒๗) นางสาวนัฐกานต์ ชุณหกิจ	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๘
๒๘) นางสาวอภิญญา วงศ์คง	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๕๙
๒๙) นางสาวสุกานดา เกิดส่องแสง	ทะเบียนเลขที่ ๖-๑๙๗-จ-๘๕๖๐

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๒๑ รายการ

อากาศเสีย (ปล่องระบาย) จำนวน ๑๓ รายการ น้ำใต้ดิน จำนวน ๑๑๘ รายการ และดิน จำนวน ๑๑๗ รายการ รวมทั้งสิ้นจำนวน ๒๖๙ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๒ ตุลาคม ๒๕๖๕ หากประสงค์จะต่ออายุหนังสือ รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ กรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการการแพทย์
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓

โทรสาร ๐ ๓๘๐๕ ๗๒๖๓

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอสจีเอส (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๑๙๗

ที่ ออก ๐๓๑๐(๓)/ ๕๖๖ ๐ ๖

ลงวันที่ ๒๕ มีนาคม ๒๕๖๓

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๖๙ รายการ
น้ำเสีย จำนวน 21 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
1	Arsenic	Digestion, Inductively Coupled Plasma Method ^[1]
2	Barium	Digestion, Inductively Coupled Plasma Method ^[1]
3	Biochemical Oxygen Demand	5-Day BOD Test, Membrane Electrode Method ^[1]
4	Cadmium	Digestion, Inductively Coupled Plasma Method ^[1]
5	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ^[1]
6	Color	ADMI Weighted – Ordinate Spectrophotometric Method ^[1]
7	Copper	Digestion, Inductively Coupled Plasma Method ^[1]
8	Hexavalent Chromium	Filtration, Colorimetric Method ^[1]
9	Lead	Digestion, Inductively Coupled Plasma Method ^[1]
10	Manganese	Digestion, Inductively Coupled Plasma Method ^[1]
11	Nickle	Digestion, Inductively Coupled Plasma Method ^[1]
12	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method ^[1]
13	pH	Electrometric Method ^[1]
14	Phenols	Distillation, Direct Photometric Method ^[1]
15	Selenium	Digestion, Inductively Coupled Plasma Method ^[1]
16	Total Chromium	Digestion, Inductively Coupled Plasma Method ^[1]
17	Total Dissolved Solids	Dried at 180 °C ^[1]
18	Total Kjeldahl Nitrogen	Digestion, Distillation, Titrimetric Method ^[1]
19	Total Suspended Solids	Dried at 103-105 °C ^[1]
20	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method, Calculation ^[1]
21	Zinc	Digestion, Inductively Coupled Plasma Method ^[1]

อากาศเสีย (ปล่องระบาย) จำนวน 13 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[2]
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[2]
3	Chlorine	Isokinetic Sampling, Ion Chromatographic Method ^[3]

นักวิทยาศาสตร์ชำนาญการ หัวหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

4 Copper...

อากาศเสีย (ปล่อยระบาย) จำนวน 13 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
4	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[2]
5	Dioxin/Furans	Isokinetic Sampling, Analysis by Accredited Laboratory ^[2]
6	Hydrogen Chloride	Isokinetic Sampling, Ion Chromatographic Method ^[3]
7	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[2]
8	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[2]
9	Mercury	Isokinetic Sampling, Digestion, Cold Vapour Atomic Absorption Spectroscopy ^[2]
10	Oxides of Nitrogen	Chemical Absorption, Colorimetric Method ^[2]
11	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[2]
12	Sulfur Dioxide	Chemical Absorption, Barium - Thorin Titrimetric Method ^[2]
13	Sulfuric Acid	Isokinetic Sampling, Barium - Thorin Titrimetric Method ^[3]

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
2	Acetone	Purge and Trap Gas Chromatographic / Mass Spectrometric Method ^[1]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[1]
6	Arsenic	Digestion, Inductively Coupled Plasma Method ^[1]
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

8 Barium...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
8	Barium	Digestion, Inductively Coupled Plasma Method ^[1]
9	Benzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
10	Benzo(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^[1]
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
18	Bis(2-Ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
20	Bromoform	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
21	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
22	Cadmium	Digestion, Inductively Coupled Plasma Method ^[1]
23	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
24	Carbon disulfide	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
25	Carbon tetrachloride	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

26 Chlordane...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
26	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
27	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
28	Chlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
29	Chlorodibromomethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
30	Chloroform	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
31	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
32	Chromium	Digestion, Inductively Coupled Plasma Method ⁽¹⁾
33	Chromium Hexavalent	Filtration, Colorimetric Method ⁽¹⁾
34	Chromium Trivalent	Digestion, Inductively Coupled Plasma Method ; Filtration, Colorimetric Method; Calculation ⁽¹⁾
35	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
36	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
37	DDD	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
38	DDE	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
39	DDT	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
40	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
41	Di-n-Butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
42	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

43 1,3-Dichlorobenzene ...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
43	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
44	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
45	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
46	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
47	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
48	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
49	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
50	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
51	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
52	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
53	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
54	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
55	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
56	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
57	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
58	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

59 2,4-Dinitrotoluene...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
59	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
60	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
61	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
62	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
63	Endrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
64	Ethylbenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
65	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
66	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
67	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
68	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
69	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
70	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
71	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
72	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
73	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
74	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

75 Hexachloroethane...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
75	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
76	n-Hexane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method
77	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
78	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
79	Lead	Digestion, Inductively Coupled Plasma Method ⁽¹⁾
80	Manganese	Digestion, Inductively Coupled Plasma Method ⁽¹⁾
81	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
82	Methyl Bromide	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
83	Methylene Chloride	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
84	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
85	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
86	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
87	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
88	Nickel	Digestion, Inductively Coupled Plasma Method ⁽¹⁾
89	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
90	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
91	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾
92	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ⁽¹⁾

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

93 pH...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
93	pH	Electrometric Method ^[1]
94	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
95	Phenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
96	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
97	Selenium	Digestion, Inductively Coupled Plasma Method ^[1]
98	Silver	Digestion, Inductively Coupled Plasma Method ^[1]
99	Styrene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
100	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
101	Tetrachloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
102	Toluene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
103	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
104	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
105	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
106	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
107	Trichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
108	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
109	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

110 1,3,5-Trimethylbenzene...

น้ำใต้ดิน จำนวน 118 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
110	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
111	Vanadium	Digestion, Inductively Coupled Plasma Method ^[1]
112	Vinyl acetate	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
113	Vinyl chloride	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
114	m-Xylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
115	o-Xylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
116	p-Xylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
117	Xylene (Total)	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[1]
118	Zinc	Digestion, Inductively Coupled Plasma Method ^[1]

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
2	Acetone	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
3	Aldrin	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
4	Anthracene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[4,7]
6	Arsenic	Digestion, Inductively Coupled Plasma Method ^[4,7]
7	Atrazine	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

8 Barium...

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
8	Barium	Digestion, Inductively Coupled Plasma Method ^[4,7]
9	Benzo(a)anthracene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
10	Benzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
11	Benzo(b)fluoranthene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
12	Benzo(k)fluoranthene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
13	Benzoic acid	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
14	Benzo(a)pyrene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
15	Benzo(g,h,i)perylene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^[4,7]
17	Bis(2-Chloroethyl)ether	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
18	Bis(2-Ethylhexyl)phthalate	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
20	Bromoform	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
21	Butyl benzyl phthalate	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
22	Cadmium	Digestion, Inductively Coupled Plasma Method ^[4,7]
23	Carbazole	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
24	Carbon disulfide	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
25	Carbon tetrachloride	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
26	Chlordane	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
27	p-Chloroaniline	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
28	Chlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
29	Chlorodibromomethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
30	Chloroform	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
31	2-Chlorophenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
32	Chromium	Digestion, Inductively Coupled Plasma Method ^[4,7]
33	Chromium (III)	Digestion, Inductively Coupled Plasma Method ; Filtration, Colorimetric Method; Calculation ^[4,5,7]
34	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[5]
35	Chrysene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
36	2,4-D	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
37	DDD	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
38	DDE	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
39	DDT	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
40	Dibenz(a,h)anthracene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
41	Di-n-Butyl phthalate	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
42	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
43	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
44	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
45	3,3-Dichlorobenzidine	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
46	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
47	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
48	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
49	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
50	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
51	2,4-Dichlorophenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
52	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
53	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
54	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
55	Dieldrin	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
56	Diethyl phthalate	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
57	2,4-Dimethylphenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
58	2,4-Dinitrophenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
59	2,4-Dinitrotoluene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

60 2,6-Dinitrotoluene...

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
60	2,6-Dinitrotoluene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
61	Di-n-octyl phthalate	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
62	Endosulfan	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
63	Endrin	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
64	Ethylbenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
65	Fluoranthene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
66	Fluorene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
67	Heptachlor	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
68	Heptachlor epoxide	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
69	Hexachlorobenzene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
70	Hexachloro-1,3-butadiene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
71	α -HCH	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
72	β -HCH	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
73	γ -HCH	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
74	Hexachlorocyclopentadiene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
75	Hexachloroethane	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

76 n-Hexane...

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
76	n-Hexane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
77	Indeno(1,2,3-cd)pyrene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
78	Isophorone	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
79	Lead	Digestion, Inductively Coupled Plasma Method ^[4,7]
80	Manganese	Digestion, Inductively Coupled Plasma Method ^[4,7]
81	Methoxychlor	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
82	Methyl Bromide	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
83	Methylene Chloride	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
84	2-Methylnaphthalene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
85	2-Methylphenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
86	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
87	Naphthalene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
88	Nickel	Digestion, Inductively Coupled Plasma Method ^[4,7]
89	Nitrobenzene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
90	N-Nitrosodiphenylamine	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
91	N-Nitrosodi-n-propylamine	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
92	Pentachlorophenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]

██████████
 นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

93 Phenanthrene...

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
93	Phenanthrene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
94	Phenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
95	Pyrene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
96	Selenium	Digestion, Inductively Coupled Plasma Method ^[4,7]
97	Silver	Digestion, Inductively Coupled Plasma Method ^[4,7]
98	Styrene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
99	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
100	Tetrachloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
101	Toluene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
102	Toxaphene	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
103	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
104	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
105	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
106	Trichloroethylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]
107	2,4,5-Trichlorophenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
108	2,4,6-Trichlorophenol	Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method ^[9,10]
109	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^[6,8]

██████████
 นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก 110 Vanadium...

ดิน จำนวน 117 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
110	Vanadium	Digestion, Inductively Coupled Plasma Method ^(4,7)
111	Vinyl Acetate	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^(6,8)
112	Vinyl Chloride	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^(6,8)
113	m-Xylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^(6,8)
114	o-Xylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^(6,8)
115	p-Xylene	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^(6,8)
116	Xylene (Total)	Purge and Trap, Gas Chromatographic / Mass Spectrometric Method ^(6,8)
117	Zinc	Digestion, Inductively Coupled Plasma Method ^(4,7)

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นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

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ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ABS Quality Evaluations

Certificate Of Conformance

This is to certify that the Quality Management System of:

SGS (Thailand) Ltd.

**100 Nanglinchee Road, Chongnonsee, Yannawa,
Bangkok 10120
Thailand**

(WITH ADDITIONAL FACILITIES LISTED ON ATTACHED ANNEX)

has been assessed by ABS Quality Evaluations, Inc. and found to be in conformance with the requirements set forth by:


ISO 9001:2015

The Quality Management System is applicable to:

PROVISION OF PHYSICAL INSPECTION, FUMIGATION, PEST CONTROL AND LABORATORY TESTING AND CALIBRATION

This certificate may be found on the ABS QE Website (www.abs-qe.com). For certificates issued in the People's Republic of China information may also be verified on the CNCA website (www.cnca.gov.cn).

Certificate No: 52229
Certification Date: 30 July 2015
Effective Date: 23 July 2020
Expiration Date: 24 July 2023
Revision Date: 23 July 2020


Dominic Townsend, President



Validity of this certificate is based on the successful completion of the periodic surveillance audits of the management system defined by the above scope and is contingent upon prompt, written notification to ABS Quality Evaluations, Inc. of significant changes to the management system or components thereof.

ABS Quality Evaluations, Inc. 1701 City Plaza Drive, Spring, TX 77389, U.S.A.
Validity of this certificate may be confirmed at www.abs-qe.com/cert_validation.

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ABS Quality Evaluations

ISO 9001:2015

Certificate Of Conformance

ANNEX

Certificate No: 52229

SGS (Thailand) Ltd.

At Below Facilities:

Facility: Facility 1 - Rayong Branch
1/209 and 1/211 Moo 1 T. Ban Chang,
A. Ban Chang,
Rayong 21130
Thailand
Activity: Inspection & Testing

Facility: Facility 3 - Nakornratchasima Office
1340/48 Suranarai Road, T. Nai Muang,
A. Muang Nakornratchasima,
30000
Thailand
Activity: Inspection & Fumigation

Facility: Facility 5 - Rama III Branch, Laboratory Services
41/16 - 20, 41/23 Rama III Road Soi 59,
Chongnonsee, Yannawa,
Bangkok 10120
Thailand
Activity: Testing

Facility: Facility 2 - Sriracha Office
144, 146 Sriracha Nskom 1 Road,
T. Sriracha, A. Sriracha,
Chonburi 20110
Thailand
Activity: Inspection, Fumigation & Pest Control

Facility: Facility 4 - Hat Yai Branch
57, 59 and 61 Soi 10 Phetkasem Road,
T. Hat Yai, A. Hat Yai,
Songkhla 90110
Thailand
Activity: Inspection, Fumigation, Pest Control & Testing

Facility: Facility 6 - SGS (Cambodia) Limited
No.1076 A-D, Street 371, Phum Trea II, Sangkat Sreung Meanchey,
Khan Meanchey, Phnom Penh,
Cambodia
Activity: Inspection



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แบบ กส.ป/ทส.๒
Form NSC/TISI 2

ใบรับรองเลขที่ 22-IB0007
(Certificate No.)

ใบรับรองระบบงาน (Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท เอสจีเอส (ประเทศไทย) จำกัด
SGS (Thailand) Limited

ตั้งอยู่เลขที่
(Address)

๓๐๐ ถนนนางลิ้นจี่ แขวงช่องนนทรี เขตยานนาวา กรุงเทพมหานคร
(100 Nanglinchee Road, Chongnonsee, Yannawa, Bangkok)

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๓๗๐๒๐ - ๒๕๕๖
(Standard No. ISO/IEC 17020 : 2012)

การตรวจสอบและรับรอง-ข้อกำหนดสำหรับหน่วยตรวจ
(Conformity assessment — Requirements for the operation of various types of bodies performing inspection)

หมายเลขการรับรองที่ หน่วยตรวจ ๐๐๓๔
(Accreditation No. INSPCETION 0034)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้อำนาจรับรอง แสดงไว้ใน QR CODE และ www.tisi.go.th
(Details of the scheme and scope of the certificate are shown in QR CODE and www.tisi.go.th)

ออกให้ ณ วันที่ ๓๑ มกราคม พ.ศ. ๒๕๖๕
(Issue date : 31 January B.E. 2565 (2022))



รองเลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
ปฏิบัติราชการแทน
เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry, Thailand, Thai Industrial Standards Institute)

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007



ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด

ที่ตั้งสถานประกอบการของหน่วยตรวจและข้อมูลติดต่อ

ที่ตั้งสำนักงานใหญ่
เลขที่ 100 ถนนนางลิ้นจี่ แขวงช่องนนทรี เขตยานนาวา
กรุงเทพมหานคร

ที่ตั้งสำนักงานสาขา (กรณีแตกต่างจากที่ตั้งสำนักงานใหญ่)

- 1) สำนักงานศรีราชา
เลขที่ 144-146 ถนนศรีราชานคร 1 ตำบลศรีราชา อำเภอศรีราชา
จังหวัดชลบุรี
- 2) สำนักงานนครราชสีมา
เลขที่ 1340/46 ถนนสุรนารายณ์ ตำบลในเมือง อำเภอเมือง
จังหวัดนครราชสีมา
- 3) สาขาหาดใหญ่
เลขที่ 57, 59, 61 ซอย 10 ถนนเพชรเกษม ตำบลหาดใหญ่
อำเภอหาดใหญ่ จังหวัดสงขลา

หมายเลขการรับรอง : หน่วยตรวจ 0034

ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
1. เครื่องแต่งกาย : เสื้อผ้าสำเสร็จรูป (เฉพาะสำนักงานใหญ่)	การตรวจสอบการผลิตและการตรวจก่อนการ ส่งมอบ ในรายการต่อไปนี้ - ลักษณะทั่วไป - รูปแบบและขนาด - ปริมาณและการบรรจุ (เฉพาะการ ตรวจก่อนการส่งมอบ)	- วิธีปฏิบัติงานของบริษัทหมายเลข P-INSP-WI-SL-001 - ข้อกำหนดของลูกค้านี้
2. ผลิตภัณฑ์อาหาร : การตรวจผลิตภัณฑ์อาหาร (เฉพาะสำนักงานใหญ่และ สาขาหาดใหญ่)	การตรวจสอบระหว่างการผลิตและการตรวจก่อน การส่งมอบ สำหรับกลุ่มผลิตภัณฑ์อาหารแช่ แข็งและกลุ่มผลิตภัณฑ์อาหารกระป๋อง	- ขั้นตอนการดำเนินงานของบริษัท หมายเลข P-CORP-I-09 - ข้อกำหนดของลูกค้านี้
3. ยานยนต์ : รถยนต์ (เฉพาะสำนักงานใหญ่)	การตรวจสอบสภาพทั่วไปก่อนการส่งมอบ ใน รายการต่อไปนี้ - จำนวน - สภาพความสมบูรณ์ภายนอกของ รถยนต์ เช่น สภาพของกระจก สภาพ ทั่วไปของตัวถัง สภาพยางและล้อ ความสะอาด และอื่น ๆ ที่อยู่นอก	- ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-OGC-IN-001 และ PR-TH-NR-OGC-IN-002 - เอกสาร New Vehicle Receiving and Inspection Procedures Issued May 1, 1989 ของ Federal Chamber of Automotive Industries

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007



ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
4. เครื่องจักรกล : ถังก๊วชปิโตรเลียมเหลว (เฉพาะสำนักงานใหญ่)	การตรวจกระบวนการผลิตและการควบคุมคุณภาพ ในรายการต่อไปนี้ <ul style="list-style-type: none"> - การตรวจชิ้นส่วนประกอบการผลิตถัง - การตรวจระหว่างการผลิต - การทำกระบวนการทางความร้อน - การทดสอบทั้งทางกล การรั่ว การขยายตัวและการกระเปิด และการตรวจสอบปริมาตร - การตรวจสอบก่อนการส่งมอบ 	<ul style="list-style-type: none"> - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-071 - ข้อกำหนดของลูกค้า
5. สินค้าเกษตร : ข้าวหอมมะลิไทย (เฉพาะสำนักงานใหญ่และสำนักงานครราชสีมา)	การตรวจในขั้นตรวจปล่อย ในรายการต่อไปนี้ <ul style="list-style-type: none"> - ปริมาณ - คุณภาพทางกายภาพและลักษณะทั่วไป ดังต่อไปนี้ <ul style="list-style-type: none"> • ประเภท ชนิด • ความบริสุทธิ์ • ความชื้น • ขนาดของเมล็ดข้าว • ส่วนผสม (ข้าวเต็มเมล็ด ข้าวหัก ต้นข้าว) • ข้าวและสิ่งที่มีปนได้ (เมล็ดเสีย เมล็ดเหลือง เมล็ดท้องไข เมล็ดแดง ฯลฯ) • ไม่มีแมลงที่ยังมีชีวิต • ระดับการขัดสี <p>ไม่ครอบคลุมการตรวจความบริสุทธิ์ด้วยวิธีวิเคราะห์ในห้องปฏิบัติการในรายการ ปริมาณอมิโลส (Amylose content) และ ค่าการสลายเมล็ดข้าวในด่าง (Alkali spreading value)</p>	<ul style="list-style-type: none"> - ประกาศกระทรวงพาณิชย์ เรื่อง หลักเกณฑ์และวิธีการจัดให้มีการตรวจสอบมาตรฐานสินค้าและการตรวจสอบมาตรฐานสินค้าข้าวหอมมะลิไทย - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-AGR-IN-004 และ PR-TH-NR-AGR-IN-005 - ข้อกำหนดของลูกค้า

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007



ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
6. สินค้าเกษตร : น้ำตาลทรายขาวและน้ำตาลทรายดิบ (เฉพาะสำนักงานใหญ่ และสำนักงานครราชสีมา)	การตรวจลักษณะทั่วไปและปริมาณ ทั้งนี้ไม่รวมผลวิเคราะห์ในห้องปฏิบัติการ	<ul style="list-style-type: none"> - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-AGR-IN-002 และ PR-TH-NR-AGR-IN-003 - ข้อกำหนดของลูกค้า
7. สินค้าเกษตร : ถ่านหิน ซีเมนต์ อีพซัม ปูนเม็ด หินปูน และหินตะกอน (เฉพาะสำนักงานใหญ่ สำนักงานศรีราชา และสาขาหาดใหญ่)	การตรวจสภาพทั่วไปและการสุ่มตัวอย่าง	<ul style="list-style-type: none"> - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-MIN-IN-001 และ PR-TH-NR-MIN-IN-002
8. การตรวจโรงงานเพื่อการรับรองคุณภาพผลิตภัณฑ์ (เฉพาะสำนักงานใหญ่)	การตรวจกระบวนการผลิต ระบบคุณภาพ และการตรวจประเมินผลิตภัณฑ์ สำหรับกลุ่มผลิตภัณฑ์ ดังต่อไปนี้ <ul style="list-style-type: none"> - วัสดุก่อสร้าง คอนกรีต สุขภัณฑ์ เซรามิก และเครื่องเรือน - บริภัณฑ์ส่องสว่าง - ไฟฟ้ากำลัง - เครื่องใช้ไฟฟ้า - เครื่องใช้อิเล็กทรอนิกส์ - โภภัณฑ์ และของเล่น - ยาง เคมี สิ่งทอ ปิโตรเลียม และอาหาร - ยานยนต์ ชิ้นส่วนยานยนต์ และเครื่องกล 	<ul style="list-style-type: none"> - หลักเกณฑ์การตรวจสอบเพื่อการอนุญาตของสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม - หลักเกณฑ์เฉพาะในการตรวจสอบเพื่อการอนุญาตผลิตภัณฑ์ที่เกี่ยวข้อง และมาตรฐานผลิตภัณฑ์อุตสาหกรรมที่เกี่ยวข้อง - เอกสารขั้นตอนการดำเนินงานของบริษัทหมายเลข THLPP.01

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007



ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
9. สิ่งแวดล้อม (เฉพาะสำนักงานใหญ่)	การตรวจคุณภาพสิ่งแวดล้อมภายในอาคาร ในรายการต่อไปนี้ <ul style="list-style-type: none"> - ระดับเสียง - ความร้อนสะสม - ปริมาณ CO, CO₂, PM-10, Ozone, Total VOCs - อุณหภูมิ - ความชื้นสัมพัทธ์ - ความเร็วลม - ระดับความเข้มแสง 	<ul style="list-style-type: none"> - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-035, PR-TH-I&E-IN-036, PR-TH-I&E-IN-038, PR-TH-I&E-IN-050, PR-TH-I&E-IN-051, PR-TH-I&E-IN-052, PR-TH-I&E-IN-054 และ PR-TH-I&E-IN-055 - ข้อกำหนดของลูกค้า - กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง
	การตรวจคุณภาพสิ่งแวดล้อมภายนอกอาคาร ในรายการต่อไปนี้ <ul style="list-style-type: none"> - ระบบการตรวจสอบคุณภาพอากาศจากปล่องแบบอัตโนมัติอย่างต่อเนื่อง (Continuous Emission Monitoring Systems : CEMs) ด้วยเครื่องมือหรือเครื่องอุปกรณ์พิเศษ (ปริมาณ CO, SO₂, NO₂, O₂, CO₂, NO และ NO_x) 	<ul style="list-style-type: none"> - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-015 และ PR-TH-I&E-IN-032 - ข้อกำหนดของลูกค้า - กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง
	การตรวจคุณภาพน้ำ ในรายการ <ul style="list-style-type: none"> - การเก็บตัวอย่างน้ำ - ลักษณะทางกายภาพ (สี สีตะกอน) - ความเป็นกรด-ด่าง - อุณหภูมิ - ปริมาณออกซิเจนที่ละลายน้ำ (Dissolved Oxygen : DO) - ค่าการนำไฟฟ้า - ค่าความเค็ม - ค่าความขุ่น <p>ทั้งนี้ไม่รวมผลวิเคราะห์ในห้องปฏิบัติการ</p>	<ul style="list-style-type: none"> - ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-043 - ข้อกำหนดของลูกค้า - กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007



ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
10. สินค้าเกษตร : ข้าวสาลีและกากถั่วเหลือง* (เฉพาะสำนักงานใหญ่และสำนักงานศรีราชา)	การตรวจสอบสภาพทั่วไป การสุ่มตัวอย่าง และการสังเกตการณ์การชั่งน้ำหนัก	<ul style="list-style-type: none"> - GAFTA Weighing Rules No. 123 - GAFTA Sampling Rules No.124 - วิธีปฏิบัติงานของบริษัทหมายเลข PR-TH-NR-AGR-IN-006 - ข้อกำหนดของลูกค้า

หมายเหตุ : * สาขาและขอบข่ายที่ได้รับการรับรองระบบงานเพิ่มเติม วันที่ 8 ธันวาคม 2564

ตั้งแต่ วันที่ 8 ธันวาคม พ.ศ. 2564
ถึง วันที่ 10 กันยายน พ.ศ. 2569
ออกให้ ณ วันที่ 31 มกราคม พ.ศ. 2565

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007



Name of Inspection Body : SGS (Thailand) Limited

Addresses and contact details

Head office or primary location 100 Nanglinchee Road, Chongnonsee, Yannawa, Bangkok

Additional Locations (If different from Head Office)

1) **Sriracha Office**
144, 146 Sriracha Nakhon 1 Road, Sriracha, Sriracha, Chonburi

2) **Nakhon Ratchasima Office**
1340/46 Suranarai Road, Nai-Muang, Muang, Nakhonratchasima

3) **Hat Yai Branch**
57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai, Songkhla

Accreditation No. : INSPECTION 0034

Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
1. Apparel : Readymade Garment (Head office)	In-line process and Pre-shipment inspection of readymade garment with the items as follows : – General appearance – Style, Size and Weight of unit – Quantity and Packing (Pre-shipment inspection)	– Work instruction of SGS (Thailand) Limited : P-INSP-WI-SL-001 – Customer's requirements
2. Food Products : Food Inspection (Head Office and Hat Yai Branch)	During process inspection and Pre-shipment inspection of food products covering frozen food products and canned food products	– Operating procedure of SGS (Thailand) Limited : P-CORP-I-09 – Customer's requirements
3. Motor Vehicle : Automotive (Head Office)	Pre-shipment inspection of general condition of vehicle with the items as follows : – Quantity – Visual inspection of external condition e.g. glass, body, tires, wheels, cleanliness etc.	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-OGC-IN-001 and PR-TH-NR-OGC-IN-002 – New Vehicle Receiving and Inspection Procedures Issued May 1, 1989 of Federal Chamber of Automotive Industries

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007



Name of Inspection Body : SGS (Thailand) Limited

Accreditation No. : INSPECTION 0034

Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
4. Machinery : LPG Cylinder (Head Office)	Production process and quality control inspection with the items as follows : – Component parts – During assembly – Heat treatment – Mechanical, Hydraulic pressure leak, Volumetric expansion, Burst test and Capacity check – Pre-delivery inspection	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-071 – Customer's requirements
5. Agricultural Products : Thai Hom Mali Rice (Head Office and Nakhon Ratchasima Office)	Pre-shipment inspection with the items as follows : – Quantity – Physical quality and general feature as follows : • Type, Grade • Purity • Moisture • Kernel size • Composition (whole kernel, broken, head rice) • Rice and matters that may be present (damaged kernel, yellow kernel, chalky kernel, red kernel, etc.) • No live insects • Milling degree Not covering the purity check by laboratory analysis for determination of Amylose content and Alkali spreading value	– Notification of Ministry of Commerce on Criteria and procedures of organizing the inspection of commodity standards and the inspection of the standards of Thai Hom Mali Rice – Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-004 and PR-TH-NR-AGR-IN-005 – Customer's requirements

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007



Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
6. Agricultural Products : White sugar and raw sugar (Head Office and Nakhon Ratchasima Office)	General appearance and quantity inspection Excluding analysis by laboratory testing	<ul style="list-style-type: none"> Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-002 and PR-TH-NR-AGR-IN-003 Customer's requirements
7. Bulk Solids : Coal, cement, gypsum, clinker, limestone and sedimentary rock (Head Office, Sriracha Office and Hat Yai Branch)	General appearance inspection and sampling	<ul style="list-style-type: none"> Operating procedure of SGS (Thailand) Limited : PR-TH-NR-MIN-IN-001 and PR-TH-NR-MIN-IN-002
8. Manufacturing inspection for product certification (Head Office)	Production process and quality control system inspection including the evaluation of the following group of products : <ul style="list-style-type: none"> Construction materials, concretes, sanitary wares, ceramics, and furniture Electrical lighting and similar equipment Electrical power devices Electrical appliances Electronic apparatus, parts, and components Consumer goods and toys Rubbers, chemicals, textiles, petroleum, and food products Automotive products, parts, and mechanical products 	<ul style="list-style-type: none"> Criteria for product certification of Thai Industrial Standards Institute Criteria for the relevant particular requirements and Thai Industrial Standards for product certification Operating procedure of SGS (Thailand) Limited : THLPP.01

Date of Initial Issue: 11 September B.E. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007



Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
9. Environmental (Head Office)	Indoor Environment Inspection with the items as follows : <ul style="list-style-type: none"> Sound level Heat stress CO, CO₂, PM-10, Ozone, Total VOCs Temperature Relative humidity Air velocity Light intensity 	<ul style="list-style-type: none"> Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-035, PR-TH-I&E-IN-036, PR-TH-I&E-IN-038, PR-TH-I&E-IN-050, PR-TH-I&E-IN-051, PR-TH-I&E-IN-052, PR-TH-I&E-IN-054, and PR-TH-I&E-IN-055 Customer's requirement Related laws and regulations
	Outdoor Environment Inspection, the items as follows : <ul style="list-style-type: none"> Continuous Emission Monitoring System : CEMS (CO, SO₂, NO₂, O₂, CO₂, NO, and NO_x) 	<ul style="list-style-type: none"> Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-015 and PR-TH-I&E-IN-032 Customer's requirement Related laws and regulations
	Water Inspection, the items as follows : <ul style="list-style-type: none"> Water sampling Physical appearance (Color, Suspended Solids) pH Temperature Dissolved Oxygen : DO Conductivity Salinity Turbidity Excludes laboratory analysis result	<ul style="list-style-type: none"> Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-043 Customer's requirement Related laws and regulations

Date of Initial Issue: 11 September B.E. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007



Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
10. Agricultural Products : Wheat and soybean meal* (Head Office and Sriracha Office)	General appearance inspection, Sampling, and weighing observation	<ul style="list-style-type: none"> - GAFTA Weighing Rules No. 123 - GAFTA Sampling Rules No.124 - Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-006 - Customer's requirement

Note: * Extent scope: 8 December B.E. 2564 (2021)

Valid from : 8 December B.E. 2564 (2021)
Until : 10 September B.E. 2569 (2026)
Issue Date : 31 January B.E. 2565 (2022)

ภาคผนวก ค

สำเนาใบรับรองการสอบเทียบเครื่องมือตรวจวัด

ENAB 078



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 15 June, 2022

Certification No. 217/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

VERIFIED

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AM140127092 Transmitter A10119A022

Customer : SGS (Thailand) Limited,
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1007.6 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 640 Serial No. 02849057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Mechanical Engineer

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 217/22

15 June, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	12.5	0.51
15.01	-	-	-	14.8	0.21
17.02	-	-	-	16.5	0.52
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.

US.DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrate

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 217/22

15 June, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
754.87	755.2	-0.33
754.75	755.1	-0.35
754.27	754.6	-0.33
754.55	754.9	-0.35
754.74	755.1	-0.36
755.22	755.6	-0.38
755.49	755.8	-0.31
755.78	756.1	-0.32
755.99	756.3	-0.31
756.51	756.8	-0.29
756.05	756.4	-0.35
756.33	756.6	-0.27
756.47	756.8	-0.33
753.77	754.1	-0.33
754.03	754.4	-0.37
755.03	755.4	-0.37
755.25	755.6	-0.35
756.59	756.9	-0.31
756.74	756.1	-0.36
755.99	756.3	-0.31

Average -0.33

Calibrated by :

Mechanical Engineer

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 217/22

15 June, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.7	-0.2
30.2	30.3	-0.1
15.4	15.4	0.0

Calibrated by :

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 217/22

15 June, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
83.02	81	2.02
62.18	61	1.18
43.27	42	1.27

Calibrated

Mechanical Engineer



Date of Issue 15 June,2022

Certification No. 217/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. A10119A022 ทำการสอบเทียบกับแก้วฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in / TIP)



วิศวกรชำนาญการ



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 30 June, 2022

Certification No. 250/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AM140127068 Transmitter AK130716013

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

VERIFIED

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1005.6 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Mechanical Engineer

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 250/22

30 June, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.1	-0.08
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.2	-0.20
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.2	-0.19
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.2	-0.19
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.	
US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibration

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 250/22

30 June, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
755.22	754.5	0.72
755.44	754.7	0.74
755.57	754.8	0.77
755.72	755.0	0.72
756.19	755.5	0.69
756.09	755.4	0.69
756.31	755.6	0.71
756.53	755.8	0.73
753.95	753.2	0.75
753.80	753.1	0.70
753.92	753.2	0.72
753.71	753.0	0.71
754.16	753.4	0.76
754.07	753.3	0.77
754.13	753.4	0.73
754.48	753.8	0.68
754.62	753.9	0.72
753.74	753.0	0.74
753.62	752.9	0.72
753.84	753.1	0.74

Average

0.73

Calib

Mechanical Engineer

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 250/22

30 June, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.7	45.7	0.0
30.4	30.3	0.1
15.6	15.5	0.1

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

30 June, 2022

Certification No. 250/22

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
85.20	86	-0.80
64.10	66	-1.90
45.20	44	1.20

Calibrated by

Mechanical Engineer



Date of Issue 30 June, 2022

Certification No. 250/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชื่อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. AK130716013 ทำการสอบเทียบกับแก้วฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in / TIP)



วิศวกรชำนาญการ

ENAB 17107



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 June, 2022

Certification No. 220/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

VERIFIED

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AZ170619022 Transmitter AZ170619028

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.6 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo 643 Serial No. 02948057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V4220015

Mechanical Engineer

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 220/22

15 June, 2022

Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	Inches H2O	Inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.

US. DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Ca

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 220/22

15 June, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
754.87	756.4	-1.53
754.75	756.2	-1.45
754.27	755.8	-1.53
754.55	756.0	-1.45
754.74	756.2	-1.46
755.22	756.7	-1.48
755.49	756.9	-1.41
755.78	757.2	-1.42
755.99	757.3	-1.31
756.51	757.8	-1.29
756.05	757.4	-1.35
756.33	757.6	-1.27
756.47	757.9	-1.43
753.77	755.2	-1.43
754.03	755.5	-1.47
755.03	756.5	-1.47
755.25	756.8	-1.55
756.59	757.9	-1.31
755.74	757.1	-1.36
755.99	757.4	-1.41

Average

Calib

Mechanical Engineer

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 220/22

15 June, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.4	0.1
30.2	30.2	0.0
15.4	15.4	0.0

Cal

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 220/22

15 June, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
83.02	82	1.02
62.18	63	-0.82
43.27	45	-1.73

Calibrated by :

Mechanical Engineer



Date of Issue 15 June, 2022

Certification No. 220/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชีท้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. AZ170619028 ทำการสอบเทียบกับแก้ว ฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

ENAS17104



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 30 June, 2022

Certification No. 251/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AZ170619028 Transmitter AZ170619022

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

VERIFIED

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1004.6 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645, Serial No. 02649057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Mechanical Engineer

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 251/22

30 June, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.1	-0.08
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.2	-0.20
9.02	-	-	-	9.0	0.02
11.01	-	-	-	11.2	-0.19
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.2	-0.19
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.	
U.S.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 251/22

30 June, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
755.22	756.3	-1.06
755.44	756.5	-1.06
755.57	756.6	-1.03
755.72	756.7	-0.98
756.19	757.1	-0.91
756.09	757.2	-1.11
756.31	757.4	-1.09
756.53	757.7	-1.17
753.95	755.1	-1.15
753.80	754.9	-1.10
753.92	755.0	-1.08
753.71	754.9	-1.19
754.16	755.4	-1.24
754.07	755.2	-1.13
754.13	755.3	-1.17
754.48	755.7	-1.22
754.62	755.8	-1.18
753.74	754.9	-1.16
753.62	754.7	-1.08
753.84	755.0	-1.16

Average

Cal

Mechanical Engineer

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 251/22

30 June, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.7	45.7	0.0
30.4	30.5	-0.1
15.6	15.5	0.1



Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 251/22

30 June, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
85.20	87	-1.80
84.10	86	-1.90
45.20	46	-0.80



Mechanical Engineer



Date of Issue 30 June,2022

Certification No. 251/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชื่อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. AZ170619022 ทำการสอบเทียบกับแก้ว ฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

ENAB 19134



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 4 March, 2022

Certification No. 089/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415074 Transmitter BD190415074

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

VERIFIED

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1012.1 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 845 Serial No. 02648057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

(Authorised Signatory)

for the Chief

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 089/22

4 March, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.	
U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibration & Test Section

Calibration & Test Section
Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156, 0-2399-0469

The Result of Calibration

Certification No. 089/22

4 March, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
759.19	759.4	-1.21
759.60	759.9	-1.30
759.47	759.6	-1.13
758.36	759.5	-1.15
759.09	759.2	-1.12
757.72	759.9	-1.18
757.55	758.6	-1.06
757.26	758.4	-1.15
757.07	758.1	-1.03
756.92	758.0	-1.08
756.45	757.4	-0.95
756.28	757.2	-0.92
756.61	760.4	-0.79
759.89	760.5	-0.61
759.76	760.6	-0.84
759.62	760.4	-0.88
759.36	760.3	-0.95
759.15	760.0	-0.85
758.99	759.9	-0.91
758.90	759.6	-0.80

Average



Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 089/22

4 March, 2022

Page : 4 of 6

Standard	Temperature Sensor Reading	
	Reading	Correction
Temp. °C	°C	°C
45.4	45.4	0.0
30.2	30.2	0.0
15.3	15.3	0.0



Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-7804, 0-2399-0469

The Result of Calibration

4 March, 2022

Certification No. 089/22

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
83.53	81	2.53
62.12	61	1.12
45.62	45	0.62

Mechanical Engineer



Date of Issue 4 March, 2022

Certification No. 089/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ซีรีส์ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. BD190415074 ทำการสอบเทียบกับแก้วฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 24 June, 2021

Certification No. 323/21

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415079 Transmitter BD190415079

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.2 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645 Serial No. 42848057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Mechanical Engineer

(Authorised Signatory)

for the Chief

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 323/21

24 June, 2021

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacuum inches	Pressure hPa	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.1	-0.08
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.2	-0.20
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.	
U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156, 0-2399-0469

The Result of Calibration

Certification No. 323/21

24 June, 2021

Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction
757.19	758.1	-0.91
756.23	757.2	-0.97
756.08	757.0	-0.92
755.76	756.7	-0.94
755.53	756.4	-0.87
755.43	756.3	-0.87
755.26	756.2	-0.94
755.09	756.0	-0.91
754.91	755.9	-0.99
754.73	755.6	-0.87
754.60	755.5	-0.90
756.83	757.8	-0.97
756.95	757.9	-0.95
757.08	758.0	-0.92
757.13	758.0	-0.87
757.25	758.2	-0.95
757.46	758.4	-0.94
757.37	758.3	-0.93
757.09	758.1	-1.01
756.95	757.8	-0.85

Average

0.92

Calibration & Test Section

Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 323/21

24 June, 2021

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.0	0.2
31.2	31.1	0.1
16.4	16.5	-0.1

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

24 June, 2021

Certification No. 323/21

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
81.46	78	3.46
62.36	60	2.36
42.56	44	-1.44

Ca

Mechanical Engineer



Date of Issue 24 June, 2021

Certification No. 323/21

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชีห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. BD190415079 ทำการสอบเทียบกับแก้ว ฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

ENAB 99139



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 20 January, 2022

Certification No. 016/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415090 Transmitter BD190415090

Customer : SGS (Thailand) Limited,
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1012.6 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, type 042, Serial No. 02348957

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. 11220015

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 016/22

20 January, 2022

Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H ₂ O	inches H ₂ O	ft/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.1	-0.08
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.

US. DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibration & Test Section

Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 016/22

20 January, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
760.50	761.4	-0.90
760.13	761.2	-1.07
760.67	761.6	-0.93
760.73	761.7	-0.97
757.28	758.3	-1.02
757.34	758.4	-1.06
757.52	758.5	-0.96
757.79	758.9	-1.11
758.10	759.1	-1.00
758.16	759.2	-1.04
758.66	759.7	-1.04
758.47	759.4	-0.93
758.56	759.5	-0.94
758.75	759.6	-0.85
758.98	760.0	-1.02
759.36	760.3	-0.94
756.54	757.6	-1.06
756.66	757.7	-1.04
757.00	758.0	-1.00
757.15	758.2	-1.05

Average

-1.00

Calibration & Test Section

Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 016/22

20 January, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.4	-0.2
30.4	30.5	-0.1
15.1	15.1	0.0

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

20 January, 2022

Certification No. 016/22

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
81.15	85	-3.85
60.23	63	-2.77
45.21	47	-1.79



Mechanical Engineer



Date of Issue 20 January, 2022

Certification No. 016/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg No. BD190415090 ทำการสอบเทียบกับแก้วฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

ENAE 19140



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 20 January, 2022

Certification No. : 017/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415091 Transmitter BD190415091

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1012.1 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645 Sensor No. 4098067

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

VERIFIED



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 017/22

20 January, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacuum m/sec	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.1	-0.08
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.2	-0.20
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.2	-0.19
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.2	-0.19
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.	
US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Ca

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 017/22

20 January, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
760.60	761.5	-1.00
760.13	761.2	-1.07
760.67	761.8	-1.13
760.73	761.9	-1.17
757.28	758.4	-1.12
757.34	758.5	-1.16
757.52	758.6	-1.08
757.79	758.9	-1.11
758.10	759.2	-1.10
758.16	759.3	-1.14
758.66	759.8	-1.14
758.47	759.6	-1.13
758.56	759.8	-1.24
758.75	759.9	-1.15
758.98	760.0	-1.02
759.36	760.5	-1.14
756.54	757.6	-1.06
756.66	757.8	-1.14
757.00	758.0	-1.00
757.15	758.2	-1.05

Average

Calibration & Test Section

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 017/22

20 January, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.1	0.1
30.4	30.4	0.0
15.1	15.2	-0.1

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

20 January, 2022

Certification No. 017/22

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
81.15	85	-3.85
60.23	62	-1.77
45.21	48	-2.79



Mechanical Engineer



Date of Issue 20 January, 2022

Certification No. 017/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg No. BD190415091 ทำการสอบเทียบกับแก้วฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

079



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 17 May, 2022

Certification No. 185/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AK130626036 Transmitter A111101P020

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

VERIFIED

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.5 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645 Series No. 72848057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

(Authorised Signatory)
for the Chief

Sub-Standard Instrument

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 185/22

17 May, 2022

Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.

U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibration & Test Section

Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 185/22

17 May, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
756.11	756.4	-0.29
756.26	756.6	-0.34
755.92	756.2	-0.28
753.01	753.3	-0.29
752.57	752.8	-0.23
752.92	753.2	-0.28
753.26	753.5	-0.24
753.92	754.2	-0.28
754.33	754.6	-0.27
754.98	755.3	-0.32
755.51	755.9	-0.39
753.83	754.1	-0.27
754.25	754.6	-0.35
755.29	755.6	-0.31
756.27	756.5	-0.23
756.59	756.9	-0.31
756.87	757.1	-0.23
756.23	756.5	-0.27
755.63	755.9	-0.27
754.89	755.1	-0.21

Average

-0.28

Calibration & Test Section

Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 185/22

17 May, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.4	-0.2
30.4	30.5	-0.1
15.2	15.3	-0.1

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 185/22

17 May, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
82.40	79	3.40
61.62	59	2.62
45.32	44	1.32



Mechanical Engineer



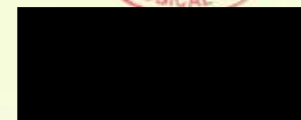
Date of Issue 17 May, 2022

Certification No. 185/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 CUK Mfg. Code. A111101P020 ทำการสอบเทียบกับ แก้วฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.2 mm/ TIP)



วิศวกรชำนาญการ

97115



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 17 May, 2022

Certification No. 187/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AZ170619045 Transmitter AZ170619045

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

VERIFIED

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1006.5 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02846951

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

(Authorized Signatory)

for the Chief

Sub-Standard Instrument

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 187/22

17 May, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.7	0.31
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.

US.DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibration & Test Section

Meteorological Instruments Bureau

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 187/22

17 May, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
756.11	756.1	0.01
756.26	756.3	-0.04
755.92	756.1	-0.18
753.01	753.1	-0.09
752.57	752.7	-0.13
752.92	753.0	-0.08
753.26	753.4	-0.14
753.92	754.1	-0.18
754.33	754.4	-0.07
754.98	755.0	-0.02
755.51	755.6	-0.09
753.83	754.0	-0.17
754.25	754.4	-0.15
756.29	755.3	-0.01
756.27	756.4	-0.13
756.59	756.7	-0.11
756.87	757.0	-0.13
756.23	756.4	-0.17
755.63	755.7	-0.07
754.89	755.0	-0.11

Average

-0.10

Calibration & Test Section

Meteorological Instruments Bureau



Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 187/22

17 May, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.3	-0.1
30.4	30.4	0.0
15.2	15.3	-0.1

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

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The Result of Calibration

Certification No. 187/22

17 May, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
82.40	84	-1.60
61.62	62	-0.38
45.32	46	-0.68



Mechanical Engineer



Date of Issue 17 May, 2022

Certification No. 187/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชีท้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. AZ170619045 ทำการสอบเทียบกับแก้ว ฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

DNAB 19/36



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 June, 2022

Certification No. 219/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

VERIFIED

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415077 Transmitter BD190415077

Customer : SGS (Thailand) Limited,
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.1 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No. 8390/94 Wet No. 8389/94
: Thermoschneider No. 9188 : testo, testo 645 Serial No. 02640057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 219/22

15 June, 2022

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.

US.DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 219/22

15 June, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
754.87	755.5	-0.63
754.75	755.4	-0.65
754.27	754.9	-0.63
754.55	755.2	-0.65
754.74	755.5	-0.76
755.22	755.9	-0.68
755.49	756.1	-0.61
755.78	756.4	-0.62
755.99	756.5	-0.51
756.51	757.1	-0.59
756.05	756.6	-0.55
756.33	756.8	-0.47
756.47	757.0	-0.53
753.77	754.5	-0.73
754.03	754.7	-0.67
755.03	755.7	-0.67
755.25	755.9	-0.65
756.59	757.2	-0.61
755.74	756.3	-0.56
755.99	756.5	-0.51

Average

-0.6

Calibration & Test Section

Meteorological Instruments Bureau



Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 219/22

15 June, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.4	0.1
30.2	30.1	0.1
15.4	15.4	0.0

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 219/22

15 June, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
83.02	81	2.02
62.18	61	1.18
43.27	42	1.27



Mechanical Engineer



Date of Issue 15 June, 2022

Certification No. 219/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. BD190415077 ทำการสอบเทียบกับแก้ว ฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.01 in/ TIP)



วิศวกรชำนาญการ

E HAB 19137



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 June, 2022

Certification No. 218/22

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 8152C

Mfg Code : Display BD190415078 Transmitter BD190415078

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1007.1 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 102949057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 218/22

15 June, 2022

Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	Inches H2O	Inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.3	0.71
13.01	-	-	-	12.5	0.51
15.01	-	-	-	14.3	0.71
17.02	-	-	-	16.5	0.52
20.02	-	-	-	19.3	0.72

Wind Aloft Plotting Board.	
U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 218/22

15 June, 2022

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
754.87	755.9	-1.03
754.75	755.8	-1.05
754.27	755.3	-1.03
754.55	755.7	-1.15
754.74	755.9	-1.16
755.22	756.2	-0.98
755.49	756.4	-0.91
755.78	756.8	-1.02
755.99	757.0	-1.01
756.51	757.7	-1.19
756.05	757.1	-1.05
756.33	757.4	-1.07
756.47	757.6	-1.13
753.77	754.9	-1.13
754.03	755.1	-1.07
755.03	756.1	-1.07
755.25	756.4	-1.15
756.59	757.5	-0.91
755.74	756.8	-1.06
755.99	757.1	-1.11
Average		-1.06

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 218/22

15 June, 2022

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.6	-0.1
30.2	30.2	0.0
15.4	15.3	0.1

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 218/22

15 June, 2022

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
83.02	85	-1.96
62.18	63	-0.82
43.27	42	1.27



Mechanical Engineer



Date of Issue 15 June, 2022

Certification No. 218/22

Page : 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152 C Mfg. Code. BD190415078 ทำการสอบเทียบกับแก้ว ฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES , NEGRETTI & ZAMBRA LONDON No 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของ เครื่องมือ (0.01 in / TIP)



วิศวกรชำนาญการ



EML 002



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0638

MTC No. EEL. BP. 67/0664

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand) Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Rion

Model : NL-21

Serial No. : 00922234 (ENSL008)

Microphone : Type UC-52 No.99263

Preamplifier : Type NH-21 No.13495

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \%$ Ambient Pressure : $(101.325 \pm 1.5) \text{ kPa}$

Standards used :

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2633526.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

VERIFIED

Date of Receipt : 14 Jun. 2021

Date of Calibration : 1-2 Jul. 2021

1 / 8

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0638

MTC No. EEL. BP. 67/0664

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

VERIFIED

Date of Calibration : 1-2 Jul. 2021

2 / 8

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0638

MTC No. EEL. BP. 67/0664

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Unit Under Test				Tolerance
	Measured Value (dB)		Deviation (dB)	Uncertainty (±dB)	Limit Class 2 (±dB)
	Before adjust	After adjust			
113.94	114.1	113.9	0.0	0.30	1.4

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 117.6 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
22.1	0.10

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

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	14.5	0.10
C-Weighting	20.7	0.10
Flat	26.9	0.10

VERIFIED

Date of Calibration : 1-2 Jul. 2021

3 / 8

The results relate only to the items tested/calibrated or value assigned.

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FIABL-MTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0638

MTC No. EEL. BP. 67/0664

3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
125	-0.1	0.1	0.0	0.40	2.0
1 000	0.1	0.0	0.1	0.40	1.4
4 000	-0.2	-0.1	-0.2	0.40	3.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
63	0.0	-0.1	-0.1	0.20	2.5
125	0.0	0.0	0.0	0.20	2.0
250	0.0	0.0	0.0	0.20	1.9
500	0.0	0.0	0.0	0.20	1.9
1 000	0.0	0.0	0.0	0.20	1.4
2 000	0.1	0.2	0.2	0.20	2.6
4 000	0.1	0.2	0.2	0.20	3.6
8 000	0.3	0.3	0.1	0.20	5.6

VERIFIED

Date of Calibration : 1-2 Jul. 2021

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FIABL-MTC.002 Rev.4

Head Office
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Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
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Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0638

MTC No. EEL, BP. 67/0664

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
A-weighting	94.0	0.0	0.20	0.4
C-weighting	94.0	0.0	0.20	0.4
Flat	94.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
Fast	94.0	0.0	0.20	0.3
Slow	94.0	0.0	0.20	0.3
Leq	94.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
125	125.0	0.0	0.30	1.4
124	124.0	0.0	0.30	1.4
123	123.0	0.0	0.30	1.4
122	122.0	0.0	0.30	1.4
121	121.0	0.0	0.30	1.4
120	120.0	0.0	0.30	1.4
119	119.0	0.0	0.30	1.4
114	114.0	0.0	0.30	1.4
109	109.0	0.0	0.30	1.4

Date of Calibration : 1-2 Jul. 2021

VERIFIED

5 / 8

The results relate only to the items tested/calibrated. Advertising the Report/Certificate and publicity of the results except in full are prohibited.

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Request No. 21-64/0638

MTC No. EEL, BP. 67/0664

6. Level linearity on the reference level range (continue)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
104	104.0	0.0	0.30	1.4
99	99.0	0.0	0.30	1.4
94	94.0	0.0	0.30	1.4
89	89.0	0.0	0.30	1.4
84	84.1	0.1	0.30	1.4
79	79.0	0.0	0.30	1.4
74	74.1	0.1	0.30	1.4
69	69.1	0.1	0.30	1.4
64	64.0	0.0	0.30	1.4
59	59.0	0.0	0.30	1.4
54	54.0	0.0	0.30	1.4
49	49.0	0.0	0.30	1.4
44	44.0	0.0	0.30	1.4
39	38.9	-0.1	0.30	1.4
34	34.0	0.0	0.30	1.4
33	33.1	0.1	0.30	1.4
32	31.9	-0.1	0.30	1.4
31	31.0	0.0	0.30	1.4
30	29.9	-0.1	0.30	1.4
29	28.9	-0.1	0.30	1.4
28	27.9	-0.1	0.30	1.4

Date of Calibration : 1-2 Jul. 2021

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Request No. 21-64/0638

MTC No. EEL, BP. 67/0664

7. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
40-130	125	125.0	0.0	0.30	1.4
30-120	115	115.0	0.0	0.30	1.4
20-110	105	105.0	0.0	0.30	1.4
20-100	95	95.0	0.0	0.30	1.4
20-90	85	85.1	0.1	0.30	1.4
20-80	75	75.1	0.1	0.30	1.4

8. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (dB)
Fast	200	116.0	0.0	0.20	±1.3
	2	98.9	-0.1	0.20	+1.3; -2.8
	0.25	89.9	-0.1	0.20	+1.8; -5.3
Slow	200	109.6	0.0	0.20	±1.3
	2	90.0	0.0	0.20	+1.3; -5.3
SEL	200	110.0	0.0	0.20	±1.3
	2	90.0	0.0	0.20	+1.3; -2.8
	0.25	80.8	-0.2	0.20	+1.8; -5.3

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Date of Calibration : 1-2 Jul. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0638

MTC No. EEL, BP. 67/0664

9. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (±dB)	Tolerance limits Class 2 (±dB)
Complete cycle	125.4	125.0	-0.4	0.20	2.4
Positive half cycle	124.4	124.2	-0.2	0.20	1.4
Negative half cycle	124.4	124.2	-0.2	0.20	1.4

10. Overload indication

Measured value (dB)		Deviated value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
Positive one-half cycle	Negative one-half cycle			
135.7	135.7	0.0	0.30	1.8

VERIFIED

Calibrated by :

Approved by :

Date of Calibration : 1-2 Jul. 2021

Date of Issue : 9 Jul. 2021

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Ref: 2011264061402561001

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Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
 Address : 100 Nanglinchoe Road, Chongnonsi, Yannawa Bangkok 10120

Certificate No : 22-ACT-166
 Request No : Req-2022-0418

Unit Under Calibration Details

Measurement item : Sound Level Meter
 Manufacturer : RION
 Model : NL-21
 Serial Number : 00243242
 ID : -
 Resolution : 0.1 dB
 Microphone Class : 2
 Microphone Model : UC-52
 Microphone S/N : 145208
 Preamplifier Model : NH-21
 Preamplifier S/N : 21291
 Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
 Humidity : 50 %RH ± 20 %RH
 Barometric Pressure : 1013 hPa ± 10 hPa
 Received Date : 23 February 2022
 Calibrated Date : 7 March 2022
 Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
 Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	GRAS	40AN	188273	15 September 2022	GRAS
Multifrequency Calibrator	Quest	Quest-cal	EFA000234	14 June 2022	TSI
Audio Generator	Svante	Svan401	131	18 October 2022	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration Officer

Calibration Engineer Supervisor

Issue Date : 7 March 2022

VERIFIED

Certificate No : 22-ACT-166

Request No : Req-2022-0418

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		Adjust		UNCERTAINTY	Acceptance
FAST / A / 30-120	Level	UUC	ERR	UUC	ERR	(± dB)	Limit
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)		(± dB)
1000 Hz 94.00 dB	94.08	94.2	+0.12	94.1	+0.02	0.20	0.3

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR-315, SN. 80411

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	23.1	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	12.4	0.10
C	15.9	0.10
Z	21.2	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance
FAST / 30-120	A	C	Z	(± dB)	Limit
STD Setting	(dB)	(dB)	(dB)		(± dB)
125 Hz	0.4	0.6	0.6	0.50	1.5
1000 Hz	0.0	0.0	0.0	0.60	1.0
4000 Hz	-1.6	-1.7	-1.7	0.60	3.0
8000 Hz	-2.8	-2.9	-2.9	0.70	5.0

Certificate No : 22-ACT-166
 Request No : Req-2022-0418

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting		Deviation from various Frequency			UNCERTAINTY	Acceptance
FAST / 30-120		Weighting Response curve				
STD Setting		A (dB)	C (dB)	Z (dB)	(± dB)	Limit (± dB)
63 Hz		-0.2	-0.1	-0.1	0.2	2.0
125 Hz		-0.2	0.0	0.0		1.5
250 Hz		-0.2	0.0	0.0		1.5
500 Hz		-0.1	0.0	0.0		1.5
1000 Hz		0.0	0.0	0.0		1.0
2000 Hz		0.1	0.1	0.1		2.0
4000 Hz		0.1	0.1	0.1		3.0
8000 Hz		0.2	0.2	0.1		5
16000 Hz		-1.7	-1.7	-2.4		+5, -INF.

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / 30-120	REF	UUC	ERR		
UUC Weighting	(dB)	(dB)	(dB)	0.2	
A	114.00	114.0	0.0		
C	114.00	114.1	0.1		
Z	114.00	114.1	0.1		

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
30-120 / A	REF	UUC	ERR		
UUC Time Response	(dB)	(dB)	(dB)	0.2	
Fast	114.00	114.0	0.0		
Slow	114.00	114.0	0.0		
Log	114.00	114.0	0.0		

Certificate No : 22-ACT-166
 Request No : Req-2022-0418

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 30-120	UUC		
STD Setting	(dB)		
Initial	114.0		
Final	114.0		
Deviated	0.0		
		0.1	0.3

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 30-120	REF	UUC	ERR		
STD dB	(dB)	(dB)	(dB)	0.3	
120.00	120	120.0	0.0		
119.00	119	119.0	0.0		
114.00	114	114.0	0.0		
109.00	109	109.0	0.0		
104.00	104	104.0	0.0		
99.00	99	99.0	0.0		
94.00	94	94.0	0.0		
89.00	89	89.1	0.1		
84.00	84	84.1	0.1		
79.00	79	79.0	0.0		
74.00	74	74.0	0.0		
69.00	69	69.0	0.0		
64.00	64	64.0	0.0		
59.00	59	59.0	0.0		
54.00	54	54.0	0.0		
49.00	49	49.0	0.0		
44.00	44	44.0	0.0		
39.00	39	39.0	0.0		
34.00	34	33.9	-0.1		
29.00	29	28.9	-0.1		

Certificate No : 22-ACT-166

Request No : Req-2022-0418

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance
FAST / A	REF	UUC	ERR		Limit
UUC Range	(dB)	(dB)	(dB)		(\pm dB)
30-120	32.50	32.7	0.2	0.3	1.1
	114	114.0	0.0		1.1

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (\pm dB)	Acceptance
A / 30-120	Toneburst	Ref	UUC	ERR		Limit
UUC Time Response	(ms)	(dB)	(dB)	(dB)		(\pm dB)
Fast	200	116.0	116.0	0.0	0.3	1
	2	99.0	98.9	-0.1		+1.0, -2.5
	0.25	90.0	89.9	-0.1		+1.5, -5.0
Slow	200	109.6	109.6	0.0		1
	2	90.0	90.0	0.0		+1.0, -5.0
SEL	200	110.0	110.0	0.0		1
	2	90.0	90.0	0.0		+1.0, -2.5
	0.25	81.0	80.8	-0.2		+1.5, -5.0

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (\pm dB)	Acceptance
FAST / C / 55-141	REF	UUC	ERR		Limit
STD Setting	(dB)	(dB)	(dB)		(\pm dB)
Complete cycle	136.4	135.9	-0.50	0.2	3.0
Positive half cycle	135.4	135.1	-0.30		2.0
Negative half cycle	135.4	135.1	-0.30		2.0

Certificate No : 22-ACT-166

Request No : Req-2022-0418

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance
FAST / A / 40-130	UUC		Limit
STD Setting	(dB)		(\pm dB)
Positive one-half cycle	139.2		
Negative one-half cycle	139.0		
Deviated	0.2	0.2	1.5

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance
FAST / A / 40-130	UUC		Limit
STD Setting	(dB)		(\pm dB)
Initial	129.0		
Final	129.0		
Deviated	0.0	0.1	0.3

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
 Address : 100 Nanglinchoe Road, Chongnonsi, Yamaa Bangkok 10120

Certificate No : 22-ACT-167
 Request No : Req-2022-0419

Unit Under Calibration Details

Measurement item : Sound Level Meter
 Manufacturer : RION
 Model : NL-21
 Serial Number : 00398390
 ID : -
 Resolution : 0.1 dB
 Microphone Class : 2
 Microphone Model : UC-52
 Microphone S/N : 124738
 Preamplifier Model : NH-21
 Preamplifier S/N : 30073
 Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
 Humidity : 50 %RH ± 20 %RH
 Barometric Pressure : 1013 hPa ± 10 hPa
 Received Date : 23 February 2022
 Calibrated Date : 7 March 2022
 Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
 Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	GRAS	40AN	185273	15 September 2022	GRAS
Multifrequency Calibrator	Quest	Quest-cal	EFA000234	14 June 2022	TSI
Audio Generator	Svanick	Svan401	131	18 October 2022	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration Officer

Calibration Engineer Supervisor

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Issue Date : 7 March 2022

Certificate No : 22-ACT-167

Request No : Req-2022-0419

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		Adjust		UNCERTAINTY	Acceptance
FAST / A / 30-120	Level	UUC	ERR	UUC	ERR	(± dB)	Limit
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)		(± dB)
1000 Hz 94.00 dB	94.08	94.1	+0.02	94.1	-0.02	0.20	0.3

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR-515, SN: 80411

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	24.9	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	18.9	0.10
C	22.7	0.10
Z	26.7	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance
FAST / 30-120	A	C	Z	(± dB)	Limit
STD Setting	(dB)	(dB)	(dB)		(± dB)
125 Hz	-0.1	0.1	0.1	0.50	1.5
1000 Hz	0.0	0.0	0.0	0.60	1.0
4000 Hz	0.5	0.5	0.6	0.60	3.0
8000 Hz	-1.2	-1.1	-1.2	0.70	5.0

Certificate No : 22-ACT-167
 Request No : Req-2022-0419

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / 30-120	A (dB)	C (dB)	Z (dB)		
STD Setting					
63 Hz	-0.2	-0.1	-0.1	0.2	2.0
125 Hz	-0.1	0.0	-0.1		1.5
250 Hz	-0.1	-0.1	0.0		1.5
500 Hz	-0.1	0.0	0.0		1.5
1000 Hz	0.0	0.0	0.0		1.0
2000 Hz	0.1	0.1	0.1		2.0
4000 Hz	0.0	0.1	0.1		3.0
8000 Hz	0.1	0.1	0.1		5
16000 Hz	-1.8	-1.8	-2.4		+5, -INF.

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / 30-120	REF	UUC	ERR		
UUC Weighting	(dB)	(dB)	(dB)		
A	114.00	114.0	0.0	0.2	0.2
C	114.00	114.0	0.0		0.2
Z	114.00	114.0	0.0		0.2

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
30-120 / A	REF	UUC	ERR		
UUC Time Response	(dB)	(dB)	(dB)		
Fast	114.00	114.0	0.0	0.2	0.1
Slow	114.00	114.0	0.0		0.1
Loq	114.00	114.0	0.0		0.1

Certificate No : 22-ACT-167
 Request No : Req-2022-0419

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 30-120	UUC		
STD Setting	(dB)		
Initial	114.0		
Final	114.0		
Deviated	0.0		

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 30-120	REF	UUC	ERR		
STD dB	(dB)	(dB)	(dB)		
120.00	120	120.0	0.0	0.3	1.1
119.00	119	119.0	0.0		1.1
118.00	118	118.0	0.0		1.1
117.00	117	117.0	0.0		1.1
116.00	116	116.0	0.0		1.1
115.00	115	115.0	0.0		1.1
114.00	114	114.0	0.0		1.1
113.00	113	113.0	0.0		1.1
112.00	112	112.0	0.0		1.1
111.00	111	111.0	0.0		1.1
110.00	110	110.0	0.0		1.1
109.00	109	109.0	0.0		1.1
108.00	108	108.0	0.0		1.1
107.00	107	107.0	0.0		1.1
106.00	106	106.0	0.0		1.1
105.00	105	105.0	0.0		1.1
104.00	104	104.0	0.0		1.1
103.00	103	103.0	0.0		1.1
102.00	102	102.0	0.0		1.1
101.00	101	101.0	0.0		1.1
100.00	100	100.0	0.0		1.1
99.00	99	99.0	0.0		1.1
98.00	98	98.0	0.0		1.1
97.00	97	97.0	0.0		1.1
96.00	96	96.0	0.0		1.1
95.00	95	95.0	0.0		1.1
94.00	94	94.0	0.0		1.1
93.00	93	93.0	0.0		1.1
92.00	92	92.0	0.0		1.1
91.00	91	91.0	0.0		1.1
90.00	90	90.0	0.0		1.1
89.00	89	89.0	0.0		1.1
88.00	88	88.0	0.0		1.1
87.00	87	87.0	0.0		1.1
86.00	86	86.0	0.0		1.1
85.00	85	85.0	0.0		1.1
84.00	84	84.0	0.0		1.1
83.00	83	83.0	0.0		1.1
82.00	82	82.0	0.0		1.1
81.00	81	81.0	0.0		1.1
80.00	80	80.0	0.0		1.1
79.00	79	79.0	0.0		1.1
78.00	78	78.0	0.0		1.1
77.00	77	77.0	0.0		1.1
76.00	76	76.0	0.0		1.1
75.00	75	75.0	0.0		1.1
74.00	74	74.0	0.0		1.1
73.00	73	73.0	0.0		1.1
72.00	72	72.0	0.0		1.1
71.00	71	71.0	0.0		1.1
70.00	70	70.0	0.0		1.1
69.00	69	69.0	0.0		1.1
68.00	68	68.0	0.0		1.1
67.00	67	67.0	0.0		1.1
66.00	66	66.0	0.0		1.1
65.00	65	65.0	0.0		1.1
64.00	64	64.0	0.0		1.1
63.00	63	63.0	0.0		1.1
62.00	62	62.0	0.0		1.1
61.00	61	61.0	0.0		1.1
60.00	60	60.0	0.0		1.1
59.00	59	59.0	0.0		1.1
58.00	58	58.0	0.0		1.1
57.00	57	57.0	0.0		1.1
56.00	56	56.0	0.0		1.1
55.00	55	55.0	0.0		1.1
54.00	54	54.0	0.0		1.1
53.00	53	53.0	0.0		1.1
52.00	52	52.0	0.0		1.1
51.00	51	51.0	0.0		1.1
50.00	50	50.0	0.0		1.1
49.00	49	49.0	0.0		1.1
48.00	48	48.0	0.0		1.1
47.00	47	47.0	0.0		1.1
46.00	46	46.0	0.0		1.1
45.00	45	45.0	0.0		1.1
44.00	44	44.0	0.0		1.1
43.00	43	43.0	0.0		1.1
42.00	42	42.0	0.0		1.1
41.00	41	41.0	0.0		1.1
40.00	40	40.0	0.0		1.1
39.00	39	39.0	0.0		1.1
38.00	38	38.0	0.0		1.1
37.00	37	37.0	0.0		1.1
36.00	36	36.0	0.0		1.1
35.00	35	35.0	0.0		1.1
34.00	34	34.0	0.0		1.1
33.00	33	33.0	0.0		1.1
32.00	32	32.0	0.0		1.1
31.00	31	31.0	0.0		1.1
30.00	30	30.0	0.0		1.1
29.00	29	29.0	-0.1		1.1

Certificate No : 22-ACT-167
 Request No : Req-2022-0419

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A	REF	UUC	ERR		
UUC Range	(dB)	(dB)	(dB)		
30-120	32.30	32.6	0.3	0.3	1.1
	114	114.0	0.0		1.1

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
A / 30-120	Toneburst	Ref	UUC	ERR		
UUC Time Response	(ms)	(dB)	(dB)	(dB)		
Fast	200	116.0	116.0	0.0	0.3	1
	2	99.0	99.0	0.0		+1.0, -2.5
	0.25	90.0	89.9	-0.1		+1.5, -5.0
Slow	200	109.6	109.6	0.0		1
	2	90.0	90.0	0.0		+1.0, -5.0
SEL	200	110.0	110.0	0.0		1
	2	90.0	90.0	0.0		+1.0, -2.5
	0.25	81.0	80.9	-0.1		+1.5, -5.0

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / C / 55-141	REF	UUC	ERR		
STD Setting	(dB)	(dB)	(dB)		
Complete cycle	136.4	135.9	-0.50	0.2	3.0
Positive half cycle	135.4	135.1	-0.30		2.0
Negative half cycle	135.4	135.1	-0.30		2.0

Certificate No : 22-ACT-167
 Request No : Req-2022-0419

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 40-130	UUC		
STD Setting	(dB)		
Positive one-half cycle	139.2		
Negative one-half cycle	139.0		
Deviated	0.2	0.2	1.5

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 40-130	UUC		
STD Setting	(dB)		
Initial	129.0		
Final	129.0		
Deviated	0.0	0.1	0.3

End of Certificate



ENCLOSURE

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand) Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Rion

Model : NL-21

Serial No. : 00398392

Microphone : Type UC-52 No.167319

Preamplifier : Type NH-21 No.32087

Standards used :

1. Band Pass Filter Stanford Research Systems SR 650 S/N 28712.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \%$ Ambient Pressure : $(101.325 \pm 1.5) \text{ kPa}$

VERIFIED

Date of Receipt : 17 Sep. 2021

Date of Calibration : 14-15 Oct. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.

10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.

11. Digital Multimeter Agilent 34401A S/N MY44005560.

12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

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Date of Calibration : 14-15 Oct. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Unit Under Test				Tolerance
	Measured Value (dB)		Deviation (dB)	Uncertainty (±dB)	Limit Class 2 (±dB)
	Before adjust	After adjust			
113.94	113.3	113.9	0.0	0.30	1.4

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 114.3 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
16.8	0.10

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

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	14.3	0.10
C-Weighting	19.9	0.10
Flat	26.2	0.10

VERIFIED

Date of Calibration : 14-15 Oct. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
125	0.2	0.3	-0.1	0.40	2.0
1 000	0.1	0.1	0.2	0.40	1.4
4 000	-1.0	-1.0	-1.0	0.40	3.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
63	0.0	-0.1	-0.2	0.20	2.5
125	0.0	0.0	-0.1	0.20	2.0
250	0.0	-0.1	-0.1	0.20	1.9
500	-0.1	0.0	0.0	0.20	1.9
1 000	0.0	0.0	0.0	0.20	1.4
2 000	0.0	0.1	0.2	0.20	2.6
4 000	0.0	0.1	0.2	0.20	3.6
8 000	0.2	0.3	0.1	0.20	5.6

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
A-weighting	94.0	0.0	0.20	0.4
C-weighting	94.0	0.0	0.20	0.4
Flat	94.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
Fast	94.0	0.0	0.20	0.3
Slow	94.0	0.0	0.20	0.3
Leq	94.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
125	125.0	0.0	0.30	1.4
124	124.0	0.0	0.30	1.4
123	123.0	0.0	0.30	1.4
122	122.0	0.0	0.30	1.4
121	121.0	0.0	0.30	1.4
120	120.0	0.0	0.30	1.4
119	119.0	0.0	0.30	1.4
114	114.0	0.0	0.30	1.4
109	109.0	0.0	0.30	1.4

Date of Calibration : 14-15 Oct. 2021

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Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

6. Level linearity on the reference level range (continue)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
104	104.0	0.0	0.30	1.4
99	99.0	0.0	0.30	1.4
94	94.0	0.0	0.30	1.4
89	89.0	0.0	0.30	1.4
84	84.0	0.0	0.30	1.4
79	79.0	0.0	0.30	1.4
74	74.1	0.1	0.30	1.4
69	69.0	0.0	0.30	1.4
64	64.0	0.0	0.30	1.4
59	59.0	0.0	0.30	1.4
54	54.0	0.0	0.30	1.4
49	48.9	-0.1	0.30	1.4
44	44.0	0.0	0.30	1.4
39	38.9	-0.1	0.30	1.4
34	34.0	0.0	0.30	1.4
33	32.9	-0.1	0.30	1.4
32	31.9	-0.1	0.30	1.4
31	30.9	-0.1	0.30	1.4
30	29.9	-0.1	0.30	1.4
29	28.8	-0.2	0.30	1.4
28	27.7	-0.3	0.30	1.4

Date of Calibration : 14-15 Oct. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

7. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
40-130	125	125.0	0.0	0.30	1.4
30-120	115	115.0	0.0	0.30	1.4
20-110	105	105.0	0.0	0.30	1.4
20-100	95	95.0	0.0	0.30	1.4
20-90	85	85.0	0.0	0.30	1.4
20-80	75	75.1	0.1	0.30	1.4

8. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (dB)
Fast	200	116.1	0.1	0.20	±1.3
	2	99.0	0.0	0.20	+1.3; -2.8
	0.25	89.9	-0.1	0.20	+1.8; -5.3
Slow	200	109.6	0.0	0.20	±1.3
	2	90.0	0.0	0.20	+1.3; -5.3
SEL	200	110.0	0.0	0.20	±1.3
	2	90.0	0.0	0.20	+1.3; -2.8
	0.25	80.9	-0.1	0.20	+1.8; -5.3

Date of Calibration : 14-15 Oct. 2021

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Request No. 21-64/0851

MTC No. EEL. BP. 58/0964

9. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (±dB)	Tolerance limits Class 2 (±dB)
Complete cycle	125.4	125.0	-0.4	0.20	2.4
Positive half cycle	124.4	124.1	-0.3	0.20	1.4
Negative half cycle	124.4	124.1	-0.3	0.20	1.4

10. Overload indication

Measured value (dB)		Deviated value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
Positive one-half cycle	Negative one-half cycle			
135.6	135.6	0.0	0.30	1.8

VERIFIED

Calibrated by :

Approved by :

Date of Calibration : 14-15 Oct. 2021

Date of Issue : 18 Oct. 2021

Acting Director
Electric and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Ref : 2011264091703872001

End of Certificate

8 / 8

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Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
 Address : 100 Nanglinchee Road, Changnonsi, Yanawa Bangkok 10120

Certificate No : 22-ACT-053
 Request No : Req-2022-0121

Unit Under Calibration Details

Measurement item : Sound Level Meter
 Manufacturer : Cirrus
 Model : CR-161B
 Serial Number : G080136
 ID : -
 Resolution : 0.1 dB

Microphone Class : 1
 Microphone Model : MK224
 Microphone S/N : 211770D
 Preamplifier Model : MK-170
 Preamplifier S/N : 0915
 Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
 Humidity : 50 %RH ± 20 %RH
 Barometric Pressure : 1013 hPa ± 10 hPa
 Received Date : 20 January 2022
 Calibrated Date : 26 January 2022
 Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
 Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	GRAS	40AN	188273	15 September 2022	GRAS
Multifrequency Calibrator	Quest	Quest-cal	EFA000234	14 June 2022	TSI
Audio Generator	Svante	Svas401	131	18 October 2022	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By :



Calibration Officer

Approved By :



Calibration Engineer Supervisor

Issue Date : 26 January 2022

Certificate No : 22-ACT-053
 Request No : Req-2022-0121

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		Adjust		UNCERTAINTY	Acceptance
FAST / A / 20-140	Level	UUC	ERR	UUC	ERR	(± dB)	Limit
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)	(± dB)
1000 Hz 114.00 dB	113.91	114.6	+0.69	113.9	-0.01	0.20	0.3

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand CASELLA, Model CEL-420/2, SN. 3864875

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 20-140	(dB)	(± dB)
UUC Weighting	(dB)	(± dB)
A	16.6	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 20-140	(dB)	(± dB)
UUC Weighting	(dB)	(± dB)
A	-	0.10
C	16.1	0.10
Z	29.0	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance Limit
FAST / 20-140	A	C	Z	(± dB)	(± dB)
STD Setting	(dB)	(dB)	(dB)	(± dB)	(± dB)
125 Hz	0.3	0.1	-0.1	0.50	1.0
1000 Hz	0.0	0.0	0.0	0.60	0.7
4000 Hz	0.3	0.5	0.6	0.60	1.0
8000 Hz	1.2	1.3	1.3	0.70	+1.5 -2.5

Certificate No : 22-ACT-053
 Request No : Req-2022-0121

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting		Deviation from various Frequency			UNCERTAINTY	Acceptance
FAST / 20-140		Weighting Response curve				Limit
STD Setting		A (dB)	C (dB)	Z (dB)	(± dB)	(± dB)
63 Hz		0.2	0.0	0.0	0.2	1.0
125 Hz		0.2	0.0	0.0		1.0
250 Hz		0.2	0.0	0.0		1.0
500 Hz		0.1	0.0	0.0		1.0
1000 Hz		0.0	0.0	0.0		0.7
2000 Hz		-0.2	-0.1	0.0		1.0
4000 Hz		-0.4	-0.2	-0.1		1.0
8000 Hz		-0.6	-0.4	-0.2		+1.5, -2.5
16000 Hz		0.0	0.1	-0.4		+2.5, -16.0

5. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / 20-140	REF	UUC	ERR		
UUC Weighting	(dB)	(dB)	(dB)	0.2	0.2
A	114.00	114.0	0.0		
C	114.00	114.0	0.0		
Z	114.00	114.0	0.0		

UUC Setting	STD	Measured		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
20-140 / A	REF	UUC	ERR		
UUC Time Response	(dB)	(dB)	(dB)	0.2	0.1
Fast	114.00	114.0	0.0		
Slow	114.00	114.0	0.0		
Leq	114.00	114.0	0.0		

Certificate No : 22-ACT-053
 Request No : Req-2022-0121

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 20-140	UUC		
STD Setting	(dB)	0.1	0.1
Initial	114.0		
Final	114.0		
Deviated	0.0		

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (\pm dB)	Acceptance Limit (\pm dB)
FAST / A / 20-140	REF	UUC	ERR		
STD dB	(dB)	(dB)	(dB)	0.3	0.8
139.00	139	139.0	0.0		
134.00	134	134.0	0.0		
129.00	129	129.0	0.0		
124.00	124	124.1	0.1		
119.00	119	119.0	0.0		
114.00	114	114.0	0.0		
109.00	109	109.0	0.0		
104.00	104	104.0	0.0		
99.00	99	99.0	0.0		
94.00	94	94.0	0.0		
89.00	89	89.0	0.0		
84.00	84	84.0	0.0		
79.00	79	79.0	0.0		
74.00	74	74.1	0.1		
69.00	69	69.1	0.1		
64.00	64	64.1	0.1		
59.00	59	59.1	0.1		
54.00	54	54.1	0.1		
49.00	49	49.1	0.1		
44.00	44	44.1	0.1		
39.00	39	39.1	0.1		
34.00	34	34.1	0.1		
29.00	29	29.1	0.1		
24.00	24	24.2	0.2		

Certificate No : 22-ACT-053
 Request No : Req-2022-0121

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)	Acceptance
FAST / A	REF	UUC	ERR		Limit
UUC Range	(dB)	(dB)	(dB)		(± dB)
20-140	25.0	25.1	0.1	0.3	0.8
	114	114.0	0.0		0.8

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)	Acceptance
A / 20-140	Toneburst	Ref	UUC	ERR		Limit
UUC Time Response	(ms)	(dB)	(dB)	(dB)		(± dB)
Fast	200	136.0	136.0	0.0	0.3	0.5
	2	119.0	118.9	-0.1		+1.0, -1.5
	0.25	110.0	109.8	-0.2		+1.0, -3.0
Slow	200	129.6	129.6	0.0		0.5
	2	110.0	110.0	0.0		+1.0, -3.0
SEL	200	130.0	130.0	0.0		0.5
	2	110.0	110.0	0.0		+1.0, +1.5
	0.25	101.0	100.9	-0.1		+1.0, -3.0

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)	Acceptance
FAST / C / 20-140	REF	UUC	ERR		Limit
STD Setting	(dB)	(dB)	(dB)		(± dB)
Complete cycle	135.4	135.6	+0.20	0.2	2.0
Positive half cycle	134.4	134.2	-0.20		1.0
Negative half cycle	134.4	134.2	-0.20		1.0

Certificate No : 22-ACT-053
 Request No : Req-2022-0121

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)	Acceptance
FAST / A / 20-140	UUC		Limit
STD Setting	(dB)		(± dB)
Positive one-half cycle	142.1		
Negative one-half cycle	142.1		
Deviated	0.0	0.2	1.5

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)	Acceptance
FAST / A / 20-140	UUC		Limit
STD Setting	(dB)		(± dB)
Initial	139.0		
Final	139.0		
Deviated	0.0	0.1	0.1

End of Certificate



ENSL 19176

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 63/0764

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand), Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Cirrus

Model : CR:161B

Serial No. : G300759 'ENSL 19170'

Microphone : Cirrus MK224 No.211770D

Preamplifier : No.7222F

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \%$ Ambient Pressure : $(101.325 \pm 1.5) \text{ kPa}$

VERIFIED

Standards used :

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2633526.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Date of Receipt : 16 Jul. 2021

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 63/0764

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

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Date of Calibration : 16-17 Aug. 2021

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1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Unit Under Test				Tolerance limit Class 1 (±dB)
	Measured Value (dB)		Deviation (dB)	Uncertainty (±dB)	
	Before adjust	After adjust			
93.90	93.8	93.8	-0.1	0.50	1.1

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 93.7 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
18.4	0.10

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

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	under-range	-
C-Weighting	18.8	0.85
Flat	32.9	1.25

Note: The under-range means the indicator cannot display the value because it is under the setting range 20-140 dB.

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3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
	A-weighting	C-weighting	Flat		
	(dB)	(dB)	(dB)		
125	0.2	0.0	-0.1	0.40	1.5
1 000	0.1	0.1	0.1	0.40	1.1
4 000	-0.3	-0.2	0.0	0.40	1.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
	A-weighting	C-weighting	Flat		
	(dB)	(dB)	(dB)		
63	0.3	0.1	0.2	0.20	1.5
125	0.3	0.1	0.1	0.20	1.5
250	0.2	0.0	0.0	0.20	1.4
500	0.2	0.0	0.0	0.20	1.4
1 000	0.0	0.0	0.0	0.20	1.1
2 000	-0.1	0.0	0.0	0.20	1.6
4 000	-0.3	-0.1	0.0	0.20	1.6
8 000	-0.5	-0.4	-0.1	0.20	+2.1; -3.1
16 000	0.2	0.3	-0.3	0.20	+3.5; -17.0

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Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 63/0764

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (+dB)	Tolerance Limits Class 1 (±dB)
A-weighting	114.0	0.0	0.20	0.4
C-weighting	114.0	0.0	0.20	0.4
Flat	114.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (+dB)	Tolerance Limits Class 1 (±dB)
Fast	114.0	0.0	0.20	0.3
Slow	114.0	0.0	0.20	0.3
Leq	114.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (+dB)	Tolerance Limits Class 1 (±dB)
138	138.1	0.1	0.30	1.1
137	137.1	0.1	0.30	1.1
136	136.1	0.1	0.30	1.1
135	135.1	0.1	0.30	1.1
134	134.1	0.1	0.30	1.1
129	129.1	0.1	0.30	1.1
124	124.0	0.0	0.30	1.1

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Date of Calibration : 16-17 Aug. 2021

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Request No. 21-64/0717

MTC No. EEL. BP. 63/0764

6. Level linearity on the reference level range (continue)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (+dB)	Tolerance Limits Class 1 (±dB)
119	119.0	0.0	0.30	1.1
114	114.0	0.0	0.30	1.1
109	109.0	0.0	0.30	1.1
104	104.0	0.0	0.30	1.1
99	99.0	0.0	0.30	1.1
94	94.0	0.0	0.30	1.1
89	89.0	0.0	0.30	1.1
84	84.0	0.0	0.30	1.1
79	79.0	0.0	0.30	1.1
74	74.0	0.0	0.30	1.1
69	69.0	0.0	0.30	1.1
64	64.0	0.0	0.30	1.1
59	59.0	0.0	0.30	1.1
54	53.9	-0.1	0.30	1.1
49	49.0	0.0	0.30	1.1
44	43.9	-0.1	0.30	1.1
39	39.0	0.0	0.30	1.1
34	34.0	0.0	0.30	1.1
29	28.9	-0.1	0.30	1.1
24	23.9	-0.1	0.30	1.1

Date of Calibration : 16-17 Aug. 2021

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Request No. 21-64/0717

MTC No. EEL. BP. 63/0764

7. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
20-140	135	135.0	0.0	0.30	1.1

8. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 1 (dB)
Fast	200	136.0	0.0	0.20	±0.8
	2	118.9	-0.1	0.20	+1.3; -1.8
	0.25	109.8	-0.2	0.20	+1.3; -3.3
Slow	200	129.6	0.0	0.20	±0.8
	2	110.0	0.0	0.20	+1.3; -3.3
SEL	200	130.0	0.0	0.20	±0.8
	2	110.0	0.0	0.20	+1.3; -1.8
	0.25	101.0	0.0	0.20	+1.3; -3.3

VERIFIED

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 63/0764

9. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (±dB)	Tolerance limits Class 1 (±dB)
Complete cycle	135.4	135.6	0.2	0.20	2.4
Positive half cycle	134.4	134.1	-0.3	0.20	1.4
Negative half cycle	134.4	134.1	-0.3	0.20	1.4

10. Overload indication

Measured value (dB)		Deviated value (dB)	Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
Positive one-half cycle	Negative one-half cycle			
140.3	140.2	0.1	0.30	1.8

VERIFIED

Calibrated by :

Approved by :

Date of Calibration : 16-17 Aug. 2021

Date of Issue : 24 Aug. 2021

Acting Director
Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Ref: 2011264071603074004

End of Certificate

8 / 8

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FM.BL.MTC.002 Rev.4

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EML 19/7/

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand), Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Cirrus

Model : CR-161B

Serial No. : G300763

Microphone : Cirrus MK224 No.2118250

Preamplifier : No.5923F

Standards used :

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2633526.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \%$ Ambient Pressure : $(101.325 \pm 1.5) \text{ kPa}$

VERIFIED

Date of Receipt : 29 Jun. 2021

Date of Calibration : 2-3 Aug. 2021

The results relate only to the items tested/calibrated or value assigned.

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

VERIFIED

Date of Calibration : 2-3 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Unit Under Test			Tolerance limit Class 1 (±dB)
	Measured Value (dB)		Deviation (dB)	
	Before adjust	After adjust		
93.90	93.8	93.8	-0.1	0.50

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 93.7 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
18.4	0.10

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

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	under-range	-
C-Weighting	19.2	1.60
Flat	33.0	1.00

Note: The under-range means the indicator cannot display the value because it is under the setting range 20-140 dB.

VERIFIED

Date of Calibration : 2-3 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
125	0.5	0.2	0.2	0.40	1.5
1 000	-0.4	-0.4	-0.4	0.40	1.1
4 000	-0.3	-0.2	0.0	0.40	1.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
63	0.4	0.1	0.1	0.20	1.5
125	0.3	0.1	0.0	0.20	1.5
250	0.1	0.0	0.0	0.20	1.4
500	0.1	0.0	0.0	0.20	1.4
1 000	0.0	0.0	0.0	0.20	1.1
2 000	-0.1	-0.1	0.0	0.20	1.6
4 000	-0.4	-0.3	0.0	0.20	1.6
8 000	-0.5	-0.4	-0.2	0.20	+2.1; -3.1
16 000	0.3	0.2	-0.4	0.21	+3.5; -17.0

VERIFIED

Date of Calibration : 2-3 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
A-weighting	114.0	0.0	0.20	0.4
C-weighting	114.0	0.0	0.20	0.4
Flat	114.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
Fast	114.0	0.0	0.20	0.3
Slow	114.0	0.0	0.20	0.3
Leq	114.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
138	138.0	0.0	0.30	1.1
137	137.0	0.0	0.30	1.1
136	136.0	0.0	0.30	1.1
135	135.0	0.0	0.30	1.1
134	134.0	0.0	0.30	1.1
129	129.0	0.0	0.30	1.1
124	124.0	0.0	0.30	1.1

Date of Calibration : 2-3 Aug. 2021

VERIFIED

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

6. Level linearity on the reference level range (continue)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
119	119.0	0.0	0.30	1.1
114	114.0	0.0	0.30	1.1
109	109.0	0.0	0.30	1.1
104	104.0	0.0	0.30	1.1
99	99.0	0.0	0.30	1.1
94	94.0	0.0	0.30	1.1
89	88.9	-0.1	0.30	1.1
84	83.9	-0.1	0.30	1.1
79	79.0	0.0	0.30	1.1
74	74.0	0.0	0.30	1.1
69	69.0	0.0	0.30	1.1
64	63.9	-0.1	0.30	1.1
59	58.9	-0.1	0.30	1.1
54	53.9	-0.1	0.30	1.1
49	48.9	-0.1	0.30	1.1
44	43.9	-0.1	0.30	1.1
39	39.0	0.0	0.30	1.1
34	33.9	-0.1	0.30	1.1
29	29.0	0.0	0.30	1.1
24	24.1	0.1	0.30	1.1

VERIFIED

Date of Calibration : 2-3 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

7. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
20-140	135	135.0	0.0	0.30	1.1

8. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (dB)
Fast	200	136.0	0.0	0.20	± 0.8
	2	118.9	-0.1	0.20	+1.3; -1.8
	0.25	109.8	-0.2	0.20	+1.3; -3.3
Slow	200	129.6	0.0	0.20	± 0.8
	2	110.0	0.0	0.20	+1.3; -3.3
SEL	200	130.0	0.0	0.20	± 0.8
	2	110.0	0.0	0.20	+1.3; -1.8
	0.25	101.0	0.0	0.20	+1.3; -3.3

VERIFIED

Date of Calibration : 2-3 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0688

MTC No. EEL. BP. 24/0764

9. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (\pm dB)	Tolerance limits Class 1 (\pm dB)
Complete cycle	135.4	135.6	0.2	0.20	2.4
Positive half cycle	134.4	134.1	-0.3	0.20	1.4
Negative half cycle	134.4	134.1	-0.3	0.20	1.4

10. Overload indication

Measured value (dB)		Deviated value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
Positive one-half cycle	Negative one-half cycle			
140.3	140.2	0.1	0.30	1.8

VERIFIED

Calibrated by:

Approved by:

Acting Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 2-3 Aug. 2021

Date of Issue : 4 Aug. 2021

Ref : 2011264070602906001

End of Certificate

8 / 8

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FM.BLMTC.002 Rev.4

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ENSL 19172

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand), Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Cirrus

Model : CR:161B

Serial No. : G300764 'ENSL 19172'

Microphone : Cirrus MK224 No.211814D

Preamplifier : No.5771F

Standards used :

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2633526.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \%$ Ambient Pressure : $(101.325 \pm 1.5) \text{ kPa}$

VERIFIED

Date of Receipt : 16 Jul. 2021

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

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This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

VERIFIED

Date of Calibration : 16-17 Aug. 2021

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FM.BLMTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Unit Under Test			Tolerance limit Class 1 (±dB)
	Measured Value (dB)		Deviation (dB)	
	Before adjust	After adjust		
93.90	93.8	93.8	-0.1	0.50

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 93.7 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
18.4	0.10

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

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	under-range	-
C-Weighting	22.2	0.10
Flat	32.1	0.10

Note: The under-range means the indicator cannot display the value because it is under the setting range 20-140 dB.

VERIFIED

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
	(dB)	(dB)	(dB)		
125	0.4	0.1	0.3	0.40	1.5
1 000	0.4	0.4	0.4	0.40	1.1
4 000	-0.7	-0.5	-0.3	0.40	1.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 1 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
	(dB)	(dB)	(dB)		
63	0.5	0.1	0.1	0.20	1.5
125	0.2	0.1	0.1	0.20	1.5
250	0.2	0.0	0.0	0.20	1.4
500	0.1	0.0	0.0	0.20	1.4
1 000	0.0	0.0	0.0	0.20	1.1
2 000	-0.1	0.0	0.0	0.20	1.6
4 000	-0.4	-0.2	0.0	0.20	1.6
8 000	-0.5	-0.3	-0.1	0.20	+2.1; -3.1
16 000	0.2	0.4	-0.2	0.20	+3.5; -17.0

VERIFIED

Date of Calibration : 16-17 Aug. 2021

The results relate only to the items tested/calibrated.

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FM.BLMTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
A-weighting	114.0	0.0	0.20	0.4
C-weighting	114.0	0.0	0.20	0.4
Flat	114.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
Fast	114.0	0.0	0.20	0.3
Slow	114.0	0.0	0.20	0.3
Leq	114.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
138	138.1	0.1	0.30	1.1
137	137.1	0.1	0.30	1.1
136	136.1	0.1	0.30	1.1
135	135.1	0.1	0.30	1.1
134	134.1	0.1	0.30	1.1
129	129.0	0.0	0.30	1.1
124	124.0	0.0	0.30	1.1

VERIFIED

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

6. Level linearity on the reference level range (continue)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
119	119.0	0.0	0.30	1.1
114	114.0	0.0	0.30	1.1
109	109.0	0.0	0.30	1.1
104	104.0	0.0	0.30	1.1
99	99.0	0.0	0.30	1.1
94	94.0	0.0	0.30	1.1
89	88.9	-0.1	0.30	1.1
84	84.0	0.0	0.30	1.1
79	79.1	0.1	0.30	1.1
74	74.0	0.0	0.30	1.1
69	69.0	0.0	0.30	1.1
64	64.0	0.0	0.30	1.1
59	59.0	0.0	0.30	1.1
54	53.9	-0.1	0.30	1.1
49	49.0	0.0	0.30	1.1
44	43.9	-0.1	0.30	1.1
39	39.0	0.0	0.30	1.1
34	34.0	0.0	0.30	1.1
29	29.1	0.1	0.30	1.1
24	24.3	0.3	0.30	1.1

VERIFIED

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

7. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
20-140	135	135.0	0.0	0.30	1.1

8. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (dB)
Fast	200	136.0	0.0	0.20	± 0.8
	2	118.9	-0.1	0.20	+1.3; -1.8
	0.25	109.8	-0.2	0.20	+1.3; -3.3
Slow	200	129.6	0.0	0.20	± 0.8
	2	110.0	0.0	0.20	+1.3; -3.3
SEL	200	130.0	0.0	0.20	± 0.8
	2	110.0	0.0	0.20	+1.3; -1.8
	0.25	101.0	0.0	0.20	+1.3; -3.3

VERIFIED

Date of Calibration : 16-17 Aug. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 64/0764

9. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (\pm dB)	Tolerance limits Class 1 (\pm dB)
Complete cycle	135.4	135.6	0.2	0.20	2.4
Positive half cycle	134.4	134.1	-0.3	0.20	1.4
Negative half cycle	134.4	134.1	-0.3	0.20	1.4

10. Overload indication

Measured value (dB)		Deviated value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 1 (\pm dB)
Positive one-half cycle	Negative one-half cycle			
140.3	140.2	0.1	0.30	1.8

VERIFIED

Calibrated by :

Approved by :

Date of Calibration : 16-17 Aug. 2021

Date of Issue : 24 Aug. 2021

Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Ref : 2011264071603074005

End of Certificate

8 / 8

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FM.BLMTC.002 Rev.4

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Encl 19125

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 60/0764

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand) Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
: Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Acoustic Calibrator

Manufacturer : Cirrus

Model : CR:515

Serial No. : 88350(ID No.:ENSL19175)

Ambient Environment

Temperature : (23 ± 3) °C

Relative Humidity : (50 ± 15) %

Ambient Pressure : (101.325 ± 1.500) kPa

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.

2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.

7. Condenser Microphone Bruel&Kjaer 4180 S/N 2633526.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

VERIFIED

Date of Receipt : 16 Jul. 2021

Date of Calibration : 21 Jul. 2021

The results relate only to the items tested/calibrated or value assigned.

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FM.BL.MTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0717

MTC No. EEL. BP. 60/0764

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

Nominal Output of Unit Under Test = 94 dB re 20μPa at 1000 Hz

Acoustic Output in dB re 20μPa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	94.19	0.19	± 0.10	±0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.3	0.3	± 1.5	±1.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	0.85	± 0.50	±3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

VERIFIED

Calibrated by :

Approved by :

Date of Calibration : 21 Jul. 2021

Date of Issue : 22 Jul. 2021

Acting Director
Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Ref: 2011264071603074001

2 / 2

End of Certificate

The results relate only to the items tested/calibrated or value assigned.

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FM.BL.MTC.002 Rev.4

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Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok
10120

Certificate No : 22-ACT-387
Request No : Req-2022-1062

Unit Under Calibration Details

Measurement item : Acoustic Calibrator Class : 1
Manufacturer : Cirrus Range : 94 dB / 1000 Hz
Model : CR-515 Instrument Status : Used
Serial Number : 88373
ID : -

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 9 June 2022
Calibration Date : 10 June 2022
Location of Calibration : LAB 1 Acoustic
Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators



Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEL	31 May 2023
THD Multimeter	2015	1047765	NIMT	2 February 2023

Traceability : This certificate provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k=2, providing a level of confidence approximately 95 %.

Calibrated By :



Service Calibration Engineer

Approved By :



Calibration Engineer Supervisor

Issue Date : 10 June 2022



Certificate No : 22-ACT-387

Request No : Req-2022-1062

Sound pressure level

Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)	Acceptance limit Class 1 (± dB)
	Measured	Error	Measured	Error		
94 dB / 1000 Hz	93.76	-0.24	-	-	0.11	0.25

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)	Acceptance limit Class 1 (± %)
	Measured (Hz)	Error (%)	Measured (Hz)	Error (%)		
94 dB / 1000 Hz	1000.00	0.00	-	-	0.10	0.70

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)	Acceptance limit Class 1 (± %)
	Measured (%)	Measured (%)		
94 dB / 1000 Hz	0.08	-	0.40	2.5

Note :

- Acceptance limit was IEC60942:2017 Class 1
- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

End of Calibration



ENSL 025

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand) Limited.

Address : 100 Nanglinchee Road, Chongnonsee, Yannawa, Bangkok, 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Ambient Environment

Description : Sound Level Meter

Temperature : $(23 \pm 3) ^\circ\text{C}$

Manufacturer : Rion

Relative Humidity : $(50 \pm 15) \%$

Model : NL-21

Ambient Pressure : $(101.325 \pm 1.5) \text{ kPa}$

Serial No. : 00965939

Microphone : Type UC-52 No.125433

Preamplifier : Type NH-21 No.30226

Standards used :

1. Band Pass Filter Stanford Research Systems SR 650 S/N 28712.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Multifunction Acoustic Calibrator Brüel&Kjær 4226 S/N 2810358.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

VERIFIED

Date of Receipt : 7 Jan. 2021

Date of Calibration : 27-28 Jan. 2021

The results relate only to the items tested or calibrated.

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FM.BLMTC.002 Rev.3

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

Date of Calibration : 27-28 Jan. 2021

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FM.BLMTC.002 Rev.3

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Unit Under Test				Tolerance
	Measured Value (dB)		Deviation (dB)	Uncertainty (±dB)	Limit Class 2 (±dB)
	Before adjust	After adjust			
113.94	114.3	113.9	0.0	0.30	1.4

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 114.9 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
19.8	0.10

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

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	14.2	0.10
C-Weighting	19.9	0.10
Flat	25.7	0.10

Date of Calibration : 27-28 Jan. 2021

The results relate only to the items tested or calibrated.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM/BL/MTC.002 Rev.3

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Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
	(dB)	(dB)	(dB)		
125	0.3	0.4	0.2	0.40	2.0
1 000	-0.4	-0.4	-0.3	0.40	1.4
4 000	-1.7	-1.7	-1.8	0.40	3.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
	(dB)	(dB)	(dB)		
63	0.0	-0.2	-0.1	0.20	2.5
125	-0.1	0.0	-0.1	0.20	2.0
250	-0.1	-0.1	-0.1	0.20	1.9
500	-0.1	0.0	0.0	0.20	1.9
1 000	0.0	0.0	0.0	0.20	1.4
2 000	0.0	0.1	0.2	0.20	2.6
4 000	0.0	0.1	0.2	0.20	3.6
8 000	0.3	0.3	0.2	0.20	5.6

Date of Calibration : 27-28 Jan. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
A-weighting	94.0	0.0	0.20	0.4
C-weighting	94.0	0.0	0.20	0.4
Flat	94.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
Fast	94.0	0.0	0.20	0.3
Slow	94.0	0.0	0.20	0.3
Leq	94.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
125	125.0	0.0	0.30	1.4
124	124.1	0.1	0.30	1.4
123	123.1	0.1	0.30	1.4
122	122.0	0.0	0.30	1.4
121	121.0	0.0	0.30	1.4
120	120.0	0.0	0.30	1.4
119	119.0	0.0	0.30	1.4
114	114.0	0.0	0.30	1.4
109	109.0	0.0	0.30	1.4

Date of Calibration : 27-28 Jan. 2021

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FM.BLMTC.002 Rev.3

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

6. Level linearity on the reference level range (cont.)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
104	104.0	0.0	0.30	1.4
99	99.0	0.0	0.30	1.4
94	94.0	0.0	0.30	1.4
89	89.0	0.0	0.30	1.4
84	84.1	0.1	0.30	1.4
79	79.1	0.1	0.30	1.4
74	74.1	0.1	0.30	1.4
69	69.0	0.0	0.30	1.4
64	64.0	0.0	0.30	1.4
59	59.0	0.0	0.30	1.4
54	54.0	0.0	0.30	1.4
49	49.1	0.1	0.30	1.4
44	44.1	0.1	0.30	1.4
39	38.9	-0.1	0.30	1.4
34	34.0	0.0	0.30	1.4
33	33.0	0.0	0.30	1.4
32	31.9	-0.1	0.30	1.4
31	31.0	0.0	0.30	1.4
30	29.9	-0.1	0.30	1.4
29	28.9	-0.1	0.30	1.4
28	27.9	-0.1	0.30	1.4

Date of Calibration : 27-28 Jan. 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

7. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
40-130	125	125.0	0.0	0.30	1.4
30-120	115	115.0	0.0	0.30	1.4
20-110	105	105.0	0.0	0.30	1.4
20-100	95	95.0	0.0	0.30	1.4
20-90	85	85.1	0.1	0.30	1.4
20-80	75	75.1	0.1	0.30	1.4

8. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (dB)
Fast	200	116.0	0.0	0.20	± 1.3
	2	98.9	-0.1	0.20	+1.3; -2.8
	0.25	89.9	-0.1	0.20	+1.8; -5.3
Slow	200	109.6	0.0	0.20	± 1.3
	2	90.0	0.0	0.20	+1.3; -5.3
SEL	200	110.0	0.0	0.20	± 1.3
	2	90.0	0.0	0.20	+1.3; -2.8
	0.25	80.9	-0.1	0.20	+1.8; -5.3

Date of Calibration : 27-28 Jan. 2021

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Request No. 21-64/0217

MTC No. EEL. BP. 26/0164

9. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (\pm dB)	Tolerance limits Class 2 (\pm dB)
Complete cycle	125.4	125.0	-0.4	0.20	2.4
Positive half cycle	124.4	124.1	-0.3	0.20	1.4
Negative half cycle	124.4	124.1	-0.3	0.20	1.4

10. Overload indication

Measured value (dB)		Deviated value (dB)	Uncertainty (\pm dB)	Tolerance Limits Class 2 (\pm dB)
Positive one-half cycle	Negative one-half cycle			
135.6	135.6	0.0	0.30	1.8

Calibrated by :



Approved by :



Acting Director

Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 27-28 Jan. 2021

Date of Issue : 4 Feb. 2021

Ref : 2011264010700062009

End of Certificate

8 / 8

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FM.BLMTC.002 Rev.3

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MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD

214 Bangwack Rd. Bangpai Bangkoe Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th



CALIBRATION CERTIFICATE

Certificate No. : AD2201-176-0001

Date Issued : 31-Jan-22

Customer : SGS (Thailand) Limited
100 Nanglinchee Road. Chongnonsi, Yannawa, Bangkok 10120

Equipment : DryCal

Manufacturer : MESA LABS

Model : DEFENDER 530-L

Serial No. : 137758

ID No./Tag No. : ENWP 15147

Date Received : 20-Jan-22

Date Calibrated : 22-Jan-22

Calibrated by : Mr. Jame Khaothong

VERIFIED

Calibration Method or Calibration Procedure Used

In-house method : CP-34 by comparison against mass flow calibrator.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by :



Page 1 of 3

Certificate No. : AD2201-176-0001

Environment : Ambient temperature : (23 \pm 2) °C
Relative humidity : (50 \pm 15) % RH

Capacity Range : 500 ml/min

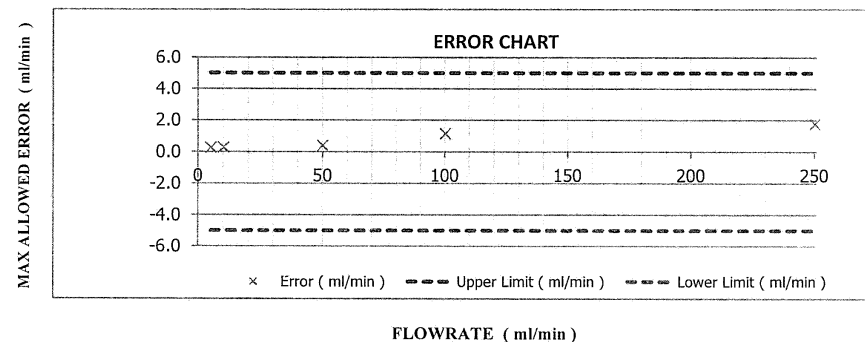
Calibration Media : Air

Type : Volumetric Flowmeter

Unit Under Calibration Reference Condition : At atmospheric pressure and room temperature condition

Temperature (° C)	Pressure (kPa)	UUC Reading (ml/min)	STD Reading (ml/min)	Error (ml/min)	Uncertainty (\pm ml/min)
22.64	100.73	5.0566	4.791	0.2656	0.18
22.73	100.77	10.040	9.761	0.279	0.18
22.87	100.87	50.048	49.65	0.398	1.7
22.81	100.93	100.17	99.02	1.15	1.6
22.56	100.82	250.25	248.5	1.75	7.6

Error = Unit Under Calibration - Standard



Page 2 of 3

Certificate No. : AD2201-176-0001

Note : The actual flow rate is determined by the equation :

$$Q_{Meas} = Q_{Ref} \times \frac{P_{Ref}}{P_{Meas}} \times \frac{T_{Meas}}{T_{Ref}}$$

; Q = Flow rate

; P = Absolute pressure

; T = Absolute temperature

; Subscript "Meas" = Measurement condition

; Subscript "Ref" = Reference condition

Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Traceability of Certificate :

The International System of Units (SI) through

NIMT Calibration Certificate No. MW-0003-20 for Mass Flow Calibrator (20 SCCM) Serial No. G500971G20, Due 22-Jan-22

MIT Calibration Certificate No. AD2011-309-0001 for Mass Flow Calibrator (200 SCCM) Serial No. 96093001W, Due 22-Nov-22

MIT Calibration Certificate No. AD2109-180-0001 for Mass Flow Calibrator (2000 SCCM) Serial No. 96093001W, Due 10-Sep-23

End of Certificate

Page 3 of 3



บริษัท ไอแอนด์อีคอนซัลแตนท์ (ประเทศไทย) จำกัด
1035/66 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพฯ 10250
โทร. 0 2322 1852-54 โทรสาร. 0 2322 1852 ext.100

I&E CONSULTANT (THAILAND) CO., LTD.
1035/66 Srinakharin Road, Chomut Suanlang, Bangkok 10250
Tel. +66 2322 1852-54 Fax. +66 2322 1852 ext.100

รายงานผลการปรับเทียบระบบควบคุมอัตราการไหลอากาศบริสุทธิ์ MASS FLOW CONTROL STANDARD GAS CALIBRATION REPORT

Calibration Instrument

เครื่องมือตรวจวัด : เครื่องมือควบคุมการไหล
Instrument :
รุ่น : 4010
Model :
ยี่ห้อ : SABIO
Manufacturer :
วันที่เข้าปรับเทียบ : 16 พฤษภาคม 2565
Date of Calibration :

หมายเลขเครื่อง : 08500311
Serial No :
ช่วงการตรวจวัด : 0 - 100 CCPM
Measuring Range :
ลูกค้า : SGS (THAILAND) LIMITED
Customer :

Result of Calibration

Flow Rate Volume (Multi Gas Calibrator Display)		Sensor Reading			
		Before		After	
Flow Set (CCPM)	Monitor (CCPM)	CCPM	%Error	CCPM	%Error
10.00	10.00	10.94	8.55	10.13	1.28
20.00	20.00	21.63	7.55	20.21	1.04
30.00	30.00	32.38	7.34	30.27	0.89
40.00	40.00	43.02	7.02	40.28	0.70
50.00	50.00	53.44	6.44	50.32	0.64
60.00	60.00	64.04	6.30	60.37	0.61
70.00	70.00	74.37	5.87	70.41	0.58
80.00	80.00	84.84	5.70	80.39	0.49
90.00	90.00	96.20	6.44	90.34	0.38
100.00	100.00	107.22	6.73	100.29	0.29
AVERAGE DIFFERENCE (%)		6.7956		0.6891	
Interception		-0.2690		-0.1874	
Correlation		1.0000		1.0000	

Calibration Tolerance : % Difference be should + / - 1 % of Full Scale
User Manual of Reference

Reference Standard Instrument

เครื่องมือสอบเทียบ : DryCal (High)
Instrument :
รุ่น : DCL-MH
Model :
ยี่ห้อ : BIOS
Manufacturer :
หมายเลขเครื่อง : 3222
Serial No :
ช่วงการตรวจวัด : 30 l/min
Measuring Range :

เครื่องมือสอบเทียบ : DryCal (Low)
Instrument :
รุ่น : Defender 520-L
Model :
ยี่ห้อ : BIOS
Manufacturer :
หมายเลขเครื่อง : 122189
Serial No :
ช่วงการตรวจวัด : 500ml/min
Measuring Range :

Result : ☒ Accepted
☐ Not Accepted

ผู้ดำเนินการ :
Service By :



Service Engineer

ผู้ตรวจสอบ :
Approved By :



Service Manager

Doc. No. : -

VERIFIED

Page 1 of 1



บริษัท ไอเซนคัลคอบริษัท (ประเทศไทย) จำกัด
1035/66 ถนนวิภาวดีรังสิต แขวงจตุจักร เขตจตุจักร กรุงเทพฯ 10350
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รายงานผลการปรับเทียบระบบควบคุมอัตราการไหลอากาศบริสุทธิ์ MASS FLOW CONTROL ZERO AIR CALIBRATION REPORT

Calibration Instrument

เครื่องมือตรวจวัด : เครื่องวัดความดันการไหลแบบ
Instrument :
รุ่น : 4010
Model :
ชื่อ : SABO
Manufacturer :

หมายเลขเครื่อง : 08500311
Serial No :
ผ่านการตรวจวัด : 0 - 10 LPM
Measuring Range :
ลูกค้า : SGS (THAILAND) LIMITED
Customer :

วันที่เข้ารับการเทียบ : 16 พฤษภาคม 2565
Date of Calibration :

Result of Calibration

Flow Rate Volume (Multi Gas Calibrator Display)		Sensor Reading			
		Before		After	
Flow Set (LPM)	Monitor (LPM)	LPM	%Error	LPM	%Error
1.00	1.000	1.051	4.853	1.011	1.088
2.00	2.000	2.104	4.943	2.019	0.941
3.00	3.000	3.132	4.215	3.026	0.859
4.00	4.000	4.135	3.265	4.028	0.695
5.00	5.000	5.122	2.382	5.030	0.596
6.00	6.000	6.113	1.849	6.031	0.514
7.00	7.000	7.113	1.589	7.034	0.483
8.00	8.000	8.123	1.514	8.029	0.361
9.00	9.000	9.213	2.312	9.024	0.266
10.00	10.000	10.300	2.913	10.019	0.190
AVERAGE DIFFERENCE (%)		2.9833		0.5994	
Interception		-0.0426		-0.0204	
Correlation		0.9999		1.0000	

Calibration Tolerance : % Difference be should + / - 1 % of Full Scal
User Manual of Reference

Reference Standard Instrument

เครื่องมือสอบเทียบ : DeyCal (High)
Instrument :
รุ่น : DCL-MH
Model :
ชื่อ : BIOS
Manufacturer :
หมายเลขเครื่อง : 3222
Serial No :
ผ่านการตรวจวัด : 30 L/min
Measuring Range :

เครื่องมือสอบเทียบ : DryCal (Low)
Instrument :
รุ่น : Defender 520-L
Model :
ชื่อ : BIOS
Manufacturer :
หมายเลขเครื่อง : 122189
Serial No :
ผ่านการตรวจวัด : 500ml/min
Measuring Range :

Result : ☒ Accepted
☐ Not Accepted

ผู้ดำเนินการ :
Service By :

Service Engineer

ผู้ตรวจสอบ :
Approved By :

Service Manager

Doc. No. :-

Page 1 of 1



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

วันที่ : 23 พฤษภาคม 2565

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T100

หมายเลขอุปกรณ์ / เครื่องมือ : 1385

TEST VALUES					
API MODEL T100				BEFORE	AFTER
1	RANGE	50 - 20,000 PPB		500	500
2	STABILITY	≤ 1 PPB		0.0	0.0
3	PRESSURE	25 - 35 in - Hg-A		29.7	29.5
4	SAMPLE FLOW	650 ± 10% cc/min		0	651
5	PMT	mV		15.1	18.2
6	NORM PMT	mV		14.9	20.0
7	UV LAMP	1000 - 4800 mV		3791.7	3774.0
8	LAMP RATIO	30 To 120 %		101.8	101.4
9	STRAY LIGHT	≤ 100 PPB		8.4	7.4
10	DARK PMT	-50 ± 200 % mV		43.8	40.5
11	DARK LAMP	-50 ± 200 % mV		1.0	1.0
12	SO ₂ SLOPE	1.0 ± 0.3		0.953	0.961
13	SO ₂ OFFSET	≤ 250 mV		17.6	15.4
14	HVPS	400 - 900 V		606	606
15	RX CELL TEMP	50 ± 1 °C		50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C		31.2	31.8
17	PMT TEMP	7 ± 2 °C		8.6	8.6
18	SO ₂ SAMPLE READING	PPB		-1.3	1.8
19	VOLTAGE TEST	+5 V +12 V +15 V -15 V		5.22 / 12.34 / 15.95 / -15.24	5.22 / 12.34 / 15.95 / -15.24
20	ZERO GAS	0.00 PPB		-10.0	0.0
21	SPAN GAS	400.00 PPB		365.4	401.9

หมายเหตุ

- ตรวจเช็คพบว่า SAMPLE FLOW WARN / ทำการแก้ไขเรียบร้อยแล้ว



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

VERIFIED

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ผาติวนารักษ์ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรมาน เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : Teledyne - API

MODEL : T100

SERIAL NO : 1385

STANDARD GAS CONCENTRATION (PPM) : 53.79

CYLINDER NO : CC745169

CYLINDER PRESSURE (psig) : 1900

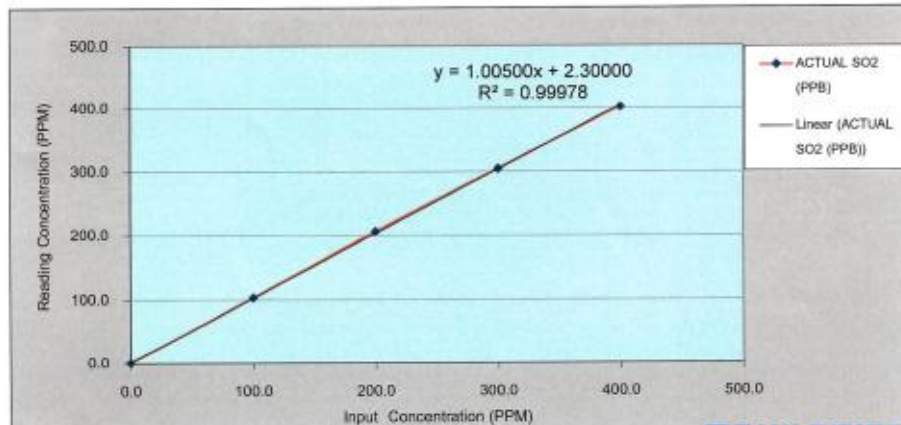
CERTIFIED DATE : Mar 10, 2021

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Mar 10, 2029

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO ₂ (PPB)	ERROR SO ₂ (PPB)	% ERROR SO ₂
ZERO	0.0	0.0	0.0	-
1	100.0	103.5	3.5	3.5
2	200.0	206.4	6.4	3.2
3	300.0	304.7	4.7	1.6
4	400.0	401.9	1.9	0.5
AVERAGE (%)				2.2



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

CALIBRATED BY : คุณพรชัย ผาดีวนารักษ์

DATE

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณพรชัย ผาดีวนารักษ์ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทริก เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8989 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15A0622

Cylinder Number: CC745169

Laboratory: 124 - Plumsteadville - PA

PGVP Number: A12021

Gas Code: CO,NO,NOX,SO₂,BALN

Reference Number: 160-402045691-1

Cylinder Volume: 144.4 CF

Cylinder Pressure: 2015 PSIG

Valve Outlet: 660

Certification Date: Mar 10, 2021

Expiration Date: Mar 10, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800R-12/931, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

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

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
NITRIC OXIDE	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	G1	+/- 0.9% NIST Traceable	03/03/2021, 03/10/2021
CARBON MONOXIDE	4500 PPM	4512 PPM	G1	+/- 0.6% NIST Traceable	03/04/2021
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	07060227	EB0079116	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Jul 23, 2023
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
GMIS	124208809	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	16010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	08012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

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

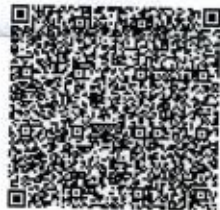
ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1KD578	NDIR	Feb 26, 2021
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Feb 11, 2021
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2021
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Feb 18, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 28.1 Kg

Net Weight: 4.6 Kg



Approved for Release

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T100

วันที่ : 9 กุมภาพันธ์ 2565

บริษัทผู้ผลิต : Teledyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 1771

TEST VALUES			
	API MODEL T100	BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500
2	STABILITY	≤ 1 PPB	0.2
3	PRESSURE	25 - 35 in - Hg-A	29.2
4	SAMPLE FLOW	650 ± 10% cc/min	445
5	PMT	mV	70.2
6	NORM PMT	mV	63.2
7	UV LAMP	1000 - 4800 mV	4135.2
8	LAMP RATIO	30 To 120 %	110.7
9	STRAY LIGHT	≤ 100 PPB	73.1
10	DARK PMT	-50 ± 200 % mV	47.5
11	DARK LAMP	-50 ± 200 % mV	4.6
12	SO ₂ SLOPE	1.0 ± 0.3	2.319
13	SO ₂ OFFSET	< 250 mV	63.1
14	HVPS	400 - 900 V	601
15	RX CELL TEMP	50 ± 1 °C	50.0
16	BOX TEMP	AMBIENT ± 5 °C	36.1
17	PMT TEMP	7 ± 2 °C	8.7
18	SO ₂ SAMPLE READING	PPB	0.1
19	OPTIC TEST	2000 ± 1000 mV	1123.8
20	ELECTRICAL TEST	2000 ± 1000 mV	1095.1
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	4.8 / 12.2 / 16.2 / -16.2
22	ZERO GAS	0.00 PPB	-55.8
23	SPAN GAS	400.00 PPB	1024.3

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, O-ring 2 ชิ้น, Spring 1 ชิ้น
- ทำการเปลี่ยน เลนส์ CD, FILTER 330 NM 1 ชิ้น
- ทำการเปลี่ยน REBUILD KIT, PUMP 1 ชุด



ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย มาติวนาภิรักษ์ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิรม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T100

วันที่ : 4 พฤศจิกายน 2564

บริษัทผู้ผลิต : Teledyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 2512

TEST VALUES			
	API MODEL T100	BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500
2	STABILITY	≤ 1 PPB	0.45
3	PRESSURE	25 - 35 in - Hg-A	28.2
4	SAMPLE FLOW	650 ± 10% cc/min	655.9
5	PMT	mV	210.7
6	NORM PMT	mV	209.1
7	UV LAMP	1000 - 4800 mV	3454.7
8	LAMP RATIO	30 To 120 %	97.4
9	STRAY LIGHT	≤ 100 PPB	91.8
10	DARK PMT	-50 ± 200 % mV	39.8
11	DARK LAMP	-50 ± 200 % mV	2.2
12	SO ₂ SLOPE	1.0 ± 0.3	1.173
13	SO ₂ OFFSET	< 250 mV	156.6
14	HVPS	400 - 900 V	648
15	RX CELL TEMP	50 ± 1 °C	50.0
16	BOX TEMP	AMBIENT ± 5 °C	34.1
17	PMT TEMP	7 ± 2 °C	8.5
18	SO ₂ SAMPLE READING	PPB	13.6
19	OPTIC TEST	2000 ± 1000 mV	1060.2
20	ELECTRICAL TEST	2000 ± 1000 mV	833.9
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.23 / 12.20 / 15.96 / -15.19
22	ZERO GAS	0.00 PPB	13.4
23	SPAN GAS	400.00 PPB	379.8

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น
- ทำการเปลี่ยน Pump Demo 1 ตัว (ขอทางบริษัท)
- ทำการเปลี่ยน Filter PMT Optic 330 NM 1 ชิ้น



ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณณัฐวิภา พัทธนาภิรักษ์ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิรม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : Teledyne - API

MODEL : T100

SERIAL NO : 2512

STANDARD GAS CONCENTRATION (PPM) : 53.79

CYLINDER NO : CC745169

CYLINDER PRESSURE (psig) : 2015

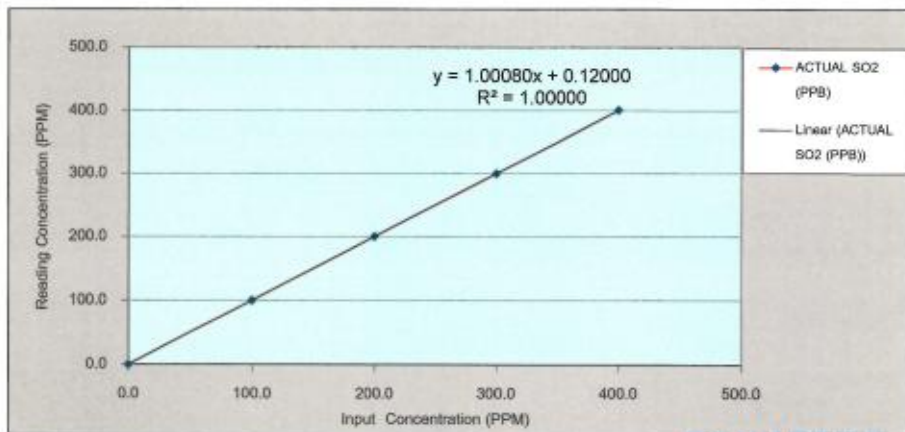
CERTIFIED DATE : Mar 10, 2021

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Mar 10, 2029

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO ₂ (PPB)	ERROR SO ₂ (PPB)	% ERROR SO ₂
ZERO	0.00	0.00	0.00	-
1	100.00	100.40	0.40	0.40
2	200.00	200.30	0.30	0.15
3	300.00	300.20	0.20	0.07
4	400.00	400.50	0.50	0.13
AVERAGE (%)				0.18



CALIBRATED BY : คุณสันต์จุฑา พัฒนวิกรมย์กุล

DATE : 4 พฤศจิกายน 2564

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณสันต์จุฑา พัฒนวิกรมย์กุล โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8989 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Part Number: E04NI99E15A0622
Cylinder Number: CC745169
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12021
Gas Code: CO,NO,NOX,SO₂,BALN

Reference Number: 160-402045691-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 660
Certification Date: Mar 10, 2021

Expiration Date: Mar 10, 2029

Certification performed in accordance with 'EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)' document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

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

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
NITRIC OXIDE	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	G1	+/- 0.9% NIST Traceable	03/03/2021, 03/10/2021
CARBON MONOXIDE	4500 PPM	4512 PPM	G1	+/- 0.6% NIST Traceable	03/03/2021, 03/10/2021
NITROGEN	Balance				03/04/2021

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Uncertainty
NTRM	07060227	EB0079116	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%
PRM	12386	D885025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%
NTRM	18010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%
NTRM	08012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%

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

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1KD579	NDIR	Feb 26, 2021
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Feb 11, 2021
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2021
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Feb 18, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 28.1 Kg
Net Weight: 4.6 Kg



Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15A0622
Cylinder Number: CC745169
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12021
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402045691-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 660
Certification Date: Mar 10, 2021

Expiration Date: Mar 10, 2029

Certification performed in accordance with 'EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)' document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

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

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
NITRIC OXIDE	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	G1	+/- 0.9% NIST Traceable	03/03/2021, 03/10/2021
CARBON MONOXIDE	4500 PPM	4512 PPM	G1	+/- 0.6% NIST Traceable	03/03/2021, 03/10/2021
NITROGEN	Balance				03/04/2021

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	07060227	EB0079116	100.3 PPM NITRIC OXIDE/NITROGEN	
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	Jul 23, 2023
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	Feb 20, 2020
NTRM	16010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN	Aug 15, 2021
NTRM	08012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN	Dec 23, 2021
The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.				Jun 07, 2024

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1KD579	NDIR	Feb 26, 2021
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Feb 11, 2021
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2021
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Feb 18, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 28.1 Kg
Net Weight: 4.6 Kg



Approved for Release

388 Ratchadapisek Rd. 32
Chadrasakem, Chatuchak
Bangkok 10900 | Thailand
+66 (0) 2-515-8999

Env_Service@kinetics.co.th

Customer Name : SGS (Thailand) Co., Ltd Contact : คุณเจริญ 02-678-1813	
Description	
Manufacturer : Teledyne API	Model : T100
Equipment : SO2 Analyzer	Serial No : 2512
Working Date : 03/11/2021	Quotation : Q-B2-2021-128-SV Rev.01

Environmental Science Business Unit

Service Report

Physical Checking	<p>ตรวจเช็คเบื้องต้นพบว่า</p> <ul style="list-style-type: none"> - ไม่สามารถทำ Calibrate Zero และค่า Span ได้ - พบ Filter PMT OPTIC 330 NM สกปรก - พบ Pump ของเครื่องเสียไม่สามารถใช้งานได้
	<div>   </div> <p>รูป Sintered Filter , O-Ring , Spring Flow</p> <p>รูป Filter PMT OPTIC 330 nm</p>
Correction Working	<div>   </div> <p>รูป Pump</p> <p>รูป ทำความสะอาดภายในเครื่อง</p>
	<ul style="list-style-type: none"> - เปลี่ยน Sintered Filter 1 ชิ้น - เปลี่ยน O-Ring 2 ชิ้น - เปลี่ยน Spring Flow 1 ชิ้น - เปลี่ยน แล่น Filter PMT OPTIC 330 nm 1 ชิ้น - เปลี่ยน Pump Demo 1 ตัว
Recommendation	<ul style="list-style-type: none"> - มีการติดตั้ง Pump ของเครื่อง Demo ให้ลูกค้าใช้งานระหว่างรออะไหล่จากต่างประเทศ

Action By : Mr.Sanjutha Date : 03/11/2021



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

รายชื่ออุปกรณ์ / เครื่องมือ : CO Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T300

วันที่ : 27 สิงหาคม 2564

บริษัทผู้ผลิต : Teledyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 1885

TEST VALUES			
API MODEL T300		BEFORE	AFTER
1	RANGE 1 - 1000 PPM	50.0	50.0
2	STABILITY ≤ 1 PPM	0.027	0.004
3	CO MEASURE 2500 - 4800 mV	3269.5	3350.8
4	CO REFERENCE 2000 - 4800 mV	2673.6	2733.4
5	MR RATION 1.1 \pm 1.3	1.233	1.235
6	PRESEURE 25 - 35 in - Hg-A	29.0	29.0
7	SAMPLE FLOW 800 \pm 10% cc/min	734	821
8	SAMPLE TEMP 48 \pm 4 °C	46.3	45.3
9	BENCH TEMP 48 \pm 2 °C	48.0	48.0
10	WHEEL TEMP 68 \pm 2 °C	68.0	68.0
11	BOX TEMP AMBIENT \pm 5 °C	31.9	33.6
12	PHT DRIVE 250 - 4750 mV	3405.7	3626.5
13	SLOPE 1.0 \pm 0.3	0.855	0.864
14	OFFSET 0.0 \pm 0.3	0.024	0.024
15	CO READING (AMBIENT) PPM	1.091	0.165
16	ELECTRICAL TEST 40 \pm 2 PPM	31.776	39.166
17	VOLTAGE TEST +5 V +12 V +15 V -15 V	5.12 / 12.26 / 16.65 / -15.40	5.12 / 12.26 / 16.65 / -15.40
18	ZERO GAS 0.00 PPM	0.071	0.30
19	SPAN GAS 40.0 PPM	39.931	40.066

หมายเหตุ

- เปลี่ยน Flow Sensor Board 1 ชิ้น ตรวจสอบเครื่อง CO Analyzer T300 SN 1481

- เปลี่ยน O-ring 2 ชิ้น , Spring 1 ชิ้น , Sintered Filter 1 ชิ้น



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ผาสุวนาภิรักษ์ โทรศัพท์ : 0-2515-8967

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิรม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8968 E-Mail : Info@kinetics.co.th



MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd

EQUIPMENT NAME : CO Analyzer

MANUFACTURER : Teledyne - API

MODEL : T300

SERIAL NO : 1885

STANDARD GAS CONCENTRATION (PPM) : 4448

CYLINDER NO : CC715528

CYLINDER PRESSURE (psig) : 1950

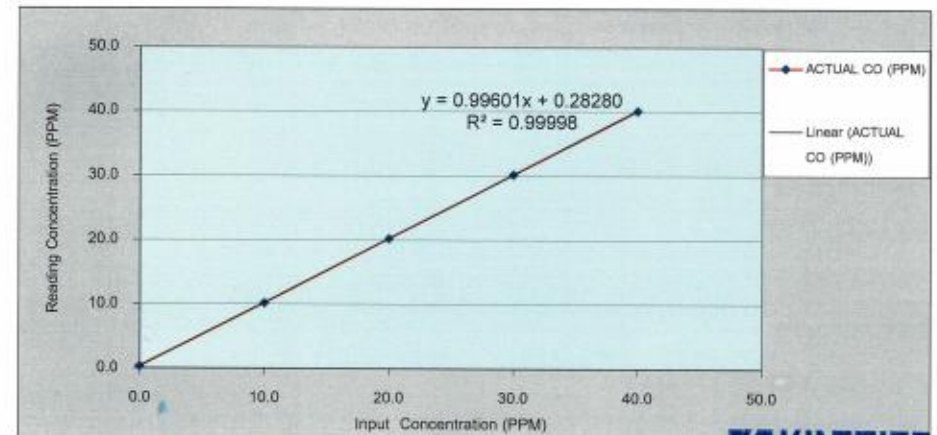
CERTIFIED DATE : Feb 13, 2019

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Feb 13, 2022

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPM)	ACTUAL CO (PPM)	ERROR CO (PPM)	% ERROR CO
ZERO	0.00	0.300	0.30	-
1	10.00	10.162	0.16	1.62
2	20.00	20.256	0.26	1.28
3	30.00	30.231	0.23	0.77
4	40.00	40.066	0.07	0.17
AVERAGE (%)				0.96



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

CALIBRATED BY : คุณสัณห์จุฑา พัฒนภิรมย์กุล

DATE : 27 สิงหาคม 2564

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิคเพิ่มเติม : คุณพรชัย ผาสุวนาภิรักษ์ โทรศัพท์ : 02-515-8997

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิรม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8968 E-Mail : Info@kinetics.co.th



Airgas Specialty Gases
Airgas USA, LLC
600 Union Landing Road
Cranston, NJ 08507-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E03N09E15A41A7
Cylinder Number: CC715528
Laboratory: 124 - Riverton (SAP) - NJ
PGVP Number: 852019
Gas Code: CO, NO, NOX, BALN

Reference Number: 82-401406850-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 880
Certification Date: Feb 13, 2019

Expiration Date: Feb 13, 2022

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA 803/R-12-031, using the assay procedure listed. Analytical methodology does not require correction for analytical interference. This cylinder has a total dry gas volume/volume basis unless otherwise noted. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder before 100 ppm, i.e. 0.2 megapascals

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	44.66 PPM	G1	+/- 1.1% NIST Traceable	02/05/2019, 02/13/2019
NITRIC OXIDE	45.00 PPM	44.53 PPM	G1	+/- 1.1% NIST Traceable	02/05/2019, 02/13/2019
CARBON MONOXIDE	4500 PPM	4448 PPM	G1	+/- 0.9% NIST Traceable	01/29/2019
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12010724	KAL004497	50.03 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Mar 12, 2024
PRM	12187	APEX109237	9.62 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Jun 01, 2017
QMS	1114201901	CC506710	4.971 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 14, 2019
PRM	12368	5604119	29.66 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Jun 03, 2017
QMS	7042010164	CC303941	5.101 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jun 01, 2020
NTRM	13080206	CC401947	4950 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Feb 15, 2019

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

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Siemens Ultramat 8 J2-889 CO/HIGH	NDIR	Jan 18, 2019
Nicolet 8700 APV1100381 NO	FTIR	Feb 08, 2019
Nicolet 8700 APV1100381 NO2	FTIR	Feb 08, 2019

Triad Date Available Upon Request

NOTES: Gross Weight: 60.8 lbs.
Net Weight: 10.4 lbs.



Approved for Release

Page 1 of 82-401406850-1



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า /หน่วยงาน : SGS (Thailand) Co., Ltd

วันที่ : 11 พฤษภาคม 2565

รายชื่ออุปกรณ์ / เครื่องมือ : NOx Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T200

หมายเลขอุปกรณ์ / เครื่องมือ : 1652

TEST VALUES			
API MODEL T200		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0
2	STABILITY	≤ 1 PPB	0.2
3	SAMPLE FLOW	500 ± 10% cc/min	481
4	OZONE FLOW	80 ± 10% cc/min	79
5	PMT	mV	1157.2
6	NORM PMT	mV	1234.0
7	A ZERO	-20 To 150 MV	199.8
8	HPVS	400 - 900 V	788
9	RX CELL TEMP	50 ± 1 °C	50.0
10	BOX TEMP	AMBIENT ± 5 °C	29.9
11	PMT TEMP	7 ± 2 °C	6.9
12	MOLY TEMP	315 ± 5 °C	316.7
13	RX CELL PRESSURE	<10 in - Hg-A	6.9
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	291.0
15	NOX SLOPE	1.0 ± 0.3	0.426
16	NOX OFFSET	-50 To 150	-208.3
17	NO SLOPE	1.0 ± 0.3	0.419
18	NO OFFSET	-50 To 150	-208.3
19	NO SAMPLE READING	PPB	299.2
20	NO2 SAMPLE READING	PPB	15.5
21	NOX SAMPLE READING	PPB	314.7
22	OPTIC TEST	2000 ± 1000 mV	2695.8
23	ELECTRICAL TEST	2000 ± 1000 mV	19661.0
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.23 / 12.19 / 15.90 / -15.21
25	ZERO GAS NO/NOx	0.00/0.00 PPB	305.4 / 313.0
26	SPAN GAS NO/NOx	400.00/400.00 PPB	488.1 / 499.6

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 3 ชิ้น, O-ring 6 ชิ้น, Spring 3 ชิ้น
- ทำการเปลี่ยน พลัส CO PMT 1 ชิ้น
- ทำการเปลี่ยน VALVE AUTO ZERO 1 ชิ้น



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ฉาวนิวนาภิรักษ์ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd

EQUIPMENT NAME : NO_x Analyzer

MANUFACTURER : Teledyne - API

MODEL : T200

SERIAL NO : 1652

STANDARD GAS CONCENTRATION (PPM) : 53.40

CYLINDER NO : CC745169

CYLINDER PRESSURE (psig) : 1900

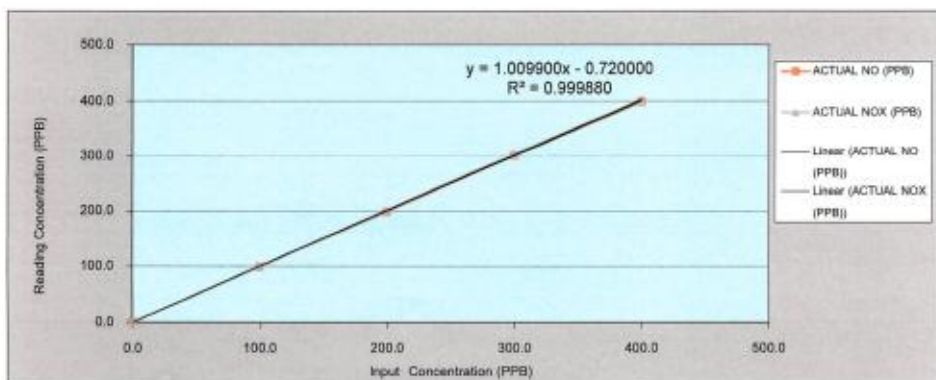
CERTIFIED DATE : Mar 10, 2021

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Mar 10, 2029

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO _x (PPB)	ERROR NO _x (PPB)	% ERROR NO _x
ZERO	0.0	0.3	0.3	-	0.5	0.5	-
1	100.0	98.8	-1.2	-1.2	98.3	-1.7	-1.7
2	200.0	199.1	-0.9	-0.45	200.6	0.6	0.3
3	300.0	301.9	1.9	0.6	304.6	4.6	1.5
4	400.0	400.2	0.2	-0.1	402.3	2.3	0.6
AVERAGE (%)				0.6	1.0		



KINETICS
บริษัท ไคเนติกส์ ก่อตั้งโดย ดร. พงษ์ศักดิ์

CALIBRATED BY : คุณพรชัย นาคศิริรักษ์

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิคเพิ่มเติม : คุณพรชัย นาคศิริรักษ์ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิบาล เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

KINETICS

388 Ratchadapisek Rd. 32

Chadrasem, Chatuchak

Bangkok 10900 | Thailand

+66 (0) 2-515-8999

Env_Service@kinetics.co.th

Customer Name : SGS (Thailand) Co., Ltd

Contact : คุณณัฐวัฒน์ 02-678-1813

Description

Manufacturer : Teledyne API

Model : T200

Equipment : NO_x Analyzer

Serial No : 1652

Working Date : 11/05/2022

Quotation : Q-B2-2022-112-SV

Environmental Science Business Unit

Service Report

Physical Checking

ตรวจเช็คเบื้องต้นพบว่า

- หลอด PMT เสื่อมสภาพ ส่งผลให้ไม่สามารถทำการ Calibrate ZERO และ SPAN ได้
- VALVE ชั่ว ส่งผลให้ AUTO ZERO WARNING



รูป Assy PMT Low Dark Curr/Hi Gain Nox Ultra



รูป ASSY, VALVE, VA59 W/DIODE, 5" LEADS

Correction Working

- ทำการทดสอบเปลี่ยน Assy PMT Low Dark Curr/Hi Gain Nox Ultra 1 ชิ้น
- ทำการทดสอบเปลี่ยน ASSY, VALVE, VA59 W/DIODE, 5" LEADS 1 ชิ้น
- จากการทดสอบการเปลี่ยนอะไหล่แล้วลองใช้งานเครื่อง *เครื่องสามารถทำงานปกติ

*รายการวัสดุสิ้นเปลือง
 Sintered Filter 3 ชิ้น
 O-ring 6 ชิ้น
 Spring 3 ชิ้น

Recommendation

ต้องทำการเปลี่ยนอะไหล่ตามรายการที่ 1 - 2 เพื่อให้เครื่องใช้งาน

Action By : Mr.Pornchai Date : 11/05/2022

CERTIFICATE OF ANALYSIS **Grade of Product: EPA Protocol**

Part Number: E04NI99E15A0622
Cylinder Number: CC745169
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12021
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402045691-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 680
Certification Date: Mar 10, 2021

Expiration Date: Mar 10, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gasous Calibration Standards (May 2012)" document EPA 800/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
NITRIC OXIDE	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable	03/03/2021, 03/10/2021
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	G1	+/- 0.9% NIST Traceable	03/03/2021, 03/10/2021
CARBON MONOXIDE	4500 PPM	4512 PPM	G1	+/- 0.6% NIST Traceable	03/03/2021, 03/10/2021
NITROGEN	Balance				03/04/2021

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Uncertainty
NTRM	07060227	EB0079116	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%
NTRM	16010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%
NTRM	08012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%

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

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1K0579	NDIR	Feb 26, 2021
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Feb 11, 2021
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2021
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Feb 18, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 28.1 Kg
Net Weight: 4.6 Kg



Approved for Release

รายงานผลการชั่งและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

รายชื่ออุปกรณ์ / เครื่องมือ : NOx Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T200

วันที่ : 7 กุมภาพันธ์ 2565

บริษัทผู้ผลิต : Teldyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 7533

TEST VALUES			
	API MODEL T200	BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500
2	STABILITY	≤ 1 PPB	0.12
3	SAMPLE FLOW	500 ± 10% cc/min	496
4	OZONE FLOW	80 ± 10% cc/min	87
5	PMT	mV	9.8
6	NORM PMT	mV	-33.4
7	A ZERO	-20 To 150 MV	45.2
8	HPVS	400 - 900 V	660
9	RX CELL TEMP	50 ± 1 °C	50.3
10	BOX TEMP	AMBIENT ± 5 °C	33.4
11	PMT TEMP	7 ± 2 °C	6.8
12	MOLY TEMP	315 ± 5 °C	313.9
13	RX CELL PRESSURE	<10 in. Hg-A	4.1
14	SAMPLE PRESSURE	25 - 35 in. Hg-A	28.6
15	NOX SLOPE	1.0 ± 0.3	0.992
16	NOX OFFSET	-50 To 150	-5.4
17	NO SLOPE	1.0 ± 0.3	0.966
18	NO OFFSET	-50 To 150	-6.4
19	NO SAMPLE READING	PPB	-12.7
20	NO2 SAMPLE READING	PPB	8.6
21	NOX SAMPLE READING	PPB	-3.8
22	OPTIC TEST	2000 ± 1000 mV	2249
23	ELECTRICAL TEST	2000 ± 1000 mV	2039
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	-
25	ZERO GAS	NO/NOx	0.00/0.00 PPB
26	SPAN GAS	NO/NOx	400.00/400.00 PPB

หมายเหตุ

ลงนามเจ้าหน้าที่ (Signature)



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T200

วันที่ : 7 กุมภาพันธ์ 2565

บริษัทผู้ผลิต : Teledyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 7534

TEST VALUES			
	API MODEL T200	BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500
2	STABILITY	≤ 1 PPB	0.15
3	SAMPLE FLOW	500 ± 10% cc/min	485
4	OZONE FLOW	80 ± 10% cc/min	86
5	PMT	mV	10.1
6	NORM PMT	mV	23.5
7	A ZERO	-20 To 150 mV	19.1
8	HPVS	400 - 900 V	650
9	RX CELL TEMP	50 ± 1 °C	50.0
10	BOX TEMP	AMBIENT ± 5 °C	32.7
11	PMT TEMP	7 ± 2 °C	7.0
12	MOLY TEMP	315 ± 5 °C	315.6
13	RX CELL PRESSURE	<10 in - Hg-A	4.6
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	28.6
15	NOX SLOPE	1.0 ± 0.3	0.992
16	NOX OFFSET	-50 To 150	-7.5
17	NO SLOPE	1.0 ± 0.3	0.983
18	NO OFFSET	-50 To 150	-8.1
19	NO SAMPLE READING	PPB	0.2
20	NO ₂ SAMPLE READING	PPB	15.2
21	NO _x SAMPLE READING	PPB	15.4
22	OPTIC TEST	2000 ± 1000 mV	2304.7
23	ELECTRICAL TEST	2000 ± 1000 mV	2115.1
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	-
25	ZERO GAS NO/NO _x	0.00/0.00 PPB	1.0 / 1.3
26	SPAN GAS NO/NO _x	400.00/400.00 PPB	518 / 523.4

หมายเหตุ

KINETICS



ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ผาดีวนาภิรักษ์ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิรม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd

รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T200

วันที่ : 7 กุมภาพันธ์ 2565

บริษัทผู้ผลิต : Teledyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 7535

TEST VALUES			
	API MODEL T200	BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500
2	STABILITY	≤ 1 PPB	0.10
3	SAMPLE FLOW	500 ± 10% cc/min	481
4	OZONE FLOW	80 ± 10% cc/min	84
5	PMT	mV	34.2
6	NORM PMT	mV	14.4
7	A ZERO	-20 To 150 mV	23.4
8	HPVS	400 - 900 V	626
9	RX CELL TEMP	50 ± 1 °C	50.3
10	BOX TEMP	AMBIENT ± 5 °C	33.9
11	PMT TEMP	7 ± 2 °C	6.8
12	MOLY TEMP	315 ± 5 °C	315.6
13	RX CELL PRESSURE	<10 in - Hg-A	4.7
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	28.6
15	NOX SLOPE	1.0 ± 0.3	1.001
16	NOX OFFSET	-50 To 150	-0.4
17	NO SLOPE	1.0 ± 0.3	0.980
18	NO OFFSET	-50 To 150	-1.2
19	NO SAMPLE READING	PPB	-0.6
20	NO ₂ SAMPLE READING	PPB	11.5
21	NO _x SAMPLE READING	PPB	5.5
22	OPTIC TEST	2000 ± 1000 mV	2196.4
23	ELECTRICAL TEST	2000 ± 1000 mV	2063.3
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	-
25	ZERO GAS NO/NO _x	0.00/0.00 PPB	-4.6 / -4.5
26	SPAN GAS NO/NO _x	400.00/400.00 PPB	481.2 / 410.2

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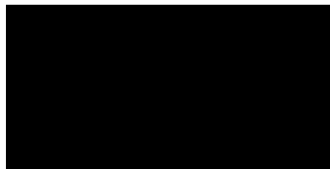
ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd
 รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer
 รุ่นของอุปกรณ์ / เครื่องมือ : T100

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

วันที่ : 7 กุมภาพันธ์ 2565
 บริษัทผู้ผลิต : Teledyne API
 หมายเลขอุปกรณ์ / เครื่องมือ : 6200

TEST VALUES				
API MODEL T100			BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500	500
2	STABILITY	≤ 1 PPB	0.16	0.04
3	PRESSURE	25 - 35 in - Hg-A	27.3	27.1
4	SAMPLE FLOW	650 ± 10% cc/min	688.2	687.2
5	PMT	mV	12.6	13.3
6	NORM PMT	mV	16.2	16.6
7	UV LAMP	1000 - 4800 mV	3780	3788.3
8	LAMP RATIO	30 To 120 %	93.5	93.5
9	STRAY LIGHT	≤ 100 PPB	7.4	8.0
10	DARK PMT	-50 ± 200 % mV	6.3	5.9
11	DARK LAMP	-50 ± 200 % mV	1.7	2.0
12	SO ₂ SLOPE	1.0 ± 0.3	0.993	0.960
13	SO ₂ OFFSET	< 250 mV	0.060	0.063
14	HVPS	400 - 900 V	511	511
15	RX CELL TEMP	50 ± 1 °C	50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C	35.7	33.9
17	PMT TEMP	7 ± 2 °C	8.3	8.3
18	SO ₂ SAMPLE READING	PPB	0.401	0.034
19	OPTIC TEST	2000 ± 1000 mV	2841.3	2728.3
20	ELECTRICAL TEST	2000 ± 1000 mV	1992.3	1991.4
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	-	-
22	ZERO GAS	0.00 PPB	0.253	0.003
23	SPAN GAS	400.00 PPB	412.846	401.484

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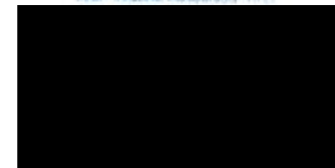
ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd
 รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer
 รุ่นของอุปกรณ์ / เครื่องมือ : T100

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

วันที่ : 7 กุมภาพันธ์ 2565
 บริษัทผู้ผลิต : Teledyne API
 หมายเลขอุปกรณ์ / เครื่องมือ : 6201

TEST VALUES				
API MODEL T100			BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500	500
2	STABILITY	≤ 1 PPB	0.02	0.09
3	PRESSURE	25 - 35 in - Hg-A	27.1	26.9
4	SAMPLE FLOW	650 ± 10% cc/min	708.0	708.4
5	PMT	mV	13.5	15.9
6	NORM PMT	mV	14.8	16.3
7	UV LAMP	1000 - 4800 mV	3867.0	3972.1
8	LAMP RATIO	30 To 120 %	98.1	98.1
9	STRAY LIGHT	≤ 100 PPB	7.5	7.5
10	DARK PMT	-50 ± 200 % mV	1.9	1.2
11	DARK LAMP	-50 ± 200 % mV	3.0	3.0
12	SO ₂ SLOPE	1.0 ± 0.3	0.998	0.944
13	SO ₂ OFFSET	< 250 mV	0.068	0.059
14	HVPS	400 - 900 V	505	505
15	RX CELL TEMP	50 ± 1 °C	50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C	36.8	34.4
17	PMT TEMP	7 ± 2 °C	8.4	8.4
18	SO ₂ SAMPLE READING	PPB	-1.115	0.004
19	OPTIC TEST	2000 ± 1000 mV	1866	1832.5
20	ELECTRICAL TEST	2000 ± 1000 mV	1937.3	1937.4
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	-	-
22	ZERO GAS	0.00 PPB	-1.436	0.010
23	SPAN GAS	400.00 PPB	418.243	400.985

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