

ภาคผนวก ง

ใบรับรองผลการตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

ภาคผนวก ง.1

ใบรับรองผลการตรวจวิเคราะห์
คุณภาพอากาศจากปล่องระบายอากาศ



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 7-239
SAMPLING DATE	: 28/08/2025	SAMPLING TIME	: 10.20-11.55 a.m.
RECEIVED DATE	: 01/09/2025	ANALYTICAL DATE	: 05-06/09/2025
REPORT DATE	: 10/09/2025	OPERATOR	: Mr. Song Hengchwankul (7-239-0-0016)
STACK LOCATION	: H-3701	FUEL TYPE	: Natural Gas / Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal

STACK DESCRIPTION					
Height	: 30.0	m	Flow Rate*	: 5,845	Ncu.m/min
Diameter	: 4.20	m	Excess Oxygen	: 15.4	%
Temperature	: 174.9	°C	Moisture Content	: 12.9	%
Gas Velocity	: 12.2	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE
		15.4%O ₂	7%O ₂	7%O ₂	
Particulate Matter	mg/Ncu.m.	2.51	6.28	60	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO. 7-239-0-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-0-0010

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
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SAMPLING DATE	: 28/08/2025	SAMPLING TIME	: 10.20-11.55 a.m.
RECEIVED DATE	: 02/09/2025	ANALYTICAL DATE	: 05-30/09/2025
REPORT DATE	: 02/10/2025	OPERATOR	: Mr. Song Hengchwankul (7-239-0-0016)
STACK LOCATION	: H-3701	FUEL TYPE	: Natural Gas / Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal

STACK DESCRIPTION					
Height	: 30.0	m	Flow Rate*	: 5,845	Ncu.m/min
Diameter	: 4.20	m	Excess Oxygen	: 15.4	%
Temperature	: 174.9	°C	Moisture Content	: 12.9	%
Gas Velocity	: 12.2	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	15.4%O ₂	7%O ₂	15.4%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.25	0.63	0.66	1.66	20/20/60	52/52/157	0.065	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	35.02	87.65	65.83	164.78	120/120/108	226/226/204	6.413	6.72	US.EPA Method 7E

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 7-239-0-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. 7-239-0-0006

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4. ^{1/} Notification of the Ministry of Industry, B.E.2567 (2024).

5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3701**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 28, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	15.38	15.30	35.60	35.59	88.34
2	15.41	15.35	34.86	34.85	87.28
3	15.43	15.39	34.62	34.61	87.31
Average	15.41	15.35	35.03	35.02	87.65

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	15.38	15.30	0.31	0.26	0.65
2	15.41	15.35	0.31	0.25	0.63
3	15.43	15.39	0.32	0.25	0.63
Average	15.41	15.35	0.31	0.25	0.63

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 28, 2025
 Start time: 10:20 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: API 200 AH
 SO₂ instrument Model: API 100 AH
 Fuel Type : Natural Gas / Fuel Gas

Run # : 1
 Location : H-3701
 Finish time : 10:40 AM
 Serial No.: 161212-13
 Serial No.: 314
 Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:20 AM	15.46	35.26	0.29
10:21 AM	15.47	35.42	0.31
10:22 AM	15.25	34.80	0.29
10:23 AM	15.34	34.12	0.32
10:24 AM	15.36	36.39	0.32
10:25 AM	15.37	35.98	0.32
10:26 AM	15.30	35.09	0.32
10:27 AM	15.39	36.13	0.30
10:28 AM	15.29	35.23	0.32
10:29 AM	15.32	36.46	0.32
10:30 AM	15.43	35.75	0.32
10:31 AM	15.42	36.13	0.30
10:32 AM	15.31	35.28	0.30
10:33 AM	15.42	34.65	0.31
10:34 AM	15.33	35.84	0.30
10:35 AM	15.45	36.17	0.30
10:36 AM	15.45	35.97	0.32
10:37 AM	15.42	35.93	0.33
10:38 AM	15.36	35.59	0.33
10:39 AM	15.47	35.71	0.33
10:40 AM	15.45	35.69	0.33
Average	15.38	35.60	0.31

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025
Start time: 10:41 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
Fuel Type : Natural Gas / Fuel Gas

Run # : 2
Location : H-3701
Finish time : 11:01 AM
Serial No.: 161212-13
Serial No.: 314
Serial No.: 058
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:41 AM	15.45	36.74	0.31
10:42 AM	15.46	36.05	0.33
10:43 AM	15.35	35.31	0.31
10:44 AM	15.34	35.90	0.32
10:45 AM	15.55	35.23	0.31
10:46 AM	15.46	33.61	0.31
10:47 AM	15.46	35.30	0.30
10:48 AM	15.37	34.54	0.31
10:49 AM	15.36	34.32	0.31
10:50 AM	15.39	33.39	0.31
10:51 AM	15.40	34.62	0.31
10:52 AM	15.32	35.04	0.31
10:53 AM	15.40	35.34	0.30
10:54 AM	15.40	33.33	0.30
10:55 AM	15.30	34.99	0.30
10:56 AM	15.40	33.23	0.30
10:57 AM	15.43	34.22	0.30
10:58 AM	15.43	34.93	0.30
10:59 AM	15.42	35.11	0.30
11:00 AM	15.40	35.52	0.30
11:01 AM	15.43	35.29	0.30
Average	15.41	34.86	0.31

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025
Start time: 11:02 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
Fuel Type : Natural Gas / Fuel Gas

Run # : 3
Location : H-3701
Finish time : 11:22 AM
Serial No.: 161212-13
Serial No.: 314
Serial No.: 058
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
11:02 AM	15.40	35.15	0.30
11:03 AM	15.40	35.67	0.30
11:04 AM	15.30	35.18	0.30
11:05 AM	15.52	34.51	0.30
11:06 AM	15.50	34.72	0.30
11:07 AM	15.33	35.46	0.30
11:08 AM	15.41	34.79	0.33
11:09 AM	15.43	36.03	0.30
11:10 AM	15.43	35.75	0.31
11:11 AM	15.42	34.00	0.31
11:12 AM	15.43	31.96	0.31
11:13 AM	15.45	33.88	0.32
11:14 AM	15.43	34.35	0.33
11:15 AM	15.44	33.39	0.34
11:16 AM	15.44	34.70	0.34
11:17 AM	15.37	35.10	0.34
11:18 AM	15.41	34.43	0.34
11:19 AM	15.49	33.36	0.34
11:20 AM	15.47	34.29	0.34
11:21 AM	15.40	34.38	0.34
11:22 AM	15.48	35.90	0.34
Average	15.43	34.62	0.32

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist



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REPORT DATE	: 10/09/2025	OPERATOR	: Mr. Song Hengchwankul (7-239-9-0016)
STACK LOCATION	: H-3703	FUEL TYPE	: Natural Gas / Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal
STACK DESCRIPTION			

Height	: 30.0	m	Flow Rate*	: 4,291	Ncu.m/min
Diameter	: 4.20	m	Excess Oxygen	: 15.4	%
Temperature	: 140.8	°C	Moisture Content	: 12.3	%
Gas Velocity	: 8.2	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE
		15.4%O ₂	7%O ₂	7%O ₂	METHODS
Particulate Matter	mg/Ncu.m.	2.95	7.48	60	US. EPA Method 5

Bongpa Puthum

(Miss Pornnapa Budithum)

Analyst

REG.NO. 7-239-9-0018

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-9-0010

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REPORT DATE	: 02/10/2025	OPERATOR	: Mr. Song Hengchwankul (7-239-9-0016)
STACK LOCATION	: H-3703	FUEL TYPE	: Natural Gas / Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal
STACK DESCRIPTION			

Height	: 30.0	m	Flow Rate*	: 4,291	Ncu.m/min
Diameter	: 4.20	m	Excess Oxygen	: 15.4	%
Temperature	: 140.8	°C	Moisture Content	: 12.3	%
Gas Velocity	: 8.2	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		METHOD
	15.4%O ₂	7%O ₂	15.4%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.18	0.46	0.47	1.19	20/20/60	52/52/157	0.034	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	33.26	84.26	62.53	158.41	120/120/122	226/226/230	4.471	14.46	US.EPA Method 7E

Katesarin Vorradetwittaya

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 7-239-9-0006

Preeda S.

(Miss Preeda Somjai)

Technical Management Team

REG.NO. 7-239-9-0006

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5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

The Monitoring Result of Emission Concentration

H-3703

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 28, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	15.50	15.38	33.25	33.24	83.70
2	15.51	15.42	33.36	33.35	84.59
3	15.51	15.44	33.20	33.19	84.49
Average	15.51	15.41	33.27	33.26	84.26

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	15.50	15.38	0.26	0.22	0.55
2	15.51	15.42	0.20	0.16	0.41
3	15.51	15.44	0.20	0.16	0.41
Average	15.51	15.41	0.22	0.18	0.46

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1) EMISSION TEST RESULT

Date: August 28, 2025
 Start time: 10:20 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: TELEDYNE 200 EM
 SO₂ instrument Model: TELEDYNE 100 EH
 Fuel Type : Natural Gas / Fuel Gas

Run # : 1
 Location : H-3703
 Finish time : 10:40 AM
 Serial No.: 071023-47
 Serial No.: 435
 Serial No.: 186
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:20 AM	15.51	33.66	0.20
10:21 AM	15.49	33.41	0.21
10:22 AM	15.54	33.38	0.23
10:23 AM	15.54	33.38	0.25
10:24 AM	15.54	33.42	0.27
10:25 AM	15.52	33.68	0.28
10:26 AM	15.50	33.68	0.31
10:27 AM	15.50	33.46	0.33
10:28 AM	15.50	33.36	0.34
10:29 AM	15.54	33.39	0.38
10:30 AM	15.54	33.44	0.40
10:31 AM	15.54	33.48	0.44
10:32 AM	15.52	33.20	0.49
10:33 AM	15.51	33.41	0.51
10:34 AM	15.51	32.84	0.29
10:35 AM	15.48	32.92	0.03
10:36 AM	15.46	32.84	0.06
10:37 AM	15.46	32.87	0.06
10:38 AM	15.42	32.95	0.09
10:39 AM	15.41	32.83	0.10
10:40 AM	15.48	32.71	0.13
Average	15.50	33.25	0.26

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025 Run #: 2
 Start time: 10:41 AM Location: H-3703
 O₂ instrument Model: AMI 70 Finish time: 11:01 AM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type: Natural Gas / Fuel Gas Serial No.: 186
 Test Operator: Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:41 AM	15.40	32.76	0.15
10:42 AM	15.41	32.99	0.16
10:43 AM	15.49	33.13	0.19
10:44 AM	15.56	33.14	0.21
10:45 AM	15.55	33.42	0.18
10:46 AM	15.49	33.15	0.15
10:47 AM	15.50	33.34	0.27
10:48 AM	15.47	33.49	0.31
10:49 AM	15.52	33.58	0.31
10:50 AM	15.50	33.80	0.31
10:51 AM	15.54	33.78	0.29
10:52 AM	15.54	33.53	0.27
10:53 AM	15.51	33.29	0.23
10:54 AM	15.53	33.42	0.20
10:55 AM	15.62	33.61	0.16
10:56 AM	15.56	33.44	0.13
10:57 AM	15.48	33.25	0.11
10:58 AM	15.50	33.19	0.17
10:59 AM	15.58	33.21	0.14
11:00 AM	15.55	33.44	0.11
11:01 AM	15.48	33.65	0.12
Average	15.51	33.36	0.20

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025 Run #: 3
 Start time: 11:02 AM Location: H-3703
 O₂ instrument Model: AMI 70 Finish time: 11:22 AM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type: Natural Gas / Fuel Gas Serial No.: 186
 Test Operator: Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
11:02 AM	15.41	33.64	0.16
11:03 AM	15.50	33.57	0.19
11:04 AM	15.57	33.43	0.21
11:05 AM	15.60	33.15	0.22
11:06 AM	15.57	33.14	0.12
11:07 AM	15.54	33.29	0.12
11:08 AM	15.46	33.13	0.12
11:09 AM	15.46	33.13	0.15
11:10 AM	15.41	33.35	0.17
11:11 AM	15.41	33.24	0.20
11:12 AM	15.47	33.04	0.11
11:13 AM	15.47	32.99	0.14
11:14 AM	15.42	33.14	0.16
11:15 AM	15.46	33.23	0.17
11:16 AM	15.52	33.03	0.20
11:17 AM	15.55	33.12	0.21
11:18 AM	15.50	33.33	0.24
11:19 AM	15.53	33.13	0.26
11:20 AM	15.60	33.03	0.29
11:21 AM	15.60	33.06	0.32
11:22 AM	15.59	33.03	0.35
Average	15.51	33.20	0.20

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist



บริษัท ซีคอต จำกัด

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Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 28/08/2025 SAMPLING TIME : 02.10-03.22 p.m.
RECEIVED DATE : 01/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 10/09/2025 OPERATOR : Mr. Song Hengchwankul (7-239-9-0016)
STACK LOCATION : H-3704 FUEL TYPE : Natural Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal

STACK DESCRIPTION
Height : 30.0 m Flow Rate* : 5,972 Ncu.m/min
Diameter : 3.60 m Excess Oxygen : 14.7 %
Temperature : 117.5 °C Moisture Content : 13.2 %
Gas Velocity : 14.9 m/s

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE METHODS
		14.7%O ₂	7%O ₂	7%O ₂	
Particulate Matter	mg/Ncu.m.	2.54	5.72	60	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO. 7-239-9-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-9-0010

Remark : 1. Reported analysis refers to submitted sample only.

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3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 28/08/2025 SAMPLING TIME : 02.10-03.22 p.m.
RECEIVED DATE : 02/09/2025 ANALYTICAL DATE : 05-30/09/2025
REPORT DATE : 02/10/2025 OPERATOR : Mr. Song Hengchwankul (7-239-9-0016)
STACK LOCATION : H-3704 FUEL TYPE : Natural Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal

STACK DESCRIPTION
Height : 30.0 m Flow Rate* : 5,972 Ncu.m/min
Diameter : 3.60 m Excess Oxygen : 14.7 %
Temperature : 117.5 °C Moisture Content : 13.2 %
Gas Velocity : 14.9 m/s

PARAMETER	RESULT ⁺				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.7%O ₂	7%O ₂	14.7%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.10	0.23	0.27	0.61	20/20/20	52/52/52	0.027	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	4.27	9.60	8.02	18.05	120/120/14	226/226/26	0.798	1.26	US.EPA Method 7E

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 7-239-9-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. 7-239-9-0006

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4. ^{1/} Notification of the Ministry of Industry, B.E.2567 (2024).

5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3704**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 28, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.76	14.72	4.30	4.26	9.58
2	14.82	14.76	4.26	4.21	9.53
3	14.77	14.69	4.39	4.33	9.69
Average	14.78	14.72	4.32	4.27	9.60

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.76	14.72	0.16	0.09	0.20
2	14.82	14.76	0.16	0.11	0.25
3	14.77	14.69	0.15	0.11	0.25
Average	14.78	14.72	0.16	0.10	0.23

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 28, 2025
 Start time: 2:20 PM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: API 200 AH
 SO₂ instrument Model: API 100 AH
 Fuel Type : Natural Gas

Run # : 1
 Location : H-3704
 Finish time : 2:40 PM
 Serial No.: 161212-13
 Serial No.: 314
 Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
2:20 PM	14.78	4.23	0.16
2:21 PM	14.80	4.27	0.18
2:22 PM	14.78	4.47	0.14
2:23 PM	14.76	4.57	0.14
2:24 PM	14.76	4.74	0.16
2:25 PM	14.76	4.78	0.16
2:26 PM	14.76	4.54	0.14
2:27 PM	14.76	4.07	0.16
2:28 PM	14.76	4.34	0.14
2:29 PM	14.76	4.19	0.16
2:30 PM	14.76	4.28	0.18
2:31 PM	14.76	4.23	0.15
2:32 PM	14.76	4.37	0.13
2:33 PM	14.76	4.37	0.11
2:34 PM	14.76	4.37	0.16
2:35 PM	14.76	4.03	0.17
2:36 PM	14.76	4.23	0.21
2:37 PM	14.76	4.16	0.17
2:38 PM	14.76	4.07	0.17
2:39 PM	14.76	3.96	0.14
2:40 PM	14.76	4.03	0.18
Average	14.76	4.30	0.16

Signature _____

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025
Start time: 2:41 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
Fuel Type : Natural Gas

Run # : 2
Location : H-3704
Finish time : 3:01 PM
Serial No.: 161212-13
Serial No.: 314
Serial No.: 058
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
2:41 PM	14.76	4.07	0.15
2:42 PM	14.76	4.22	0.12
2:43 PM	15.05	4.35	0.14
2:44 PM	14.76	4.29	0.18
2:45 PM	14.76	4.36	0.13
2:46 PM	15.04	4.33	0.16
2:47 PM	14.76	4.25	0.14
2:48 PM	14.78	4.12	0.16
2:49 PM	14.82	4.37	0.15
2:50 PM	14.82	4.22	0.17
2:51 PM	14.82	4.35	0.14
2:52 PM	14.82	4.35	0.19
2:53 PM	14.82	4.27	0.18
2:54 PM	14.79	4.57	0.14
2:55 PM	14.80	4.51	0.18
2:56 PM	14.82	4.27	0.15
2:57 PM	14.81	4.10	0.19
2:58 PM	14.78	3.80	0.18
2:59 PM	14.82	3.86	0.18
3:00 PM	14.82	4.24	0.15
3:01 PM	14.82	4.50	0.15
Average	14.82	4.26	0.16

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025
Start time: 3:02 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
Fuel Type : Natural Gas

Run # : 3
Location : H-3704
Finish time : 3:22 PM
Serial No.: 161212-13
Serial No.: 314
Serial No.: 058
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:02 PM	14.81	4.74	0.13
3:03 PM	14.79	4.98	0.14
3:04 PM	14.76	4.84	0.15
3:05 PM	14.76	4.34	0.15
3:06 PM	14.76	3.93	0.16
3:07 PM	14.76	4.32	0.14
3:08 PM	14.76	4.31	0.14
3:09 PM	14.78	4.15	0.17
3:10 PM	14.76	4.03	0.18
3:11 PM	14.76	4.37	0.13
3:12 PM	14.76	4.37	0.16
3:13 PM	14.76	4.31	0.16
3:14 PM	14.76	4.04	0.17
3:15 PM	14.76	4.32	0.11
3:16 PM	14.77	4.28	0.15
3:17 PM	14.77	4.17	0.15
3:18 PM	14.76	4.34	0.17
3:19 PM	14.76	4.63	0.15
3:20 PM	14.76	4.94	0.13
3:21 PM	14.76	4.63	0.15
3:22 PM	14.76	4.14	0.16
Average	14.77	4.39	0.15

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 2-239
SAMPLING DATE	: 28/08/2025	SAMPLING TIME	: 02.20-04.25 p.m.
RECEIVED DATE	: 01/09/2025	ANALYTICAL DATE	: 05-06/09/2025
REPORT DATE	: 10/09/2025	OPERATOR	: Mr. Song Hengchwankul (2-239-9-0016)
STACK LOCATION	: H-3705	FUEL TYPE	: Natural Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal
STACK DESCRIPTION			

Height	: 30.0	m	Flow Rate*	: 5,569	Ncu.m/min
Diameter	: 3.60	m	Excess Oxygen	: 14.9	%
Temperature	: 117.4	°C	Moisture Content	: 13.3	%
Gas Velocity	: 13.9	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE
		14.9%O ₂	7%O ₂	7%O ₂	METHODS
Particulate Matter	mg/Ncu.m.	2.77	6.37	60	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO. 2-239-9-0018

(Miss Narisa Poowasanpeteh)

Technical Management Team

REG.NO. 2-239-9-0010

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3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 2-239
SAMPLING DATE	: 28/08/2025	SAMPLING TIME	: 02.20-04.25 p.m.
RECEIVED DATE	: 02/09/2025	ANALYTICAL DATE	: 05-30/09/2025
REPORT DATE	: 02/10/2025	OPERATOR	: Mr. Song Hengchwankul (2-239-9-0016)
STACK LOCATION	: H-3705	FUEL TYPE	: Natural Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal
STACK DESCRIPTION			

Height	: 30.0	m	Flow Rate*	: 5,569	Ncu.m/min
Diameter	: 3.60	m	Excess Oxygen	: 14.9	%
Temperature	: 117.4	°C	Moisture Content	: 13.3	%
Gas Velocity	: 13.9	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		METHOD
	14.9%O ₂	7%O ₂	14.9%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.03	0.06	0.07	0.16	20/20/20	52/52/52	0.006	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	4.11	9.45	7.72	17.76	120/120/14	226/226/26	0.717	1.26	US.EPA Method 7E

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 2-239-9-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. 2-239-9-0006

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5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3705**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 28, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.90	14.85	4.16	4.10	9.42
2	14.89	14.86	4.18	4.14	9.53
3	14.88	14.86	4.11	4.08	9.39
Average	14.89	14.86	4.15	4.11	9.45

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.90	14.85	0.08	0.04	0.09
2	14.89	14.86	0.07	0.02	0.05
3	14.88	14.86	0.08	0.02	0.05
Average	14.89	14.86	0.08	0.03	0.06

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 28, 2025

Start time: 2:20 PM

O₂ instrument Model: AMI 70

NO_x instrument Model: TELEDYNE 200 EM

SO₂ instrument Model: TELEDYNE 100 EH

Fuel Type: Natural Gas

Run # : 1

Location : H-3705

Finish time : 2:40 PM

Serial No.: 071023-47

Serial No.: 435

Serial No.: 186

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
2:20 PM	14.91	4.17	0.10
2:21 PM	14.91	4.17	0.10
2:22 PM	14.91	4.21	0.09
2:23 PM	14.90	4.19	0.09
2:24 PM	14.91	4.12	0.07
2:25 PM	14.91	4.11	0.07
2:26 PM	14.91	4.15	0.07
2:27 PM	14.89	4.17	0.08
2:28 PM	14.91	4.13	0.07
2:29 PM	14.89	4.11	0.07
2:30 PM	14.90	4.13	0.07
2:31 PM	14.89	4.13	0.08
2:32 PM	14.89	4.12	0.08
2:33 PM	14.89	4.14	0.08
2:34 PM	14.90	4.21	0.08
2:35 PM	14.89	4.22	0.08
2:36 PM	14.89	4.16	0.10
2:37 PM	14.90	4.16	0.08
2:38 PM	14.91	4.20	0.07
2:39 PM	14.90	4.17	0.07
2:40 PM	14.89	4.15	0.07
Average	14.90	4.16	0.08

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025 Run # : 2
 Start time: 2:41 PM Location : H-3705
 O₂ instrument Model: AMI 70 Finish time : 3:01 PM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type : Natural Gas Serial No.: 186
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
2:41 PM	14.91	4.16	0.09
2:42 PM	14.89	4.16	0.07
2:43 PM	14.89	4.19	0.08
2:44 PM	14.89	4.21	0.07
2:45 PM	14.90	4.21	0.09
2:46 PM	14.89	4.20	0.09
2:47 PM	14.89	4.16	0.09
2:48 PM	14.88	4.18	0.07
2:49 PM	14.88	4.15	0.07
2:50 PM	14.89	4.12	0.07
2:51 PM	14.89	4.12	0.07
2:52 PM	14.89	4.15	0.07
2:53 PM	14.88	4.13	0.07
2:54 PM	14.89	4.10	0.07
2:55 PM	14.89	4.09	0.07
2:56 PM	14.89	4.13	0.07
2:57 PM	14.88	4.20	0.07
2:58 PM	14.88	4.27	0.07
2:59 PM	14.89	4.23	0.07
3:00 PM	14.89	4.27	0.07
3:01 PM	14.89	4.28	0.07
Average	14.89	4.18	0.07

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 28, 2025 Run # : 3
 Start time: 3:02 PM Location : H-3705
 O₂ instrument Model: AMI 70 Finish time : 3:22 PM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type : Natural Gas Serial No.: 186
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:02 PM	14.89	4.25	0.07
3:03 PM	14.88	4.26	0.07
3:04 PM	14.88	4.25	0.07
3:05 PM	14.89	4.21	0.07
3:06 PM	14.88	4.24	0.08
3:07 PM	14.89	4.22	0.07
3:08 PM	14.88	4.19	0.07
3:09 PM	14.88	4.19	0.07
3:10 PM	14.88	4.16	0.08
3:11 PM	14.88	4.15	0.08
3:12 PM	14.88	4.05	0.08
3:13 PM	14.88	4.02	0.08
3:14 PM	14.88	4.04	0.08
3:15 PM	14.88	4.02	0.08
3:16 PM	14.88	3.98	0.09
3:17 PM	14.88	4.00	0.08
3:18 PM	14.89	3.99	0.09
3:19 PM	14.89	3.99	0.09
3:20 PM	14.89	3.97	0.08
3:21 PM	14.89	4.01	0.08
3:22 PM	14.88	4.05	0.08
Average	14.88	4.11	0.08

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๖-239
SAMPLING DATE	: 29/08/2025	SAMPLING TIME	: 10.30-11.35 a.m.
RECEIVED DATE	: 01/09/2025	ANALYTICAL DATE	: 05-06/09/2025
REPORT DATE	: 10/09/2025	OPERATOR	: Mr. Song Hengchwankul (๖-239-๖-0016)
STACK LOCATION	: H-3706	FUEL TYPE	: Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal

STACK DESCRIPTION					
Height	: 35.0	m	Flow Rate*	: 722	Ncu.m/min
Diameter	: 1.80	m	Excess Oxygen	: 5.7	%
Temperature	: 145.3	°C	Moisture Content	: 13.9	%
Gas Velocity	: 7.8	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE
		5.7%O ₂	7%O ₂	7%O ₂	METHODS
Particulate Matter	mg/Ncu.m.	2.62	2.40	60	US. EPA Method 5


(Miss Pornnapha Budthum)

Analyst

REG.NO. ๖-239-๖-0018


(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. ๖-239-๖-0010

Remark : 1. Reported analysis refers to submitted sample only.

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3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๖-239
SAMPLING DATE	: 29/08/2025	SAMPLING TIME	: 10.30-11.35 a.m.
RECEIVED DATE	: 02/09/2025	ANALYTICAL DATE	: 05-30/09/2025
REPORT DATE	: 02/10/2025	OPERATOR	: Mr. Song Hengchwankul (๖-239-๖-0016)
STACK LOCATION	: H-3706	FUEL TYPE	: Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal

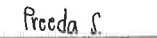
STACK DESCRIPTION					
Height	: 35.0	m	Flow Rate*	: 722	Ncu.m/min
Diameter	: 1.80	m	Excess Oxygen	: 5.7	%
Temperature	: 145.3	°C	Moisture Content	: 13.9	%
Gas Velocity	: 7.8	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		METHOD
	5.7%O ₂	7%O ₂	5.7%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	2.72	2.49	7.14	6.52	20/20/20	52/52/52	0.086	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	31.22	28.52	58.69	53.62	120/120/37	226/226/69	0.706	1.50	US.EPA Method 7E


(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006


(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 (2024).

5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3706**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 29, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.24	5.31	31.93	31.92	28.46
2	5.71	5.76	31.66	31.65	29.06
3	5.96	5.99	30.09	30.08	28.04
Average	5.63	5.69	31.23	31.22	28.52

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.24	5.31	2.63	2.59	2.31
2	5.71	5.76	2.54	2.51	2.30
3	5.96	5.99	3.10	3.07	2.86
Average	5.63	5.69	2.76	2.72	2.49

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 29, 2025
 Start time: 10:30 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: TELEDYNE 200 EM
 SO₂ instrument Model: TELEDYNE 100 EH
 Fuel Type : Fuel Gas

Run # : 1
 Location : H-3706
 Finish time : 10:50 AM
 Serial No.: 071023-47
 Serial No.: 435
 Serial No.: 186
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:30 AM	6.09	31.12	2.61
10:31 AM	5.93	31.16	2.61
10:32 AM	5.49	31.07	2.62
10:33 AM	4.49	30.91	2.62
10:34 AM	4.87	30.85	2.63
10:35 AM	5.09	30.84	2.63
10:36 AM	5.03	30.83	2.61
10:37 AM	5.58	31.30	2.61
10:38 AM	5.53	31.94	2.63
10:39 AM	5.37	32.19	2.63
10:40 AM	5.36	32.30	2.64
10:41 AM	5.24	32.41	2.63
10:42 AM	5.05	32.54	2.64
10:43 AM	4.93	32.54	2.65
10:44 AM	4.96	32.53	2.64
10:45 AM	4.62	32.55	2.64
10:46 AM	4.55	32.61	2.66
10:47 AM	5.84	32.67	2.64
10:48 AM	5.70	32.65	2.67
10:49 AM	5.53	32.70	2.66
10:50 AM	4.72	32.77	2.66
Average	5.24	31.93	2.63

Signature _____

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 29, 2025 Run # : 2
 Start time: 10:51 AM Location : H-3706
 O₂ instrument Model: AMI 70 Finish time : 11:11 AM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type : Fuel Gas Serial No.: 186
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:51 AM	5.64	32.85	2.66
10:52 AM	5.09	32.91	2.66
10:53 AM	5.32	32.94	2.67
10:54 AM	5.23	32.93	2.67
10:55 AM	5.65	32.95	2.69
10:56 AM	5.76	32.93	2.68
10:57 AM	5.34	32.96	2.65
10:58 AM	5.76	32.99	2.42
10:59 AM	5.24	32.94	2.41
11:00 AM	5.67	32.95	2.42
11:01 AM	5.47	32.90	2.43
11:02 AM	5.67	32.86	2.43
11:03 AM	6.09	30.16	2.43
11:04 AM	6.05	28.32	2.43
11:05 AM	6.04	30.13	2.44
11:06 AM	5.98	30.16	2.46
11:07 AM	6.02	30.24	2.50
11:08 AM	5.99	30.18	2.53
11:09 AM	5.99	30.19	2.57
11:10 AM	6.00	30.21	2.62
11:11 AM	5.94	30.23	2.65
Average	5.71	31.66	2.54

Signature

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 29, 2025 Run # : 3
 Start time: 11:12 AM Location : H-3706
 O₂ instrument Model: AMI 70 Finish time : 11:32 AM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type : Fuel Gas Serial No.: 186
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
11:12 AM	5.94	30.17	2.71
11:13 AM	5.95	30.15	2.76
11:14 AM	5.96	30.24	2.81
11:15 AM	5.99	30.33	2.87
11:16 AM	5.98	30.31	2.92
11:17 AM	5.97	30.30	2.97
11:18 AM	5.99	30.28	3.03
11:19 AM	5.96	30.16	3.09
11:20 AM	5.96	30.10	3.15
11:21 AM	5.96	30.11	3.20
11:22 AM	5.94	30.15	3.26
11:23 AM	5.94	30.13	3.32
11:24 AM	5.95	30.06	3.36
11:25 AM	5.99	30.02	3.41
11:26 AM	5.97	29.98	3.46
11:27 AM	5.93	29.95	3.38
11:28 AM	5.94	29.91	2.98
11:29 AM	5.95	29.82	3.01
11:30 AM	5.96	29.76	3.06
11:31 AM	5.93	29.88	3.11
11:32 AM	5.92	30.11	3.15
Average	5.96	30.09	3.10

Signature

(Miss Katesarin Vorradetwittaya)

Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 2-239
SAMPLING DATE	: 29/08/2025	SAMPLING TIME	: 09.30-11.32 a.m.
RECEIVED DATE	: 01/09/2025	ANALYTICAL DATE	: 05-06/09/2025
REPORT DATE	: 10/09/2025	OPERATOR	: Mr. Song Hengchwankul (2-239-9-0016)
STACK LOCATION	: H-3707	FUEL TYPE	: Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal

STACK DESCRIPTION

Height	: 35.0	m	Flow Rate*	: 732	Ncu.m/min
Diameter	: 1.80	m	Excess Oxygen	: 6.0	%
Temperature	: 150.3	°C	Moisture Content	: 13.1	%
Gas Velocity	: 7.9	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE
		6.0%O ₂	7%O ₂	7%O ₂	METHODS
Particulate Matter	mg/Ncu.m.	2.50	2.34	60	US. EPA Method 5

Bongsa Buddhum

(Miss Pornnapa Buddhum)

Analyst

REG.NO. 2-239-9-0018

Manira Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-9-0010

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3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: PTT Global Chemical Public Co., Ltd.	REFERENCE NO.	: 225007-CEMS-2508-0073
	Branch 2, Power Plant		
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 2-239
SAMPLING DATE	: 29/08/2025	SAMPLING TIME	: 09.30-11.32 a.m.
RECEIVED DATE	: 02/09/2025	ANALYTICAL DATE	: 05-30/09/2025
REPORT DATE	: 02/10/2025	OPERATOR	: Mr. Song Hengchwankul (2-239-9-0016)
STACK LOCATION	: H-3707	FUEL TYPE	: Fuel Gas
SOURCE DESCRIPTION	: Combustion	SAMPLE CONDITION	: Normal

STACK DESCRIPTION

Height	: 35.0	m	Flow Rate*	: 732	Ncu.m/min
Diameter	: 1.80	m	Excess Oxygen	: 6.0	%
Temperature	: 150.3	°C	Moisture Content	: 13.1	%
Gas Velocity	: 7.9	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		METHOD
	6.0%O ₂	7%O ₂	6.0%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.69	0.65	1.81	1.69	20/20/20	52/52/52	0.022	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	28.62	26.77	53.81	50.34	120/120/37	226/226/69	0.656	1.50	US.EPA Method 7E

Miss Katesarin

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 2-239-9-0006

Preeda S.

(Miss Preeda Somjai)

Technical Management Team

REG.NO. 2-239-9-0006

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5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3707**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 29, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.93	5.94	29.09	29.08	27.02
2	6.23	6.24	28.78	28.77	27.28
3	5.92	5.94	28.03	28.02	26.03
Average	6.03	6.04	28.64	28.62	26.77

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.93	5.94	0.62	0.57	0.53
2	6.23	6.24	0.75	0.71	0.67
3	5.92	5.94	0.83	0.79	0.73
Average	6.03	6.04	0.73	0.69	0.65

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 29, 2025
 Start time: 10:30 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: API 200 AH
 SO₂ instrument Model: API 100 AH
 Fuel Type : Fuel Gas

Run # : 1
 Location : H-3707
 Finish time : 10:50 AM
 Serial No.: 161212-13
 Serial No.: 314
 Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:30 AM	5.43	27.44	0.63
10:31 AM	5.41	30.26	0.63
10:32 AM	5.42	28.80	0.63
10:33 AM	5.42	29.32	0.63
10:34 AM	5.55	28.93	0.63
10:35 AM	5.71	28.34	0.63
10:36 AM	5.79	28.92	0.62
10:37 AM	5.84	30.42	0.62
10:38 AM	5.86	27.67	0.62
10:39 AM	5.91	29.90	0.62
10:40 AM	5.94	29.52	0.62
10:41 AM	5.99	29.41	0.62
10:42 AM	6.15	27.61	0.62
10:43 AM	6.13	28.87	0.62
10:44 AM	6.20	29.18	0.62
10:45 AM	6.22	29.58	0.62
10:46 AM	6.21	29.68	0.62
10:47 AM	6.25	29.07	0.62
10:48 AM	6.34	29.45	0.62
10:49 AM	6.38	29.01	0.62
10:50 AM	6.32	29.58	0.62
Average	5.93	29.09	0.62

Signature

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 29, 2025 Run # : 2
 Start time: 10:51 AM Location : H-3707
 O₂ instrument Model: AMI 70 Finish time : 11:11 AM
 NO_x instrument Model: API 200 AH Serial No.: 161212-13
 SO₂ instrument Model: API 100 AH Serial No.: 314
 Fuel Type : Fuel Gas Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
10:51 AM	6.53	29.51	0.62
10:52 AM	6.28	30.79	0.62
10:53 AM	6.25	29.51	0.62
10:54 AM	6.37	30.40	0.61
10:55 AM	6.47	29.67	0.61
10:56 AM	6.59	26.84	0.62
10:57 AM	6.42	29.65	0.61
10:58 AM	6.20	29.03	0.80
10:59 AM	5.91	30.11	0.81
11:00 AM	5.90	29.12	0.81
11:01 AM	6.13	28.14	0.81
11:02 AM	6.15	29.61	0.81
11:03 AM	6.17	28.95	0.81
11:04 AM	6.36	28.35	0.81
11:05 AM	6.33	27.86	0.81
11:06 AM	6.18	27.56	0.82
11:07 AM	6.17	26.27	0.82
11:08 AM	6.06	29.42	0.82
11:09 AM	6.06	28.11	0.82
11:10 AM	6.14	28.72	0.82
11:11 AM	6.16	26.78	0.82
Average	6.23	28.78	0.75

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 29, 2025 Run # : 3
 Start time: 11:12 AM Location : H-3707
 O₂ instrument Model: AMI 70 Finish time : 11:32 AM
 NO_x instrument Model: API 200 AH Serial No.: 161212-13
 SO₂ instrument Model: API 100 AH Serial No.: 314
 Fuel Type : Fuel Gas Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
11:12 AM	6.02	28.36	0.82
11:13 AM	6.03	27.89	0.83
11:14 AM	5.89	27.20	0.83
11:15 AM	5.79	27.00	0.83
11:16 AM	5.65	27.24	0.83
11:17 AM	5.71	27.66	0.83
11:18 AM	5.63	28.18	0.83
11:19 AM	5.78	29.52	0.83
11:20 AM	5.73	29.36	0.83
11:21 AM	5.90	28.69	0.83
11:22 AM	5.89	27.97	0.83
11:23 AM	6.06	27.54	0.83
11:24 AM	6.05	29.00	0.83
11:25 AM	6.02	28.90	0.83
11:26 AM	5.97	28.04	0.83
11:27 AM	5.89	27.46	0.83
11:28 AM	6.12	28.53	0.83
11:29 AM	6.09	25.58	0.83
11:30 AM	6.08	28.46	0.83
11:31 AM	6.07	28.40	0.83
11:32 AM	5.98	27.73	0.84
Average	5.92	28.03	0.83

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist



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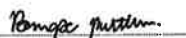
TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 02.50-04.12 p.m.
RECEIVED DATE : 01/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 10/09/2025 OPERATOR : Mr. Song Hengchwankul (7-239-0-0016)
STACK LOCATION : H-3708 FUEL TYPE : Natural Gas / Fuel Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height	: 35.0	m	Flow Rate*	: 7,095	Ncu.m/min
Diameter	: 3.26	m	Excess Oxygen	: 14.3	%
Temperature	: 160.4	°C	Moisture Content	: 12.5	%
Gas Velocity	: 23.7	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE METHODS
		14.3%O ₂	7%O ₂	7%O ₂	
Particulate Matter	mg/Ncu.m.	2.11	4.42	60	US, EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO. 7-239-0-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-0-0010

Remark : 1. Reported analysis refers to submitted sample only.

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3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 02.50-04.12 p.m.
RECEIVED DATE : 02/09/2025 ANALYTICAL DATE : 05-30/09/2025
REPORT DATE : 02/10/2025 OPERATOR : Mr. Song Hengchwankul (7-239-0-0016)
STACK LOCATION : H-3708 FUEL TYPE : Natural Gas / Fuel Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height	: 35.0	m	Flow Rate*	: 7,095	Ncu.m/min
Diameter	: 3.26	m	Excess Oxygen	: 14.3	%
Temperature	: 160.4	°C	Moisture Content	: 12.5	%
Gas Velocity	: 23.7	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.3%O ₂	7%O ₂	14.3%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.08	0.17	0.22	0.46	20/20/20	52/52/52	0.026	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	6.59	13.82	12.39	25.97	120/120/18	226/226/33	1.465	2.44	US.EPA Method 7E



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 7-239-0-0006



(Miss Preeda Sonjai)

Technical Management Team

REG.NO. 7-239-0-0006

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4. ^{1/} Notification of the Ministry of Industry, B.E.2567 (2024).

5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3708**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 27, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.34	14.27	6.68	6.64	13.92
2	14.31	14.25	6.64	6.61	13.82
3	14.35	14.29	6.54	6.52	13.71
Average	14.33	14.27	6.62	6.59	13.82

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.34	14.27	0.17	0.10	0.21
2	14.31	14.25	0.15	0.08	0.17
3	14.35	14.29	0.14	0.07	0.15
Average	14.33	14.27	0.15	0.08	0.17

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 27, 2025

Start time: 3:10 PM

O₂ instrument Model: AMI 70

NO_x instrument Model: API 200 AH

SO₂ instrument Model: API 100 AH

Fuel Type : Natural Gas / Fuel Gas

Run # : 1

Location : H-3708

Finish time : 3:30 PM

Serial No.: 161212-13

Serial No.: 314

Serial No.: 058

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:10 PM	14.29	6.43	0.15
3:11 PM	14.39	6.45	0.15
3:12 PM	14.28	6.74	0.15
3:13 PM	14.27	6.67	0.15
3:14 PM	14.29	6.57	0.15
3:15 PM	14.29	6.74	0.15
3:16 PM	14.29	6.53	0.15
3:17 PM	14.29	6.38	0.15
3:18 PM	14.33	6.56	0.15
3:19 PM	14.35	6.68	0.15
3:20 PM	14.35	6.61	0.15
3:21 PM	14.35	6.64	0.16
3:22 PM	14.37	6.65	0.16
3:23 PM	14.35	6.53	0.16
3:24 PM	14.40	6.96	0.17
3:25 PM	14.41	7.02	0.35
3:26 PM	14.27	6.99	0.27
3:27 PM	14.40	6.81	0.15
3:28 PM	14.36	6.81	0.15
3:29 PM	14.31	6.69	0.15
3:30 PM	14.41	6.87	0.15
Average	14.34	6.68	0.17

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025
 Start time: 3:31 PM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: API 200 AH
 SO₂ instrument Model: API 100 AH
 Fuel Type: Natural Gas / Fuel Gas

Run # : 2
 Location : H-3708
 Finish time : 3:51 PM
 Serial No.: 161212-13
 Serial No.: 314
 Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:31 PM	14.31	6.83	0.15
3:32 PM	14.31	6.91	0.15
3:33 PM	14.32	6.87	0.15
3:34 PM	14.28	6.83	0.15
3:35 PM	14.28	6.86	0.15
3:36 PM	14.29	6.73	0.15
3:37 PM	14.28	6.99	0.15
3:38 PM	14.33	6.85	0.15
3:39 PM	14.32	6.57	0.15
3:40 PM	14.24	6.53	0.15
3:41 PM	14.32	6.51	0.15
3:42 PM	14.21	6.39	0.15
3:43 PM	14.32	6.21	0.15
3:44 PM	14.23	6.61	0.15
3:45 PM	14.22	6.70	0.15
3:46 PM	14.28	6.66	0.15
3:47 PM	14.40	6.42	0.15
3:48 PM	14.44	6.32	0.15
3:49 PM	14.35	6.48	0.15
3:50 PM	14.35	6.75	0.15
3:51 PM	14.35	6.38	0.14
Average	14.31	6.64	0.15

Signature 

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025
 Start time: 3:52 PM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: API 200 AH
 SO₂ instrument Model: API 100 AH
 Fuel Type: Natural Gas / Fuel Gas

Run # : 3
 Location : H-3708
 Finish time : 4:12 PM
 Serial No.: 161212-13
 Serial No.: 314
 Serial No.: 058
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:52 PM	14.35	6.67	0.14
3:53 PM	14.35	6.58	0.15
3:54 PM	14.35	6.74	0.15
3:55 PM	14.35	6.54	0.15
3:56 PM	14.35	6.55	0.15
3:57 PM	14.35	6.62	0.15
3:58 PM	14.35	6.42	0.15
3:59 PM	14.35	6.47	0.14
4:00 PM	14.35	6.68	0.15
4:01 PM	14.35	6.58	0.14
4:02 PM	14.35	6.36	0.14
4:03 PM	14.35	6.55	0.14
4:04 PM	14.35	6.48	0.14
4:05 PM	14.35	6.45	0.14
4:06 PM	14.35	6.61	0.14
4:07 PM	14.35	6.56	0.14
4:08 PM	14.35	6.46	0.14
4:09 PM	14.35	6.76	0.14
4:10 PM	14.35	6.50	0.14
4:11 PM	14.35	6.42	0.14
4:12 PM	14.34	6.33	0.14
Average	14.35	6.54	0.14

Signature 

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist



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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 02.50-04.12 p.m.
RECEIVED DATE : 01/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 10/09/2025 OPERATOR : Mr. Song Hengchwankul (7-239-0-0016)
STACK LOCATION : H-3709 FUEL TYPE : Natural Gas / Fuel Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height : 35.0 m Flow Rate* : 5,642 Ncu.m/min
Diameter : 3.26 m Excess Oxygen : 14.8 %
Temperature : 171.1 °C Moisture Content : 12.5 %
Gas Velocity : 19.3 m/s

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE METHODS
		14.8%O ₂	7%O ₂	7%O ₂	
Particulate Matter	mg/Ncu.m.	2.20	5.00	60	US, EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO. 7-239-0-0018

(Miss Narisa Poowasanetch)

Technical Management Team

REG.NO. 7-239-0-0010

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 02.50-04.12 p.m.
RECEIVED DATE : 02/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 06/09/2025 OPERATOR : Mr. Song Hengchwankul (7-239-0-0016)
STACK LOCATION : H-3709 FUEL TYPE : Natural Gas / Fuel Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height : 35.0 m Flow Rate* : 5,642 Ncu.m/min
Diameter : 3.26 m Excess Oxygen : 14.8 %
Temperature : 171.1 °C Moisture Content : 12.5 %
Gas Velocity : 19.3 m/s

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.8%O ₂	7%O ₂	14.8%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.11	0.24	0.29	0.63	20/20/20	52/52/52	0.027	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	7.17	16.29	13.47	30.62	120/120/18	226/226/33	1.267	2.44	US.EPA Method 7E

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 7-239-0-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. 7-239-0-0006

Remark : 1. Reported analysis refers to submitted sample only.

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5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3709**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 27, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.80	14.77	7.12	7.10	16.10
2	14.80	14.79	7.28	7.26	16.52
3	14.78	14.79	7.17	7.14	16.24
Average	14.79	14.78	7.19	7.17	16.29

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.80	14.77	0.08	0.08	0.18
2	14.80	14.79	0.14	0.14	0.32
3	14.78	14.79	0.10	0.10	0.23
Average	14.79	14.78	0.11	0.11	0.24

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 27, 2025

Start time: 3:10 PM

O₂ instrument Model: AMI 70

NO_x instrument Model: TELEDYNE 200 EM

SO₂ instrument Model: TELEDYNE 100 EH

Fuel Type : Natural Gas / Fuel Gas

Run # : 1

Location : H-3709

Finish time : 3:30 PM

Serial No.: 071023-47

Serial No.: 435

Serial No.: 186

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:10 PM	14.79	6.84	0.12
3:11 PM	14.81	7.02	0.09
3:12 PM	14.81	7.17	0.09
3:13 PM	14.81	6.69	0.08
3:14 PM	14.78	7.22	0.10
3:15 PM	14.81	7.16	0.11
3:16 PM	14.82	7.01	0.11
3:17 PM	14.82	6.97	0.11
3:18 PM	14.78	6.93	0.11
3:19 PM	14.80	7.04	0.10
3:20 PM	14.80	7.00	0.09
3:21 PM	14.80	6.94	0.08
3:22 PM	14.80	7.05	0.08
3:23 PM	14.78	7.11	0.07
3:24 PM	14.81	7.33	0.06
3:25 PM	14.78	7.32	0.05
3:26 PM	14.81	7.30	0.05
3:27 PM	14.79	7.27	0.05
3:28 PM	14.81	7.39	0.02
3:29 PM	14.80	7.42	0.05
3:30 PM	14.81	7.32	0.06
Average	14.80	7.12	0.08

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025 Run #: 2
 Start time: 3:31 PM Location: H-3709
 O₂ instrument Model: AMI 70 Finish time: 3:51 PM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type: Natural Gas / Fuel Gas Serial No.: 186
 Test Operator: Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:31 PM	14.78	7.13	0.06
3:32 PM	14.78	7.20	0.06
3:33 PM	14.80	7.29	0.07
3:34 PM	14.81	7.24	0.09
3:35 PM	14.79	7.21	0.10
3:36 PM	14.79	7.22	0.12
3:37 PM	14.81	7.29	0.09
3:38 PM	14.79	7.15	0.12
3:39 PM	14.78	7.11	0.12
3:40 PM	14.81	7.33	0.14
3:41 PM	14.80	7.39	0.15
3:42 PM	14.79	7.28	0.14
3:43 PM	14.81	7.25	0.14
3:44 PM	14.80	7.20	0.16
3:45 PM	14.80	7.24	0.17
3:46 PM	14.78	7.09	0.19
3:47 PM	14.80	7.49	0.18
3:48 PM	14.81	7.51	0.19
3:49 PM	14.80	7.40	0.20
3:50 PM	14.80	7.42	0.20
3:51 PM	14.81	7.47	0.23
Average	14.80	7.28	0.14

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025 Run #: 3
 Start time: 3:52 PM Location: H-3709
 O₂ instrument Model: AMI 70 Finish time: 4:12 PM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 071023-47
 SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 435
 Fuel Type: Natural Gas / Fuel Gas Serial No.: 186
 Test Operator: Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:52 PM	14.77	7.45	0.23
3:53 PM	14.81	7.56	0.23
3:54 PM	14.80	7.63	0.23
3:55 PM	14.79	7.57	0.23
3:56 PM	14.81	7.71	0.24
3:57 PM	14.78	7.82	0.26
3:58 PM	14.80	7.78	0.05
3:59 PM	14.80	7.65	0.06
4:00 PM	14.81	7.86	0.06
4:01 PM	14.80	7.74	0.06
4:02 PM	14.80	7.89	0.07
4:03 PM	14.80	7.33	0.06
4:04 PM	14.78	6.91	0.05
4:05 PM	14.79	6.38	0.04
4:06 PM	14.76	6.88	0.04
4:07 PM	14.76	6.72	0.03
4:08 PM	14.77	6.49	0.04
4:09 PM	14.76	6.41	0.04
4:10 PM	14.77	6.38	0.03
4:11 PM	14.74	6.23	0.03
4:12 PM	14.78	6.24	0.04
Average	14.78	7.17	0.10

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 2-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 10.50 a.m.-00.32 p.m.
RECEIVED DATE : 01/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 10/09/2025 OPERATOR : Mr. Kittipong Thakoengsuk (2-239-ท-0024)
STACK LOCATION : H-3710 FUEL TYPE : Natural Gas / Fuel Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height	: 35.0	m	Flow Rate*	: 8,029	Ncu.m/min
Diameter	: 3.26	m	Excess Oxygen	: 14.1	%
Temperature	: 185.3	°C	Moisture Content	: 12.5	%
Gas Velocity	: 28.4	m/s			

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE METHODS
		14.1%O ₂	7%O ₂	7%O ₂	
Particulate Matter	mg/Ncu.m.	1.86	3.82	60	US. EPA Method 5


(Miss Pornnapa Budthum)
Analyst
REG.NO. 2-239-ท-0018


(Miss Narisa Poowasanpetch)
Technical Management Team
REG.NO. 2-239-ท-0010

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 2-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 10.50 a.m.-00.32 p.m.
RECEIVED DATE : 02/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 06/09/2025 OPERATOR : Mr. Kittipong Thakoengsuk (2-239-ท-0024)
STACK LOCATION : H-3710 FUEL TYPE : Natural Gas / Fuel Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height	: 35.0	m	Flow Rate*	: 8,029	Ncu.m/min
Diameter	: 3.26	m	Excess Oxygen	: 14.1	%
Temperature	: 185.3	°C	Moisture Content	: 12.5	%
Gas Velocity	: 28.4	m/s			

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.1%O ₂	7%O ₂	14.1%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	0.93	1.91	2.45	5.02	20/20/20	52/52/52	0.327		US.EPA Method 6C
Oxide of Nitrogen (NOx)	7.82	16.05	14.71	30.17	120/120/18	226/226/33	1.968	2.44	US.EPA Method 7E


(Miss Katesarin Vorradetwittaya)
Environmental Scientist
REG.NO. 2-239-ท-0006


(Miss Preeda Somjai)
Technical Management Team
REG.NO. 2-239-ท-0006

Remark : 1. Reported analysis refers to submitted sample only.

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4. ^{1/} Notification of the Ministry of Industry, B.E.2567 (2024).

5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

The Monitoring Result of Emission Concentration
H-3710
PTT Global Chemical Public Co., Ltd.
(Branch 2 : Power Plant I-1)
August 27, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.14	14.08	7.76	7.71	15.71
2	14.23	14.15	8.10	8.05	16.58
3	14.23	14.14	7.71	7.71	15.85
Average	14.20	14.12	7.86	7.82	16.05

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.14	14.08	1.55	1.51	3.08
2	14.23	14.15	0.57	0.50	1.03
3	14.23	14.14	0.86	0.79	1.62
Average	14.20	14.12	0.99	0.93	1.91

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025
 Start time: 11:30 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: TELEDYNE 200 EM
 SO₂ instrument Model: API 100 AH
 Fuel Type : Natural Gas / Fuel Gas

Run # : 1
 Location : H-3710
 Finish time : 11:50 AM
 Serial No.: 161212-14
 Serial No.: 433
 Serial No.: 118
 Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
11:30 AM	14.12	7.14	0.59
11:31 AM	14.12	7.36	0.61
11:32 AM	14.12	7.39	0.67
11:33 AM	14.12	7.59	0.79
11:34 AM	14.12	7.78	1.07
11:35 AM	14.12	7.72	1.57
11:36 AM	14.12	7.69	2.11
11:37 AM	14.13	7.79	2.59
11:38 AM	14.13	7.83	2.88
11:39 AM	14.13	7.60	2.75
11:40 AM	14.13	7.47	2.57
11:41 AM	14.13	7.57	2.40
11:42 AM	14.13	7.85	2.16
11:43 AM	14.13	7.98	1.96
11:44 AM	14.13	7.87	1.69
11:45 AM	14.13	7.84	1.35
11:46 AM	14.14	8.01	1.16
11:47 AM	14.15	8.21	0.96
11:48 AM	14.17	8.14	0.84
11:49 AM	14.18	8.01	0.86
11:50 AM	14.23	8.14	0.89
Average	14.14	7.76	1.55

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025
 Start time: 11:51 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: TELEDYNE 200 EM
 SO₂ instrument Model: API 100 AH
 Fuel Type : Natural Gas / Fuel Gas

Run # : 2
 Location : H-3710
 Finish time : 12:11 PM
 Serial No.: 161212-14
 Serial No.: 433
 Serial No.: 118
 Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
11:51 AM	14.23	8.18	0.82
11:52 AM	14.23	8.05	0.69
11:53 AM	14.23	8.09	0.59
11:54 AM	14.23	8.27	0.53
11:55 AM	14.23	8.39	0.51
11:56 AM	14.23	8.23	0.49
11:57 AM	14.23	8.13	0.49
11:58 AM	14.23	8.19	0.50
11:59 AM	14.23	8.16	0.47
12:00 PM	14.23	8.03	0.48
12:01 PM	14.23	7.93	0.49
12:02 PM	14.23	7.99	0.54
12:03 PM	14.22	8.06	0.55
12:04 PM	14.22	8.12	0.55
12:05 PM	14.22	8.17	0.53
12:06 PM	14.22	8.09	0.52
12:07 PM	14.22	8.08	0.57
12:08 PM	14.22	8.04	0.61
12:09 PM	14.22	7.95	0.66
12:10 PM	14.22	7.94	0.64
12:11 PM	14.22	8.08	0.72
Average	14.23	8.10	0.57

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025
 Start time: 12:12 PM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: TELEDYNE 200 EM
 SO₂ instrument Model: API 100 AH
 Fuel Type : Natural Gas / Fuel Gas

Run # : 3
 Location : H-3710
 Finish time : 12:32 PM
 Serial No.: 161212-14
 Serial No.: 433
 Serial No.: 118
 Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
12:12 PM	14.22	8.14	0.77
12:13 PM	14.22	7.95	0.83
12:14 PM	14.22	7.85	0.85
12:15 PM	14.22	7.94	0.95
12:16 PM	14.22	8.04	1.03
12:17 PM	14.15	7.90	1.04
12:18 PM	14.19	7.83	1.08
12:19 PM	14.21	7.89	1.03
12:20 PM	14.19	7.81	1.02
12:21 PM	14.23	7.82	1.07
12:22 PM	14.14	7.86	0.94
12:23 PM	14.24	7.82	0.91
12:24 PM	14.24	7.72	0.86
12:25 PM	14.26	7.63	0.77
12:26 PM	14.27	7.48	0.78
12:27 PM	14.27	7.42	0.70
12:28 PM	14.27	7.39	0.67
12:29 PM	14.26	7.37	0.68
12:30 PM	14.24	7.37	0.68
12:31 PM	14.26	7.34	0.67
12:32 PM	14.27	7.32	0.63
Average	14.23	7.71	0.86

Signature 
 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800
239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND
TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 00.20-04.02 p.m.
RECEIVED DATE : 01/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 10/09/2025 OPERATOR : Mr. Kittipong Thakoengsuk (7-239-0-0024)
STACK LOCATION : H-3711 FUEL TYPE : Natural Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height : 35.0 m Flow Rate* : 7,321 Ncu.m/min
Diameter : 3.26 m Excess Oxygen : 13.0 %
Temperature : 136.4 °C Moisture Content : 11.7 %
Gas Velocity : 22.9 m/s

PARAMETER	UNITS	RESULTS*		STANDARDS ^{1/}	REFERENCE METHODS
		13.0%O ₂	7%O ₂	7%O ₂	
Particulate Matter	mg/Ncu.m.	2.15	3.78	60	US. EPA Method 5


(Miss Pornnapa Budthum)

Analyst

REG.NO. 7-239-0-0018


(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-0-0010

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 and the Ministry of Natural Resources and Environment, B.E.2566.



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800
239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND
TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-CEMS-2508-0073
Branch 2, Power Plant
SAMPLING BY : SECOT Co., Ltd. REGISTRATION NO. : 7-239
SAMPLING DATE : 27/08/2025 SAMPLING TIME : 00.20-04.02 p.m.
RECEIVED DATE : 02/09/2025 ANALYTICAL DATE : 05-06/09/2025
REPORT DATE : 06/09/2025 OPERATOR : Mr. Kittipong Thakoengsuk (7-239-0-0024)
STACK LOCATION : H-3711 FUEL TYPE : Natural Gas
SOURCE DESCRIPTION : Combustion SAMPLE CONDITION : Normal
STACK DESCRIPTION

Height : 35.0 m Flow Rate* : 7,321 Ncu.m/min
Diameter : 3.26 m Excess Oxygen : 13.0 %
Temperature : 136.4 °C Moisture Content : 11.7 %
Gas Velocity : 22.9 m/s

PARAMETER	RESULT*				STANDARD ^{1/2/} / EIA ^{3/}		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	13.0%O ₂	7%O ₂	13.0%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ^{3/}	
Sulfur Dioxide (SO ₂)	1.04	1.82	2.72	4.76	20/20/20	52/52/52	0.331	-	US.EPA Method 6C
Oxide of Nitrogen (NOx)	2.49	4.37	4.68	8.21	120/120/14	226/226/26	0.571	2.44	US.EPA Method 7E


(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. 7-239-0-0006


(Miss Preeda Somjai)

Technical Management Team

REG.NO. 7-239-0-0006

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ^{1/} Notification of the Ministry of Industry, B.E.2567 (2024).

5. ^{2/} Notification of the Ministry of Natural Resources and Environment, B.E.2566 (2023).

6. ^{3/} The assigned value is specified in EIA report, B.E.2561 (2018).

**The Monitoring Result of Emission Concentration
H-3711**

PTT Global Chemical Public Co., Ltd.

(Branch 2 : Power Plant I-1)

August 27, 2025

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	13.17	13.07	3.14	3.09	5.49
2	13.07	12.97	2.27	2.21	3.87
3	12.99	12.89	2.23	2.17	3.77
Average	13.08	12.98	2.55	2.49	4.37

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	13.17	13.07	1.10	1.03	1.83
2	13.07	12.97	1.11	1.04	1.82
3	12.99	12.89	1.11	1.04	1.80
Average	13.08	12.98	1.11	1.04	1.82

**PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT**

Date: August 27, 2025

Start time: 3:00 PM

O₂ instrument Model: AMI 70

NO_x instrument Model: TELEDYNE 200 EM

SO₂ instrument Model: API 100 AH

Fuel Type : Natural Gas

Run # : 1

Location : H-3711

Finish time : 3:20 PM

Serial No.: 141212-14


Serial No.: 433

Serial No.: 118

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:00 PM	13.28	5.56	1.12
3:01 PM	13.28	4.78	1.10
3:02 PM	13.26	4.27	1.13
3:03 PM	13.21	4.12	1.15
3:04 PM	13.19	3.92	1.13
3:05 PM	13.19	3.69	1.10
3:06 PM	13.18	3.40	1.09
3:07 PM	13.18	3.14	1.09
3:08 PM	13.18	2.98	1.13
3:09 PM	13.18	2.86	1.08
3:10 PM	13.18	2.73	1.08
3:11 PM	13.21	2.62	1.11
3:12 PM	13.18	2.56	1.13
3:13 PM	13.18	2.51	1.13
3:14 PM	13.18	2.44	1.09
3:15 PM	13.18	2.41	1.09
3:16 PM	13.10	2.39	1.09
3:17 PM	13.08	2.42	1.06
3:18 PM	13.08	2.44	1.05
3:19 PM	13.08	2.41	1.07
3:20 PM	13.08	2.36	1.08
Average	13.17	3.14	1.10

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025 Run # : 2
 Start time: 3:21 PM Location : H-3711
 O₂ instrument Model: AMI 70 Finish time : 3:41 PM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 141212-14
 SO₂ instrument Model: API 100 AH Serial No.: 433
 Fuel Type : Natural Gas Serial No.: 118
 Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:21 PM	13.09	2.33	1.12
3:22 PM	13.18	2.27	1.13
3:23 PM	13.18	2.22	1.14
3:24 PM	13.18	2.20	1.09
3:25 PM	13.17	2.23	1.09
3:26 PM	13.10	2.24	1.05
3:27 PM	12.99	2.27	1.12
3:28 PM	12.95	2.29	1.09
3:29 PM	12.91	2.35	1.09
3:30 PM	12.95	2.39	1.09
3:31 PM	13.01	2.36	1.12
3:32 PM	13.07	2.34	1.09
3:33 PM	13.08	2.30	1.12
3:34 PM	13.08	2.28	1.09
3:35 PM	13.13	2.23	1.09
3:36 PM	13.08	2.22	1.12
3:37 PM	13.08	2.24	1.09
3:38 PM	13.08	2.23	1.13
3:39 PM	13.08	2.22	1.15
3:40 PM	13.08	2.20	1.15
3:41 PM	13.08	2.25	1.09
Average	13.07	2.27	1.11

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

PTT Global Chemical Public Co., Ltd. (Branch 2 : Power Plant I-1)
EMISSION TEST RESULT

Date: August 27, 2025 Run # : 3
 Start time: 3:42 PM Location : H-3711
 O₂ instrument Model: AMI 70 Finish time : 4:02 PM
 NO_x instrument Model: TELEDYNE 200 EM Serial No.: 141212-14
 SO₂ instrument Model: API 100 AH Serial No.: 433
 Fuel Type : Natural Gas Serial No.: 118
 Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)
3:42 PM	13.08	2.25	1.08
3:43 PM	13.08	2.23	1.10
3:44 PM	13.08	2.22	1.08
3:45 PM	13.08	2.20	1.05
3:46 PM	13.00	2.19	1.08
3:47 PM	12.97	2.22	1.08
3:48 PM	12.96	2.24	1.07
3:49 PM	12.93	2.27	1.12
3:50 PM	12.91	2.30	1.09
3:51 PM	12.95	2.32	1.11
3:52 PM	12.97	2.31	1.09
3:53 PM	12.97	2.27	1.09
3:54 PM	12.97	2.23	1.13
3:55 PM	12.97	2.24	1.15
3:56 PM	12.97	2.22	1.13
3:57 PM	12.97	2.21	1.13
3:58 PM	12.98	2.21	1.14
3:59 PM	12.97	2.18	1.14
4:00 PM	12.97	2.17	1.14
4:01 PM	12.97	2.20	1.15
4:02 PM	12.97	2.18	1.18
Average	12.99	2.23	1.11

Signature



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

ภาคผนวก ง.2

ใบรับรองผลการตรวจวิเคราะห์คุณภาพอากาศในบรรยากาศ

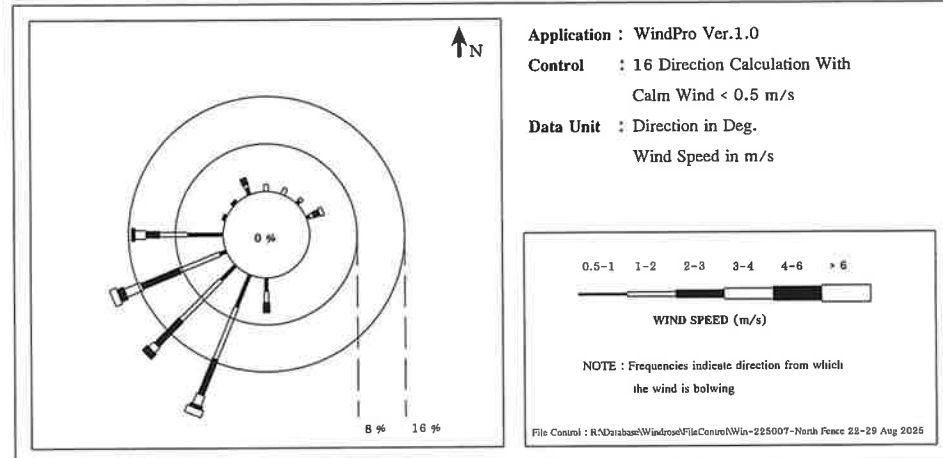


Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : North Fence Monitor period : 22-29 Aug 2025
 Wind Speed Model : Novalynx WS-25 Serial No : A5088
 Wind Direction Model : Novalynx WS-25 Serial No : A5088

Direction	Percentage of Occurrence of Wind Direct Grouped in Various Wind Speed						Total
	0.5-1 m/s	1-2 m/s	2-3 m/s	3-4 m/s	4-6 m/s	More than 6	
N	0.0000	0.0119	0.0000	0.0000	0.0000	0.0000	0.0119
NNE	0.0000	0.0119	0.0000	0.0000	0.0000	0.0000	0.0119
NE	0.0060	0.0060	0.0000	0.0000	0.0000	0.0000	0.0119
ENE	0.0060	0.0060	0.0119	0.0060	0.0000	0.0000	0.0298
E	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ESE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SSE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S	0.0238	0.0179	0.0179	0.0000	0.0000	0.0000	0.0595
SSW	0.0595	0.0952	0.0655	0.0179	0.0060	0.0119	0.2560
SW	0.0357	0.0952	0.0595	0.0119	0.0119	0.0000	0.2143
WSW	0.0119	0.0714	0.0714	0.0298	0.0119	0.0119	0.2083
W	0.0595	0.0476	0.0238	0.0179	0.0060	0.0000	0.1548
WNW	0.0000	0.0000	0.0060	0.0000	0.0000	0.0000	0.0060
NW	0.0000	0.0000	0.0060	0.0000	0.0000	0.0000	0.0060
NNW	0.0119	0.0060	0.0119	0.0000	0.0000	0.0000	0.0298
CALM	0.0000						



(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Preeda Somjai)
 Technical Management Team

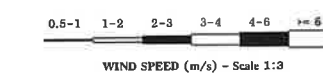


Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : North Fence Monitor period : 22-29 Aug 2025
 Wind Speed Model : Novalynx WS-25 Serial No : A5088
 Wind Direction Model : Novalynx WS-25 Serial No : A5088

Time	22-23 Aug 2025		23-24 Aug 2025		24-25 Aug 2025		25-26 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
10:00 - 11:00	4.2	WSW	3.0	SSW	2.2	WSW	1.1	SSW
11:00 - 12:00	1.3	SW	3.6	WSW	1.8	WSW	1.5	S
12:00 - 13:00	2.5	W	1.3	SSW	5.0	WSW	2.8	SW
13:00 - 14:00	1.0	WSW	2.0	SSW	1.9	SW	0.7	SW
14:00 - 15:00	2.0	SW	0.8	W	2.4	SW	3.7	WSW
15:00 - 16:00	2.8	SW	0.8	SSW	3.0	W	2.2	WSW
16:00 - 17:00	2.2	W	2.3	WSW	1.4	WSW	2.4	WSW
17:00 - 18:00	2.3	SSW	2.8	SW	2.0	SSW	1.3	SSW
18:00 - 19:00	2.5	WSW	2.4	SW	1.3	SW	2.7	WSW
19:00 - 20:00	0.7	SW	2.0	SSW	1.3	SSW	0.9	S
20:00 - 21:00	2.3	SW	2.3	SSW	2.4	S	1.8	W
21:00 - 22:00	0.8	W	1.9	W	1.3	SSW	3.8	W
22:00 - 23:00	2.2	NNW	0.8	NNW	1.0	SSW	1.3	WSW
23:00 - 24:00	0.9	NE	2.6	ENE	1.5	SW	1.0	SW
00:00 - 01:00	2.2	ENE	0.7	SSW	0.9	W	1.1	WSW
01:00 - 02:00	1.4	NNE	0.5	W	1.4	N	0.7	W
02:00 - 03:00	3.0	ENE	1.6	SW	0.5	WSW	1.4	WSW
03:00 - 04:00	0.8	W	0.9	SSW	2.3	W	1.7	SW
04:00 - 05:00	2.4	WNW	2.6	SW	1.4	SSW	2.3	SSW
05:00 - 06:00	0.7	ENE	1.1	SSW	1.0	NNW	3.0	WSW
06:00 - 07:00	1.8	ENE	1.5	SW	1.0	W	4.0	SW
07:00 - 08:00	1.3	NE	2.9	SW	2.6	S	2.1	SSW
08:00 - 09:00	1.9	NNE	1.1	SW	1.8	SW	1.2	SSW
09:00 - 10:00	1.4	SSW	2.3	WSW	1.1	SSW	5.2	SSW



File Control : R:\Database\Windrose\Win-225007-North Fence 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Preeda Somjai)
 Technical Management Team



Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : North Fence

Monitor period : 22-29 Aug 2025

Wind Speed Model : Novalynx WS-25

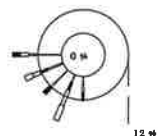
Serial No : A5088

Wind Direction Model : Novalynx WS-25

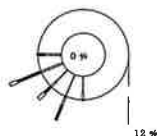
Serial No : A5088

Time	26-27 Aug 2025		27-28 Aug 2025		28-29 Aug 2025		
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD	
10:00 - 11:00	6.1	WSW	2.9	WSW	1.2	SSW	
11:00 - 12:00	0.7	W	1.3	W	0.7	WSW	
12:00 - 13:00	0.9	SSW	2.2	WSW	1.7	SW	
13:00 - 14:00	6.1	SSW	2.9	SSW	1.0	SW	
14:00 - 15:00	0.5	SW	0.7	S	1.2	WSW	
15:00 - 16:00	3.3	SSW	1.3	WSW	0.8	SSW	
16:00 - 17:00	7.0	SSW	1.6	SW	6.5	WSW	
17:00 - 18:00	3.0	WSW	0.6	SSW	1.3	SW	
18:00 - 19:00	0.5	W	1.7	SSW	2.5	SSW	
19:00 - 20:00	2.0	WSW	0.9	SSW	1.5	SSW	
20:00 - 21:00	1.1	SW	1.0	W	1.9	SSW	
21:00 - 22:00	2.5	S	0.7	SSW	1.2	W	
22:00 - 23:00	0.8	SW	2.3	W	1.1	W	
23:00 - 24:00	3.0	SSW	0.6	S	1.0	N	
00:00 - 01:00	2.2	SSW	3.1	WSW	0.8	W	
01:00 - 02:00	0.8	S	1.5	WSW	1.2	SW	
02:00 - 03:00	4.1	SW	2.4	SSW	0.5	SSW	
03:00 - 04:00	1.8	W	1.8	WSW	0.9	NNW	
04:00 - 05:00	4.9	W	0.8	SW	2.1	NW	
05:00 - 06:00	1.9	WSW	3.1	SW	2.1	NNW	
06:00 - 07:00	3.6	W	1.2	S	0.9	SSW	
07:00 - 08:00	1.0	WSW	0.7	SW	3.0	SW	
08:00 - 09:00	0.6	W	2.6	WSW	1.8	SSW	
09:00 - 10:00	1.3	S	2.6	SW	2.8	WSW	

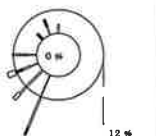
Wind Rose



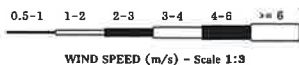
12 %



12 %



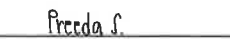
12 %



WIND SPEED (m/s) - Scale 1:3

File Control : R:\Database\Windrose\Win-225007-North Fence 22-29 Aug 2025


(Miss Katesarin Vorradetwittaya)
Environmental Scientist


(Miss Preeda Somjai)
Technical Management Team



Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : South Fence

Monitor period : 22-29 Aug 2025

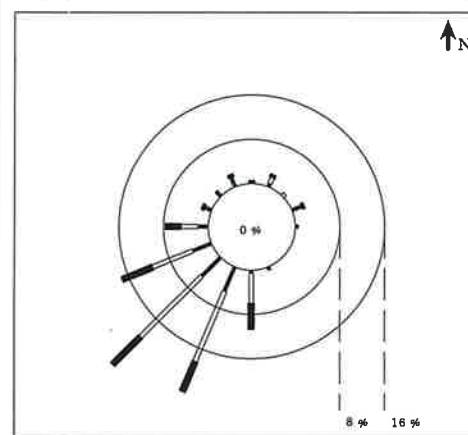
Wind Speed Model : Novalynx WS-25

Serial No : A5091

Wind Direction Model : Novalynx WS-25

Serial No : A5091

Direction	Percentage of Occurrence of Wind Direct Grouped in Various Wind Speed						
	0.5-1 m/s	1-2 m/s	2-3 m/s	3-4 m/s	4-6 m/s	More than 6	Total
N	0.0000	0.0000	0.0060	0.0000	0.0000	0.0000	0.0060
NNE	0.0060	0.0119	0.0060	0.0000	0.0000	0.0000	0.0238
NE	0.0000	0.0060	0.0000	0.0000	0.0000	0.0000	0.0060
ENE	0.0179	0.0000	0.0060	0.0000	0.0000	0.0000	0.0238
E	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0060
ESE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SSE	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0060
S	0.0060	0.0536	0.0476	0.0000	0.0000	0.0000	0.1071
SSW	0.0476	0.1369	0.0595	0.0000	0.0000	0.0000	0.2440
SW	0.0476	0.1548	0.0714	0.0000	0.0000	0.0000	0.2738
WSW	0.0357	0.0774	0.0595	0.0000	0.0000	0.0000	0.1726
W	0.0179	0.0298	0.0298	0.0000	0.0000	0.0000	0.0774
WNW	0.0119	0.0000	0.0060	0.0000	0.0000	0.0000	0.0179
NW	0.0119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0119
NNW	0.0179	0.0000	0.0060	0.0000	0.0000	0.0000	0.0238
CALM	0.0000						



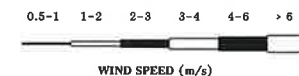
Application : WindPro Ver.1.0

Control : 16 Direction Calculation With

Calm Wind < 0.5 m/s

Data Unit : Direction in Deg.

Wind Speed in m/s

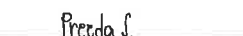


WIND SPEED (m/s)

NOTE : Frequencies indicate direction from which
the wind is blowing

File Control : R:\Database\Windrose\Win-225007-South Fence 22-29 Aug 2025


(Miss Katesarin Vorradetwittaya)
Environmental Scientist


(Miss Preeda Somjai)
Technical Management Team



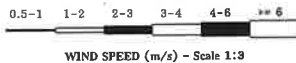
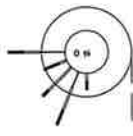
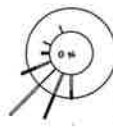
Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : South Fence Monitor period : 22-29 Aug 2025
 Wind Speed Model : Novalynx WS-25 Serial No : A5091
 Wind Direction Model : Novalynx WS-25 Serial No : A5091

Time	22-23 Aug 2025		23-24 Aug 2025		24-25 Aug 2025		25-26 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
10:00 - 11:00	2.2	WSW	0.8	SSW	2.0	WSW	0.7	W
11:00 - 12:00	2.4	S	2.4	S	1.7	SW	2.2	WSW
12:00 - 13:00	1.0	SSW	1.5	SSW	1.0	S	1.2	SW
13:00 - 14:00	1.8	SSW	1.4	SSW	1.1	SW	1.6	W
14:00 - 15:00	1.0	SSW	2.5	S	1.5	SSW	1.3	WSW
15:00 - 16:00	1.0	SSW	2.1	SSW	1.3	WSW	1.6	S
16:00 - 17:00	2.0	SW	2.4	SSW	1.9	SW	0.7	W
17:00 - 18:00	2.0	S	0.9	WSW	2.1	SSW	0.6	SSW
18:00 - 19:00	2.3	WSW	2.2	SW	1.0	SW	1.4	SW
19:00 - 20:00	2.1	SW	1.1	WSW	0.7	SW	1.3	SW
20:00 - 21:00	2.4	W	1.3	SW	1.0	SW	2.4	S
21:00 - 22:00	0.7	NW	2.5	SW	1.6	SSW	1.6	SSW
22:00 - 23:00	0.8	NW	0.6	NNW	2.2	WSW	1.4	SSW
23:00 - 24:00	0.7	ENE	0.6	ENE	1.0	WSW	1.6	SW
00:00 - 01:00	2.4	NNE	0.6	WSW	0.5	WNW	1.4	W
01:00 - 02:00	1.6	NE	1.5	SSW	2.2	W	0.9	SSW
02:00 - 03:00	0.7	NNE	2.0	SSW	0.7	SW	2.0	SW
03:00 - 04:00	0.6	WNW	2.3	WSW	2.0	SSW	0.7	W
04:00 - 05:00	2.3	WNW	0.9	SW	2.2	S	2.4	W
05:00 - 06:00	0.7	ENE	0.9	SSW	0.5	NNW	2.3	W
06:00 - 07:00	2.2	ENE	1.3	W	0.7	SW	2.5	WSW
07:00 - 08:00	1.1	NNE	1.3	SW	1.1	SSW	2.2	SSW
08:00 - 09:00	1.5	NNE	1.4	SW	2.2	SSW	2.5	SSW
09:00 - 10:00	0.7	SSW	1.0	WSW	1.4	S	1.3	SSW

Wind Rose



File Control : R:\Database\Windrose\FileControl\Win-225007-South Fence 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



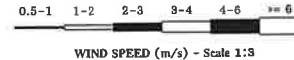
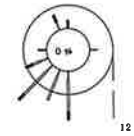
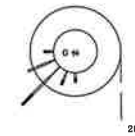
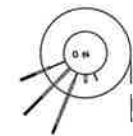
Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : South Fence Monitor period : 22-29 Aug 2025
 Wind Speed Model : Novalynx WS-25 Serial No : A5091
 Wind Direction Model : Novalynx WS-25 Serial No : A5091

Time	26-27 Aug 2025		27-28 Aug 2025		28-29 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
10:00 - 11:00	1.2	SSW	1.4	WSW	2.5	SW
11:00 - 12:00	1.8	SSW	1.7	SW	1.3	WSW
12:00 - 13:00	2.0	SW	1.7	W	1.7	SW
13:00 - 14:00	1.3	SW	0.9	SW	1.1	SSW
14:00 - 15:00	1.2	SW	1.9	WSW	1.1	S
15:00 - 16:00	2.4	SSW	1.7	SW	1.8	SW
16:00 - 17:00	1.6	SSW	1.4	SW	1.7	SSW
17:00 - 18:00	1.3	SSW	1.3	WSW	1.9	S
18:00 - 19:00	1.9	WSW	2.3	W	2.0	WSW
19:00 - 20:00	2.3	SW	0.7	SW	1.8	S
20:00 - 21:00	1.2	SW	2.3	SSW	1.7	SW
21:00 - 22:00	2.1	SW	1.6	S	1.1	SSW
22:00 - 23:00	1.6	SSW	0.7	SSW	1.5	W
23:00 - 24:00	1.3	SSW	1.1	SSW	0.7	E
00:00 - 01:00	0.9	WSW	2.5	S	0.5	WSW
01:00 - 02:00	2.3	WSW	1.9	WSW	1.6	S
02:00 - 03:00	1.4	SW	2.5	SW	0.8	SW
03:00 - 04:00	0.9	WSW	2.2	SW	0.6	NNW
04:00 - 05:00	1.0	S	0.9	WSW	2.1	NNW
05:00 - 06:00	1.1	SW	0.8	SW	2.0	N
06:00 - 07:00	1.0	WSW	1.2	SW	0.7	SSW
07:00 - 08:00	2.4	WSW	1.2	WSW	1.0	SW
08:00 - 09:00	0.5	SSE	1.9	SW	2.2	S
09:00 - 10:00	0.5	SSW	2.4	SW	0.9	S

Wind Rose



File Control : R:\Database\Windrose\FileControl\Win-225007-South Fence 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Meteorological Monitoring Results : Wind Rose MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Map Chalute

Monitor period : 22-29 Aug 2025

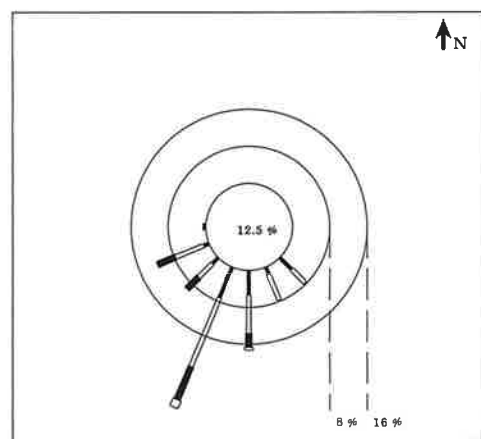
Wind Speed Model : Scarlet WS-21

Serial No : AD:28

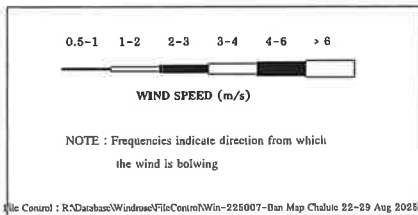
Wind Direction Model : Scarlet WS-21

Serial No : AD:28

Direction	Percentage of Occurrence of Wind Direct Grouped in Various Wind Speed						Total
	0.5-1 m/s	1-2 m/s	2-3 m/s	3-4 m/s	4-6 m/s	More than 6	
N	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ENE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
E	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ESE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SE	0.0357	0.0417	0.0000	0.0000	0.0000	0.0000	0.0774
SSE	0.0179	0.0595	0.0000	0.0000	0.0000	0.0000	0.0774
S	0.0536	0.0833	0.0298	0.0060	0.0000	0.0000	0.1726
SSW	0.0714	0.1607	0.0774	0.0179	0.0000	0.0000	0.3274
SW	0.0179	0.0417	0.0357	0.0000	0.0000	0.0000	0.0952
WSW	0.0119	0.0655	0.0417	0.0000	0.0000	0.0000	0.1190
W	0.0000	0.0000	0.0060	0.0000	0.0000	0.0000	0.0060
WNW	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NW	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NNW	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CALM	0.1250						



Application : WindPro Ver.1.0

Control : 16 Direction Calculation With
Calm Wind < 0.5 m/sData Unit : Direction in Deg.
Wind Speed in m/s

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Meteorological Monitoring Results : Wind Rose MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Map Chalute

Monitor period : 22-29 Aug 2025

Wind Speed Model : Scarlet WS-21

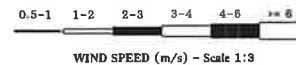
Serial No : AD:28

Wind Direction Model : Scarlet WS-21

Serial No : AD:28

Time	22-23 Aug 2025		23-24 Aug 2025		24-25 Aug 2025		25-26 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
13:00 - 14:00	1.3	SE	1.6	S	1.2	SSW	1.5	SE
14:00 - 15:00	1.7	S	1.8	SSW	1.8	SSW	1.6	SSE
15:00 - 16:00	2.1	SW	2.1	SW	1.8	SSW	1.5	S
16:00 - 17:00	2.1	SW	2.3	WSW	1.9	SW	1.6	SSE
17:00 - 18:00	2.1	SW	2.3	WSW	2.4	WSW	1.7	SE
18:00 - 19:00	2.2	SW	1.9	WSW	2.3	W	1.6	SSE
19:00 - 20:00	2.1	WSW	1.5	WSW	2.3	WSW	1.5	SE
20:00 - 21:00	2.0	WSW	1.7	WSW	2.2	WSW	1.5	SSE
21:00 - 22:00	2.0	SW	1.6	WSW	1.9	WSW	1.3	SSE
22:00 - 23:00	1.5	S	1.6	WSW	0.8	WSW	0.7	SE
23:00 - 24:00	1.0	S	0.9	WSW	0.1	SSE	0.6	S
00:00 - 01:00	0.6	S	1.4	WSW	0.4	SSE	0.8	S
01:00 - 02:00	0.9	S	1.1	SW	0.5	SSE	1.1	SSW
02:00 - 03:00	1.6	SSW	1.2	SW	0.6	SSW	1.2	SW
03:00 - 04:00	1.5	SSW	1.1	SW	1.2	SW	1.4	WSW
04:00 - 05:00	1.6	SSW	1.5	WSW	1.0	S	1.2	WSW
05:00 - 06:00	0.5	S	1.1	WSW	0.6	S	0.3	SSW
06:00 - 07:00	0.3	SSE	0.5	SSW	0.6	SSE	0.4	SSW
07:00 - 08:00	0.2	ESE	0.4	S	1.1	SE	0.6	SW
08:00 - 09:00	0.2	ESE	0.4	SSE	0.6	SE	0.5	SSW
09:00 - 10:00	0.3	ESE	0.3	SSE	0.4	SE	0.3	WSW
10:00 - 11:00	0.4	ESE	0.6	SE	0.7	SE	0.4	SW
11:00 - 12:00	0.6	SSE	0.6	SE	0.9	SE	0.7	SSW
12:00 - 13:00	1.1	SE	1.1	SSE	1.1	SE	1.5	S

Wind Rose



File Control : R:\Database\Windrose\FileControl\Win-225007-Ban Map Chalute 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



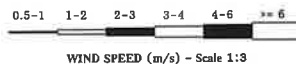
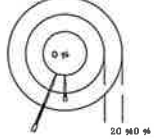
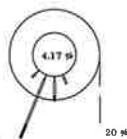
Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Map Chalut Monitor period : 22-29 Aug 2025
 Wind Speed Model : Scarlet WS-21 Serial No : AD:28
 Wind Direction Model : Scarlet WS-21 Serial No : AD:28

Time	26-27 Aug 2025		27-28 Aug 2025		28-29 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
13:00 - 14:00	1.8	S	3.3	SSW	2.9	SSW
14:00 - 15:00	1.9	SSW	3.3	SSW	3.0	SSW
15:00 - 16:00	1.6	SSW	3.0	S	2.8	S
16:00 - 17:00	1.6	SW	2.7	SSW	2.4	SSW
17:00 - 18:00	1.5	SSW	2.6	S	2.3	S
18:00 - 19:00	1.4	SSE	2.2	SSW	2.2	S
19:00 - 20:00	1.4	S	2.0	SSW	1.9	SSE
20:00 - 21:00	1.2	SSE	1.6	S	1.6	SSE
21:00 - 22:00	0.8	SW	1.5	S	1.4	S
22:00 - 23:00	0.4	SSW	1.1	S	0.9	SSW
23:00 - 24:00	0.6	SSW	0.6	S	0.3	SW
00:00 - 01:00	0.9	S	0.8	S	0.7	SSW
01:00 - 02:00	1.8	SSW	1.4	SSW	0.9	SSW
02:00 - 03:00	2.0	SSW	1.1	SSW	1.2	SSW
03:00 - 04:00	1.8	SSW	1.3	SSW	0.8	SW
04:00 - 05:00	1.7	SSW	1.1	SSW	0.4	SSW
05:00 - 06:00	1.4	SSW	1.1	SSW	0.5	SSW
06:00 - 07:00	1.5	SSW	0.9	SSW	0.8	SSW
07:00 - 08:00	1.8	SSW	0.8	SSW	0.1	WNW
08:00 - 09:00	1.9	SSW	1.5	SSW	0.2	S
09:00 - 10:00	1.8	S	1.9	SSW	0.4	SW
10:00 - 11:00	2.1	SSW	2.2	SSW	1.6	SSW
11:00 - 12:00	2.1	SSW	2.5	SSW	2.0	SSW
12:00 - 13:00	2.9	S	2.5	SSW	2.8	SSW

Wind Rose



File Control : R:\Database\Windrose\FileControl\Win-225007-Ban Map Chalut 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Preeda Somjai)
 Technical Management Team

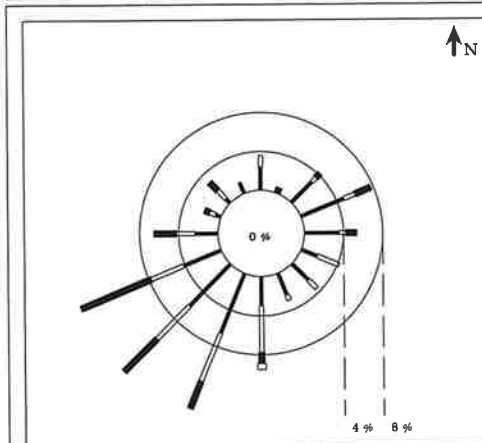


Meteorological Monitoring Results : Wind Rose

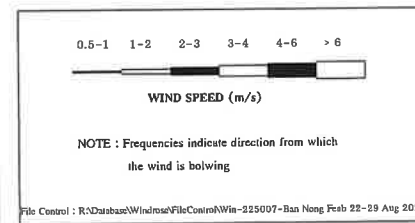
MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Nong Feab Monitor period : 22-29 Aug 2025
 Wind Speed Model : Novalynx WS-25 Serial No : A4905
 Wind Direction Model : Novalynx WS-25 Serial No : A4905

Direction	Percentage of Occurrence of Wind Direct Grouped in Various Wind Speed						Total
	0.5-1 m/s	1-2 m/s	2-3 m/s	3-4 m/s	4-6 m/s	More than 6	
N	0.0238	0.0119	0.0000	0.0000	0.0000	0.0000	0.0357
NNE	0.0000	0.0000	0.0060	0.0000	0.0000	0.0000	0.0060
NE	0.0298	0.0060	0.0060	0.0000	0.0000	0.0000	0.0417
ENE	0.0476	0.0119	0.0179	0.0000	0.0000	0.0000	0.0774
E	0.0357	0.0060	0.0119	0.0000	0.0000	0.0000	0.0536
ESE	0.0179	0.0238	0.0000	0.0000	0.0000	0.0000	0.0417
SE	0.0238	0.0119	0.0000	0.0000	0.0000	0.0000	0.0357
SSE	0.0238	0.0060	0.0000	0.0000	0.0000	0.0000	0.0298
S	0.0298	0.0476	0.0119	0.0060	0.0000	0.0000	0.0952
SSW	0.0655	0.0536	0.0298	0.0000	0.0000	0.0000	0.1488
SW	0.0595	0.0476	0.0476	0.0000	0.0000	0.0000	0.1548
WSW	0.0417	0.0357	0.0774	0.0000	0.0000	0.0000	0.1548
W	0.0238	0.0179	0.0238	0.0000	0.0000	0.0000	0.0655
WNW	0.0060	0.0060	0.0060	0.0000	0.0000	0.0000	0.0179
NW	0.0060	0.0119	0.0119	0.0000	0.0000	0.0000	0.0298
NNW	0.0119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0119
CALM	0.0000						



Application : WindPro Ver.1.0
 Control : 16 Direction Calculation With
 Calm Wind < 0.5 m/s
 Data Unit : Direction in Deg.
 Wind Speed in m/s



(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Preeda Somjai)
 Technical Management Team



Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Nong Feab

Monitor period : 22-29 Aug 2025

Wind Speed Model : Novalynx WS-25

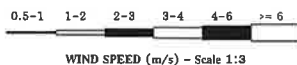
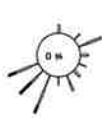
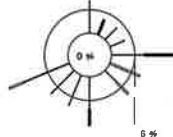
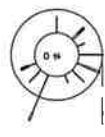
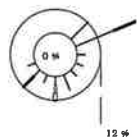
Serial No : A4905

Wind Direction Model : Novalynx WS-25

Serial No : A4905

Time	22-23 Aug 2025		23-24 Aug 2025		24-25 Aug 2025		25-26 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
11:00 - 12:00	0.6	SSE	0.6	ENE	1.2	SE	2.1	WSW
12:00 - 13:00	0.5	ENE	0.6	SSW	0.5	SSW	1.2	SE
13:00 - 14:00	2.2	ENE	2.0	NE	1.3	WSW	1.2	SSE
14:00 - 15:00	0.7	SSW	0.6	SSW	0.8	WSW	0.5	ENE
15:00 - 16:00	0.5	NE	2.4	WSW	0.5	NE	0.5	SSE
16:00 - 17:00	0.5	ENE	0.7	E	0.6	SW	0.6	ESE
17:00 - 18:00	2.4	ENE	0.7	SSW	0.5	ENE	0.5	NE
18:00 - 19:00	1.0	S	1.1	NE	0.9	WSW	1.0	E
19:00 - 20:00	0.6	NE	0.7	SW	0.7	S	1.1	N
20:00 - 21:00	0.5	E	0.5	N	1.3	ESE	1.0	ENE
21:00 - 22:00	0.7	SW	0.6	SE	0.5	WSW	1.4	ENE
22:00 - 23:00	0.5	ENE	1.6	ESE	0.5	N	2.7	SSW
23:00 - 24:00	2.1	ENE	0.7	SSW	0.8	E	0.9	SW
00:00 - 01:00	0.6	ESE	0.6	E	2.0	NNE	2.4	SW
01:00 - 02:00	0.6	ENE	0.5	SSW	0.7	E	1.2	SSW
02:00 - 03:00	0.5	S	1.2	SSW	2.4	S	0.8	WSW
03:00 - 04:00	2.1	SW	0.5	SSE	0.7	SSW	1.7	WSW
04:00 - 05:00	2.1	SW	0.9	ESE	0.7	SE	0.7	SSW
05:00 - 06:00	0.6	ENE	0.5	SW	0.7	S	1.9	SSW
06:00 - 07:00	0.5	SE	0.5	E	0.7	N	1.7	SW
07:00 - 08:00	0.5	NE	0.8	SE	1.2	ESE	0.8	S
08:00 - 09:00	0.7	WSW	0.6	N	2.5	E	1.9	WSW
09:00 - 10:00	3.0	S	0.9	WSW	2.3	E	0.7	SSW
10:00 - 11:00	0.6	SSE	1.5	ESE	0.5	SW	2.4	SW

Wind Rose



File Control : R:\Database\Windrose\FileControl\Win-225007-Ban Nong Feab 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Meteorological Monitoring Results : Wind Rose

MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Nong Feab

Monitor period : 22-29 Aug 2025

Wind Speed Model : Novalynx WS-25

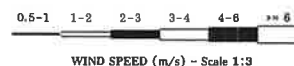
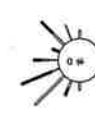
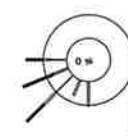
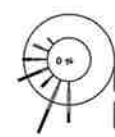
Serial No : A4905

Wind Direction Model : Novalynx WS-25

Serial No : A4905

Time	26-27 Aug 2025		27-28 Aug 2025		28-29 Aug 2025	
	WS(m/s)	WD	WS(m/s)	WD	WS(m/s)	WD
11:00 - 12:00	0.8	S	0.8	SW	2.2	WSW
12:00 - 13:00	1.5	W	1.4	SSW	1.5	SW
13:00 - 14:00	1.1	SSW	1.7	SW	1.1	SW
14:00 - 15:00	1.2	WSW	2.3	WSW	2.5	WSW
15:00 - 16:00	2.4	SSW	0.7	W	2.5	WSW
16:00 - 17:00	2.4	WSW	2.3	WSW	1.1	SSW
17:00 - 18:00	1.8	S	1.7	SSW	1.5	SW
18:00 - 19:00	2.3	WSW	1.6	SW	1.3	SW
19:00 - 20:00	0.9	SW	2.0	SW	0.7	NNW
20:00 - 21:00	1.9	SSW	0.9	W	2.0	NW
21:00 - 22:00	1.5	S	2.5	WSW	2.1	NW
22:00 - 23:00	1.6	SSW	2.4	W	1.0	NW
23:00 - 24:00	2.1	W	1.9	S	0.6	W
00:00 - 01:00	2.0	S	1.3	WSW	0.7	NNW
01:00 - 02:00	2.5	SW	0.8	SW	1.4	NW
02:00 - 03:00	1.0	S	2.0	SW	1.3	W
03:00 - 04:00	0.7	W	2.5	SW	2.0	WNW
04:00 - 05:00	2.5	SSW	2.2	WSW	1.8	N
05:00 - 06:00	2.4	SSW	1.3	S	0.5	WSW
06:00 - 07:00	0.6	NW	0.9	SW	2.4	WSW
07:00 - 08:00	1.4	WNW	1.7	S	1.9	S
08:00 - 09:00	0.7	WNW	2.5	W	1.8	SW
09:00 - 10:00	0.6	SSW	1.6	W	2.3	SSW
10:00 - 11:00	2.0	WSW	1.3	WSW	2.3	W

Wind Rose



File Control : R:\Database\Windrose\FileControl\Win-225007-Ban Nong Feab 22-29 Aug 2025

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-Ambient-2508-0074
Branch 2, Power Plant SAMPLING DATE : 22-29/08/2025
SAMPLING BY : SECOT Co., Ltd. ANALYTICAL DATE : 04-06/09/2025
RECEIVED DATE : 03/09/2025 SAMPLE CONDITION : Normal
REPORT DATE : 12/09/2025 SITE OPERATOR : Mr. Siwanon Kulawong
LOCATION DESCRIPTION : 1. Ban Map Chalute
2. Ban Nong Feab

PARAMETER	SAMPLING DATE	UNITS	RESULTS		STANDARD*	REFERENCE METHODS
			1	2		
TSP (24 hr)	22-23/08/2025	mg/m ³	0.016	0.025	0.330	High Volume Air
	23-24/08/2025	mg/m ³	0.019	0.019		Sampler/Gravimetric
	24-25/08/2025	mg/m ³	0.016	0.021		Method
	25-26/08/2025	mg/m ³	0.028	0.027		
	26-27/08/2025	mg/m ³	0.024	0.022		
	27-28/08/2025	mg/m ³	0.022	0.024		
	28-29/08/2025	mg/m ³	0.027	0.025		

Pornnapa Budthum

(Miss Pornnapa Budthum)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * Notification of National Environment Board, No.24, B.E.2547 (2004).



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Co., Ltd. REFERENCE NO. : 225007-Ambient-2508-0074
Branch 2, Power Plant SAMPLING DATE : 22-29/08/2025
SAMPLING BY : SECOT Co., Ltd. ANALYTICAL DATE : 04-06/09/2025
RECEIVED DATE : 03/09/2025 SAMPLE CONDITION : Normal
REPORT DATE : 12/09/2025 SITE OPERATOR : Mr. Siwanon Kulawong
LOCATION DESCRIPTION : 1. Ban Map Chalute
2. Ban Nong Feab

PARAMETER	SAMPLING DATE	UNITS	RESULTS		STANDARD*	REFERENCE METHODS
			1	2		
PM-10 (24 hr)	22-23/08/2025	mg/m ³	0.015	0.017	0.120	High Volume Air Sampler
	23-24/08/2025	mg/m ³	0.016	0.011		(Hi-Vol PM-10 Size
	24-25/08/2025	mg/m ³	0.013	0.013		Selective Inlet)/
	25-26/08/2025	mg/m ³	0.017	0.017		Gravimetric Method
	26-27/08/2025	mg/m ³	0.020	0.015		
	27-28/08/2025	mg/m ³	0.014	0.016		
	28-29/08/2025	mg/m ³	0.020	0.018		

Pornnapa Budthum

(Miss Pornnapa Budthum)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. * Notification of National Environment Board, No.24, B.E.2547 (2004).



Ambient Air Monitoring Results : Sulfur dioxide MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Map Chalute Monitor Period : 22-29 Aug 2025
Analyzer Model : Thermo 43C Station No : SS2-20
Serial No : 60771-328-2 Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D. : EB0102326
Certified Date : 08 Jan 2025 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 07 Jan 2026

Time	SO2 Concentration (ppm)						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
09:00 - 10:00	0.0074	0.0030	0.0043	0.0054	0.0038	0.0064	0.0082
10:00 - 11:00	0.0087	0.0039	0.0073	0.0026	0.0035	0.0059	0.0077
11:00 - 12:00	0.0074	0.0088	0.0059	0.0086	0.0084	0.0076	0.0061
12:00 - 13:00	0.0045	0.0077	0.0049	0.0027	0.0049	0.0056	0.0058
13:00 - 14:00	0.0050	0.0074	0.0064	0.0027	0.0029	0.0057	0.0054
14:00 - 15:00	0.0051	0.0065	0.0070	0.0041	0.0050	0.0061	0.0073
15:00 - 16:00	0.0069	0.0066	0.0043	0.0047	0.0025	0.0068	0.0066
16:00 - 17:00	0.0082	0.0037	0.0028	0.0049	0.0043	0.0076	0.0062
17:00 - 18:00	0.0062	0.0050	0.0080	0.0041	0.0048	0.0055	0.0059
18:00 - 19:00	0.0072	0.0031	0.0044	0.0049	0.0031	0.0058	0.0082
19:00 - 20:00	0.0080	0.0047	0.0052	0.0027	0.0043	0.0083	0.0066
20:00 - 21:00	0.0064	0.0053	0.0029	0.0035	0.0025	0.0069	0.0061
21:00 - 22:00	0.0078	0.0049	0.0052	0.0049	0.0031	0.0083	0.0071
22:00 - 23:00	0.0075	0.0087	0.0065	0.0040	0.0067	0.0067	0.0067
23:00 - 00:00	0.0067	0.0081	0.0064	0.0040	0.0056	0.0066	0.0057
00:00 - 01:00	0.0079	0.0076	0.0039	0.0056	0.0083	0.0059	0.0059
01:00 - 02:00	0.0073	0.0058	0.0047	0.0036	0.0059	0.0070	0.0053
02:00 - 03:00	0.0034	0.0059	0.0040	0.0046	0.0077	0.0055	0.0055
03:00 - 04:00	0.0066	0.0049	0.0048	0.0046	0.0054	0.0067	0.0070
04:00 - 05:00	0.0049	0.0050	0.0029	0.0045	0.0060	0.0059	0.0069
05:00 - 06:00	0.0057	0.0045	0.0037	0.0046	0.0054	0.0059	0.0072
06:00 - 07:00	0.0032	0.0046	0.0044	0.0042	0.0024	0.0028	0.0056
07:00 - 08:00	0.0051	0.0045	0.0056	0.0028	0.0027	0.0027	0.0022
08:00 - 09:00	0.0043	0.0039	0.0048	0.0027	0.0059	0.0025	0.0060

Average-24Hr*	0.0063	0.0056	0.0050	0.0042	0.0048	0.0060	0.0063
Max-1Hr	0.0087	0.0088	0.0080	0.0086	0.0084	0.0083	0.0082
Min-1Hr	0.0032	0.0030	0.0028	0.0026	0.0024	0.0025	0.0022

Standard-1Hr	0.30 ppm(780 ug/cu.m)
Standard-24Hr	0.12 ppm(300 ug/cu.m)

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Sulfur dioxide MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Nong Feab Monitor Period : 22-29 Aug 2025
Analyzer Model : Teledyne T100 Station No : SCT-15
Serial No : 120 Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D. : EB0102326
Certified Date : 08 Jan 2025 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 07 Jan 2026

Time	SO2 Concentration (ppm)						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
09:00 - 10:00	0.0068	0.0056	0.0083	0.0040	0.0052	0.0089	0.0072
10:00 - 11:00	0.0085	0.0045	0.0060	0.0042	0.0071	0.0060	0.0062
11:00 - 12:00	0.0061	0.0081	0.0061	0.0028	0.0053	0.0071	0.0057
12:00 - 13:00	0.0080	0.0064	0.0081	0.0034	0.0024	0.0077	0.0062
13:00 - 14:00	0.0067	0.0066	0.0081	0.0075	0.0024	0.0058	0.0066
14:00 - 15:00	0.0061	0.0063	0.0086	0.0038	0.0039	0.0064	0.0055
15:00 - 16:00	0.0089	0.0086	0.0082	0.0038	0.0025	0.0073	0.0066
16:00 - 17:00	0.0084	0.0061	0.0057	0.0035	0.0045	0.0053	0.0058
17:00 - 18:00	0.0068	0.0036	0.0027	0.0038	0.0041	0.0055	0.0081
18:00 - 19:00	0.0079	0.0029	0.0052	0.0045	0.0073	0.0070	0.0060
19:00 - 20:00	0.0075	0.0051	0.0043	0.0049	0.0027	0.0080	0.0062
20:00 - 21:00	0.0068	0.0055	0.0066	0.0033	0.0044	0.0076	0.0053
21:00 - 22:00	0.0081	0.0050	0.0043	0.0037	0.0030	0.0069	0.0065
22:00 - 23:00	0.0085	0.0053	0.0058	0.0028	0.0034	0.0063	0.0066
23:00 - 00:00	0.0072	0.0066	0.0056	0.0036	0.0060	0.0061	0.0076
00:00 - 01:00	0.0072	0.0082	0.0079	0.0044	0.0073	0.0054	0.0077
01:00 - 02:00	0.0065	0.0038	0.0053	0.0052	0.0082	0.0070	0.0072
02:00 - 03:00	0.0068	0.0038	0.0027	0.0053	0.0075	0.0055	0.0072
03:00 - 04:00	0.0046	0.0042	0.0041	0.0052	0.0056	0.0079	0.0080
04:00 - 05:00	0.0029	0.0034	0.0054	0.0044	0.0083	0.0061	0.0054
05:00 - 06:00	0.0040	0.0053	0.0051	0.0034	0.0037	0.0053	0.0038
06:00 - 07:00	0.0049	0.0027	0.0053	0.0035	0.0031	0.0073	0.0051
07:00 - 08:00	0.0029	0.0046	0.0028	0.0028	0.0048	0.0029	0.0041
08:00 - 09:00	0.0037	0.0043	0.0048	0.0054	0.0060	0.0050	0.0062

Average-24Hr*	0.0065	0.0053	0.0057	0.0041	0.0049	0.0063	0.0063
Max-1Hr	0.0089	0.0086	0.0086	0.0075	0.0083	0.0080	0.0081
Min-1Hr	0.0029	0.0027	0.0027	0.0028	0.0024	0.0029	0.0038

Standard-1Hr	0.30 ppm(780 ug/cu.m)
Standard-24Hr	0.12 ppm(300 ug/cu.m)

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-PTTGC, Branch 2 (Power Plant)

Location : North Fence Monitor Period : 22-29 Aug 2025
Analyzer Model : API 200A Station No : Mobile 18
Serial No : 2387 Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D. : EB0102326
Certified Date : 08 Jan 2025 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppm)						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
08:00 - 09:00	0.0057	0.0084	0.0065	0.0051	0.0074	0.0067	0.0053
09:00 - 10:00	0.0111	0.0055	0.0054	0.0086	0.0107	0.0088	0.0096
10:00 - 11:00	0.0115	0.0096	0.0098	0.0091	0.0109	0.0120	0.0092
11:00 - 12:00	0.0113	0.0128	0.0104	0.0090	0.0094	0.0103	0.0091
12:00 - 13:00	0.0107	0.0109	0.0093	0.0112	0.0092	0.0124	0.0098
13:00 - 14:00	0.0107	0.0121	0.0093	0.0115	0.0091	0.0104	0.0119
14:00 - 15:00	0.0118	0.0108	0.0129	0.0074	0.0076	0.0097	0.0126
15:00 - 16:00	0.0107	0.0093	0.0105	0.0079	0.0069	0.0116	0.0124
16:00 - 17:00	0.0101	0.0110	0.0118	0.0067	0.0114	0.0096	0.0118
17:00 - 18:00	0.0094	0.0083	0.0077	0.0072	0.0106	0.0099	0.0091
18:00 - 19:00	0.0105	0.0051	0.0086	0.0087	0.0108	0.0103	0.0111
19:00 - 20:00	0.0127	0.0086	0.0073	0.0067	0.0110	0.0122	0.0088
20:00 - 21:00	0.0111	0.0063	0.0090	0.0084	0.0102	0.0122	0.0103
21:00 - 22:00	0.0091	0.0076	0.0120	0.0061	0.0114	0.0099	0.0117
22:00 - 23:00	0.0126	0.0093	0.0106	0.0053	0.0103	0.0120	0.0124
23:00 - 00:00	0.0127	0.0092	0.0124	0.0058	0.0121	0.0110	0.0100
00:00 - 01:00	0.0126	0.0108	0.0120	0.0055	0.0104	0.0124	0.0091
01:00 - 02:00	0.0080	0.0063	0.0068	0.0085	0.0105	0.0055	0.0072
02:00 - 03:00	0.0087	0.0069	0.0082	0.0084	0.0088	0.0086	0.0052
03:00 - 04:00	0.0064	0.0065	0.0032	0.0051	0.0080	0.0077	0.0052
04:00 - 05:00	0.0038	0.0074	0.0035	0.0053	0.0080	0.0067	0.0073
05:00 - 06:00	0.0010	0.0031	0.0038	0.0066	0.0042	0.0068	0.0052
06:00 - 07:00	0.0012	0.0037	0.0037	0.0052	0.0043	0.0055	0.0065
07:00 - 08:00	0.0035	0.0088	0.0080	0.0054	0.0050	0.0053	0.0032

Average-24Hr*	0.0090	0.0083	0.0085	0.0073	0.0091	0.0095	0.0089
Max-1Hr	0.0127	0.0128	0.0129	0.0115	0.0121	0.0124	0.0126
Min-1Hr	0.0010	0.0031	0.0032	0.0051	0.0042	0.0053	0.0032

Standard-1Hr	0.17 ppm(320 ug/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 08:00-08:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-PTTGC, Branch 2 (Power Plant)

Location : South Fence Monitor Period : 22-29 Aug 2025
Analyzer Model : API 200A Station No : SECOT-019
Serial No : 1505 Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D. : EB0102326
Certified Date : 08 Jan 2025 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppm)						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
08:00 - 09:00	0.0061	0.0044	0.0087	0.0051	0.0082	0.0082	0.0077
09:00 - 10:00	0.0067	0.0056	0.0066	0.0046	0.0069	0.0076	0.0060
10:00 - 11:00	0.0067	0.0101	0.0110	0.0080	0.0063	0.0092	0.0087
11:00 - 12:00	0.0126	0.0105	0.0051	0.0123	0.0063	0.0116	0.0097
12:00 - 13:00	0.0107	0.0115	0.0116	0.0046	0.0064	0.0108	0.0104
13:00 - 14:00	0.0104	0.0119	0.0088	0.0084	0.0073	0.0088	0.0104
14:00 - 15:00	0.0063	0.0091	0.0123	0.0075	0.0059	0.0105	0.0112
15:00 - 16:00	0.0096	0.0102	0.0072	0.0055	0.0080	0.0069	0.0087
16:00 - 17:00	0.0130	0.0071	0.0073	0.0066	0.0073	0.0123	0.0103
17:00 - 18:00	0.0099	0.0068	0.0078	0.0065	0.0069	0.0123	0.0123
18:00 - 19:00	0.0110	0.0081	0.0062	0.0066	0.0065	0.0093	0.0120
19:00 - 20:00	0.0091	0.0048	0.0079	0.0064	0.0079	0.0108	0.0121
20:00 - 21:00	0.0098	0.0059	0.0057	0.0050	0.0053	0.0086	0.0081
21:00 - 22:00	0.0108	0.0081	0.0082	0.0082	0.0088	0.0110	0.0113
22:00 - 23:00	0.0124	0.0111	0.0079	0.0068	0.0067	0.0094	0.0115
23:00 - 00:00	0.0111	0.0086	0.0070	0.0054	0.0092	0.0123	0.0103
00:00 - 01:00	0.0070	0.0051	0.0086	0.0080	0.0090	0.0086	0.0052
01:00 - 02:00	0.0076	0.0075	0.0075	0.0071	0.0082	0.0054	0.0052
02:00 - 03:00	0.0062	0.0053	0.0080	0.0052	0.0078	0.0043	0.0070
03:00 - 04:00	0.0045	0.0084	0.0009	0.0086	0.0067	0.0068	0.0075
04:00 - 05:00	0.0040	0.0046	0.0045	0.0061	0.0071	0.0031	0.0073
05:00 - 06:00	0.0044	0.0042	0.0047	0.0005	0.0029	0.0018	0.0033
06:00 - 07:00	0.0027	0.0019	0.0025	0.0084	0.0021	0.0007	0.0060
07:00 - 08:00	0.0043	0.0087	0.0063	0.0058	0.0071	0.0005	0.0059

Average-24Hr*	0.0082	0.0075	0.0071	0.0066	0.0069	0.0080	0.0087
Max-1Hr	0.0130	0.0119	0.0123	0.0123	0.0092	0.0123	0.0123
Min-1Hr	0.0027	0.0019	0.0009	0.0005	0.0021	0.0005	0.0033

Standard-1Hr	0.17 ppm(320 ug/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 08:00-08:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Map Chalute Monitor Period : 22-29 Aug 2025
Analyzer Model : RP 8400N Station No : SS2-20
Serial No : 096 Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D. : EB0102326
Certified Date : 08 Jan 2025 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppm)						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
09:00 - 10:00	0.0062	0.0072	0.0078	0.0073	0.0078	0.0064	0.0056
10:00 - 11:00	0.0065	0.0064	0.0103	0.0083	0.0049	0.0089	0.0090
11:00 - 12:00	0.0098	0.0091	0.0045	0.0061	0.0054	0.0087	0.0106
12:00 - 13:00	0.0109	0.0094	0.0074	0.0080	0.0075	0.0105	0.0109
13:00 - 14:00	0.0045	0.0096	0.0092	0.0068	0.0083	0.0098	0.0083
14:00 - 15:00	0.0058	0.0088	0.0082	0.0053	0.0053	0.0088	0.0117
15:00 - 16:00	0.0104	0.0101	0.0061	0.0083	0.0077	0.0114	0.0118
16:00 - 17:00	0.0117	0.0084	0.0079	0.0076	0.0045	0.0093	0.0102
17:00 - 18:00	0.0086	0.0048	0.0059	0.0052	0.0063	0.0095	0.0110
18:00 - 19:00	0.0114	0.0070	0.0049	0.0014	0.0056	0.0046	0.0120
19:00 - 20:00	0.0094	0.0062	0.0067	0.0041	0.0053	0.0070	0.0087
20:00 - 21:00	0.0061	0.0075	0.0063	0.0060	0.0080	0.0076	0.0081
21:00 - 22:00	0.0059	0.0059	0.0073	0.0053	0.0071	0.0097	0.0049
22:00 - 23:00	0.0087	0.0053	0.0056	0.0074	0.0056	0.0109	0.0078
23:00 - 00:00	0.0071	0.0058	0.0084	0.0054	0.0119	0.0090	0.0068
00:00 - 01:00	0.0063	0.0082	0.0078	0.0079	0.0056	0.0073	0.0049
01:00 - 02:00	0.0078	0.0048	0.0048	0.0075	0.0054	0.0071	0.0059
02:00 - 03:00	0.0014	0.0047	0.0046	0.0054	0.0050	0.0079	0.0066
03:00 - 04:00	0.0031	0.0068	0.0039	0.0084	0.0074	0.0041	0.0013
04:00 - 05:00	0.0008	0.0011	0.0023	0.0012	0.0005	0.0066	0.0048
05:00 - 06:00	0.0018	0.0042	0.0034	0.0015	0.0020	0.0024	0.0019
06:00 - 07:00	0.0041	0.0015	0.0023	0.0045	0.0029	0.0003	0.0006
07:00 - 08:00	0.0028	0.0015	0.0025	0.0045	0.0051	0.0008	0.0008
08:00 - 09:00	0.0045	0.0059	0.0049	0.0064	0.0045	0.0046	0.0020
Average-24Hr*	0.0065	0.0063	0.0060	0.0057	0.0058	0.0072	0.0069
Max-1Hr	0.0117	0.0101	0.0103	0.0084	0.0119	0.0114	0.0120
Min-1Hr	0.0008	0.0011	0.0023	0.0012	0.0005	0.0003	0.0006
Standard-1Hr	0.17 ppm(320 ug/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-PTTGC, Branch 2 (Power Plant)

Location : Ban Nong Feab Monitor Period : 22-29 Aug 2025
Analyzer Model : API 200A Station No : SCT-15
Serial No : 2386 Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D. : EB0102326
Certified Date : 08 Jan 2025 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppm)						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
09:00 - 10:00	0.0064	0.0077	0.0071	0.0058	0.0069	0.0079	0.0078
10:00 - 11:00	0.0086	0.0055	0.0110	0.0087	0.0087	0.0097	0.0098
11:00 - 12:00	0.0119	0.0072	0.0051	0.0116	0.0073	0.0101	0.0096
12:00 - 13:00	0.0110	0.0053	0.0074	0.0078	0.0058	0.0096	0.0096
13:00 - 14:00	0.0051	0.0111	0.0065	0.0068	0.0077	0.0094	0.0097
14:00 - 15:00	0.0087	0.0125	0.0113	0.0054	0.0058	0.0098	0.0115
15:00 - 16:00	0.0085	0.0062	0.0085	0.0087	0.0082	0.0094	0.0124
16:00 - 17:00	0.0111	0.0062	0.0085	0.0073	0.0088	0.0108	0.0097
17:00 - 18:00	0.0121	0.0055	0.0089	0.0048	0.0059	0.0114	0.0095
18:00 - 19:00	0.0096	0.0072	0.0075	0.0029	0.0061	0.0118	0.0109
19:00 - 20:00	0.0106	0.0086	0.0069	0.0064	0.0056	0.0078	0.0109
20:00 - 21:00	0.0084	0.0061	0.0063	0.0071	0.0085	0.0065	0.0069
21:00 - 22:00	0.0128	0.0068	0.0087	0.0065	0.0053	0.0098	0.0065
22:00 - 23:00	0.0091	0.0086	0.0069	0.0065	0.0068	0.0120	0.0053
23:00 - 00:00	0.0065	0.0074	0.0062	0.0075	0.0122	0.0117	0.0061
00:00 - 01:00	0.0059	0.0082	0.0071	0.0086	0.0066	0.0059	0.0065
01:00 - 02:00	0.0073	0.0085	0.0070	0.0058	0.0062	0.0082	0.0050
02:00 - 03:00	0.0050	0.0066	0.0032	0.0080	0.0077	0.0080	0.0081
03:00 - 04:00	0.0046	0.0060	0.0028	0.0064	0.0058	0.0079	0.0074
04:00 - 05:00	0.0036	0.0027	0.0036	0.0085	0.0035	0.0026	0.0057
05:00 - 06:00	0.0041	0.0016	0.0012	0.0010	0.0014	0.0038	0.0012
06:00 - 07:00	0.0038	0.0015	0.0049	0.0032	0.0009	0.0023	0.0044
07:00 - 08:00	0.0050	0.0048	0.0010	0.0065	0.0079	0.0038	0.0036
08:00 - 09:00	0.0045	0.0064	0.0056	0.0050	0.0066	0.0050	0.0058
Average-24Hr*	0.0077	0.0066	0.0064	0.0065	0.0065	0.0081	0.0077
Max-1Hr	0.0128	0.0125	0.0113	0.0116	0.0122	0.0120	0.0124
Min-1Hr	0.0036	0.0015	0.0010	0.0010	0.0009	0.0023	0.0012
Standard-1Hr	0.17 ppm(320 ug/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team

ภาคผนวก ง.3

ใบรับรองผลการตรวจวัดระดับเสียงทั่วไป



Noise Monitoring Result : Community Noise

MTR-PTTGC, Branch 2 (Power Plant)

Location : The North of Fence Monitor Period : 22-29 Aug 2025
SLM Model : Cirrus CR162B Serial No : G300769
Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : 27 Feb 2025
SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 25 Feb 2026
Cal Sheet No. : CR-515-2025-224

Time	Equivalent Sound Pressure Level (dB(A))						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
10:00 - 11:00	65.0	65.6	65.4	66.5	67.3	67.7	66.6
11:00 - 12:00	65.3	66.6	65.7	66.5	67.5	67.7	66.6
12:00 - 13:00	66.5	65.6	66.0	65.8	67.1	66.4	66.5
13:00 - 14:00	67.2	65.8	66.3	67.0	67.3	66.9	66.8
14:00 - 15:00	66.9	65.6	65.7	66.8	67.1	66.5	66.7
15:00 - 16:00	66.3	65.9	66.1	67.3	67.2	66.4	66.6
16:00 - 17:00	67.0	66.4	65.8	67.8	67.6	67.9	67.3
17:00 - 18:00	67.3	66.7	65.7	68.2	68.2	67.8	67.5
18:00 - 19:00	66.6	66.7	66.3	67.9	67.5	67.2	67.2
19:00 - 20:00	66.0	66.1	65.2	66.9	67.3	67.3	67.2
20:00 - 21:00	66.3	65.7	64.7	66.5	66.8	66.1	67.1
21:00 - 22:00	65.9	64.7	64.5	66.6	66.6	65.3	65.9
22:00 - 23:00	65.7	65.1	64.3	66.0	66.6	65.9	65.9
23:00 - 00:00	65.1	64.6	63.9	65.4	65.9	65.4	65.3
00:00 - 01:00	65.1	65.1	63.9	65.5	65.8	65.3	65.3
01:00 - 02:00	64.6	63.9	63.8	65.1	66.0	65.1	65.1
02:00 - 03:00	64.9	64.1	63.7	65.4	65.6	65.2	65.0
03:00 - 04:00	65.4	64.1	63.7	65.6	65.6	64.9	65.1
04:00 - 05:00	64.6	63.9	63.9	65.9	65.7	65.1	65.4
05:00 - 06:00	64.9	64.4	64.8	66.6	66.1	65.7	66.2
06:00 - 07:00	67.7	66.4	67.3	68.3	67.8	68.3	67.9
07:00 - 08:00	68.5	66.6	68.0	68.7	68.7	68.6	68.8
08:00 - 09:00	67.5	65.8	67.2	68.0	67.8	67.2	66.2
09:00 - 10:00	66.4	65.4	66.2	67.6	67.5	66.9	66.2
Leq(24)*	66.2	65.5	65.5	66.9	67.0	66.7	66.5
Ldn	72.0	71.3	71.2	72.7	72.8	72.4	72.4
Lmax **	93.0	91.8	91.6	94.2	88.1	94.4	87.6
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 10:00-10:00

** Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-PTTGC, Branch 2 (Power Plant)

Location : The North of Fence Monitor Period : 22-29 Aug 2025
SLM Model : Cirrus CR162B Serial No : G300769
Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : 27 Feb 2025
SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 25 Feb 2026
Cal Sheet No. : CR-515-2025-224

Time	L90 (dB(A))						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
10:00 - 11:00	62.2	63.1	63.2	63.3	65.2	65.6	64.3
11:00 - 12:00	62.5	63.4	63.3	63.5	65.2	64.8	64.3
12:00 - 13:00	63.4	62.9	63.7	63.4	65.2	63.9	64.4
13:00 - 14:00	63.9	63.1	64.0	64.3	65.2	64.3	64.8
14:00 - 15:00	63.5	63.3	64.1	64.4	65.1	64.0	64.5
15:00 - 16:00	63.6	63.4	63.7	65.1	65.2	63.6	64.5
16:00 - 17:00	63.8	63.3	63.4	65.3	64.9	63.8	64.6
17:00 - 18:00	63.9	63.7	63.6	65.7	65.0	64.6	64.6
18:00 - 19:00	63.8	63.3	63.2	64.9	65.1	64.1	64.7
19:00 - 20:00	63.9	63.3	63.5	65.0	65.2	64.1	64.7
20:00 - 21:00	63.7	63.6	63.5	64.9	65.0	64.0	64.6
21:00 - 22:00	63.4	63.2	63.6	64.8	65.7	64.2	64.3
22:00 - 23:00	63.5	63.4	63.3	64.6	65.0	64.1	64.4
23:00 - 00:00	63.5	63.2	62.8	64.6	64.8	64.2	64.5
00:00 - 01:00	63.6	63.1	62.9	64.6	65.1	64.2	64.5
01:00 - 02:00	63.9	63.0	62.9	64.4	65.1	64.3	64.4
02:00 - 03:00	64.0	63.1	62.8	64.6	64.8	64.4	64.4
03:00 - 04:00	63.9	63.2	62.8	64.9	65.0	64.1	64.7
04:00 - 05:00	63.5	63.1	62.8	65.0	65.0	64.1	64.7
05:00 - 06:00	63.5	63.2	63.1	65.5	65.0	64.3	64.9
06:00 - 07:00	63.9	63.5	63.5	65.9	65.3	64.8	65.2
07:00 - 08:00	63.8	63.2	63.6	65.6	65.5	64.8	65.4
08:00 - 09:00	63.4	62.8	62.9	65.5	64.7	63.9	64.8
09:00 - 10:00	63.5	62.7	62.7	65.3	64.8	64.2	64.9
L90(avg)*	63.6	63.2	63.3	64.8	65.1	64.3	64.6

Remark : * Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise MTR-PTTGC, Branch 2 (Power Plant)

Location : The South of Fence Monitor Period : 22-29 Aug 2025
SLM Model : Cirrus CR162B Serial No : G300709
Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : 27 Feb 2025
SLM Reading / Adjust dB(A) : 94.3/-0.6 Expire Date : 25 Feb 2026
Cal Sheet No. : CR-515-2025-224

Time	Equivalent Sound Pressure Level (dB(A))						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
11:00 - 12:00	61.0	59.8	59.1	59.4	59.9	61.6	60.5
12:00 - 13:00	60.4	59.4	59.1	59.9	59.5	60.1	59.6
13:00 - 14:00	60.7	59.3	60.1	59.7	60.2	60.6	60.0
14:00 - 15:00	61.0	60.0	63.0	59.7	60.6	61.0	60.0
15:00 - 16:00	61.0	60.9	59.3	60.2	61.7	61.3	60.8
16:00 - 17:00	63.2	59.0	59.8	62.8	61.2	61.3	62.4
17:00 - 18:00	60.7	59.3	59.3	60.4	61.2	62.6	62.2
18:00 - 19:00	60.7	59.1	58.4	59.5	60.0	60.4	59.5
19:00 - 20:00	60.6	58.8	58.8	60.2	59.8	60.1	59.8
20:00 - 21:00	60.5	58.7	58.9	60.4	61.1	59.5	59.2
21:00 - 22:00	61.4	58.9	59.0	59.5	60.8	59.3	59.4
22:00 - 23:00	61.4	58.6	58.6	59.6	60.8	58.9	58.7
23:00 - 00:00	59.2	58.4	58.4	59.4	61.1	58.7	58.8
00:00 - 01:00	58.1	58.8	58.2	59.2	61.3	58.5	59.0
01:00 - 02:00	58.0	59.2	58.5	59.1	60.6	59.1	60.1
02:00 - 03:00	57.9	59.2	58.8	59.0	60.4	59.1	58.7
03:00 - 04:00	59.9	58.6	58.6	59.0	60.6	59.0	58.6
04:00 - 05:00	58.5	58.9	58.5	58.8	60.7	58.7	58.5
05:00 - 06:00	58.7	58.7	58.7	59.1	60.8	58.7	64.0
06:00 - 07:00	59.0	59.3	59.8	60.0	61.2	59.5	60.4
07:00 - 08:00	59.8	58.9	60.6	61.1	61.5	60.1	59.9
08:00 - 09:00	59.8	58.8	60.9	60.9	61.9	60.8	61.7
09:00 - 10:00	61.5	59.1	61.2	61.1	61.8	62.5	60.8
10:00 - 11:00	61.4	59.2	60.4	60.9	61.4	61.3	61.3

Leq(24)*	60.4	59.2	59.6	60.1	60.9	60.3	60.4
Ldn	65.8	65.3	65.3	65.9	67.3	65.7	66.5
Lmax **	87.4	95.5	87.7	95.7	95.3	94.6	96.6

Standard-24Hr 70 dB(A)
Standard-Max 115 dB(A)

Remark : * Average time between 11:00-11:00

** Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise MTR-PTTGC, Branch 2 (Power Plant)

Location : The South of Fence Monitor Period : 22-29 Aug 2025
SLM Model : Cirrus CR162B Serial No : G300709
Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : 27 Feb 2025
SLM Reading / Adjust dB(A) : 94.3/-0.6 Expire Date : 25 Feb 2026
Cal Sheet No. : CR-515-2025-224

Time	L90 (dB(A))						
	22-23 Aug 2025	23-24 Aug 2025	24-25 Aug 2025	25-26 Aug 2025	26-27 Aug 2025	27-28 Aug 2025	28-29 Aug 2025
11:00 - 12:00	59.6	58.3	58.0	58.1	58.5	59.2	58.4
12:00 - 13:00	59.4	58.2	57.9	58.3	58.2	58.7	58.4
13:00 - 14:00	59.6	58.3	58.0	58.4	58.7	58.9	58.5
14:00 - 15:00	59.3	58.5	59.3	58.2	59.0	59.3	58.7
15:00 - 16:00	59.4	58.1	58.2	58.2	58.8	59.1	59.0
16:00 - 17:00	59.8	58.0	58.1	58.4	58.9	59.2	59.1
17:00 - 18:00	59.1	58.0	57.7	58.4	58.6	59.2	58.6
18:00 - 19:00	59.5	57.9	57.2	58.0	58.4	58.9	58.3
19:00 - 20:00	59.6	57.8	57.7	58.1	58.4	58.8	58.2
20:00 - 21:00	59.5	58.0	58.1	58.6	59.6	58.4	58.1
21:00 - 22:00	58.9	58.1	58.0	58.4	59.3	58.4	57.7
22:00 - 23:00	59.5	57.9	57.7	58.5	59.4	58.0	57.7
23:00 - 00:00	58.4	57.8	57.5	58.5	59.7	57.7	57.9
00:00 - 01:00	57.4	58.0	57.5	58.2	59.8	57.6	58.0
01:00 - 02:00	57.4	58.4	57.5	58.2	59.3	58.0	57.9
02:00 - 03:00	57.2	58.4	58.0	58.1	59.1	58.0	57.8
03:00 - 04:00	57.7	57.8	57.8	58.1	59.1	57.9	57.7
04:00 - 05:00	57.8	57.9	57.6	57.9	59.2	57.8	57.6
05:00 - 06:00	57.9	57.8	57.6	58.1	59.3	57.8	59.0
06:00 - 07:00	57.8	57.9	58.2	58.8	59.4	57.9	58.1
07:00 - 08:00	58.3	57.6	58.2	58.6	59.3	57.7	58.3
08:00 - 09:00	58.0	57.6	58.2	58.8	59.5	58.1	58.5
09:00 - 10:00	58.4	58.0	58.3	58.6	59.6	58.6	58.3
10:00 - 11:00	58.6	58.0	58.3	58.8	59.4	58.4	58.1

L90(avg)*	58.7	58.0	58.0	58.4	59.1	58.4	58.3
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Remark : * Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team

ภาคผนวก ง.4

ใบรับรองผลการตรวจวิเคราะห์คุณภาพน้ำ



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited, REQUEST SERVICE No. : 1288/68
Branch 2 (Power Plant) SAMPLING METHOD : Grab
SAMPLING BY : SECOT Co., Ltd. SAMPLING TIME : 11:10
SAMPLING DATE : 09/07/2025 ANALYTICAL DATE : 10-16/07/2025
RECEIVED DATE : 10/07/2025 SITE OPERATOR : Mr. Anawat Pimwanna
REPORT DATE : 18/07/2025 FILE CODE : 225007_WW_July
SAMPLE CONDITION : Normal
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	33.7	≤ 40
pH	-	4500-H B	< 0.10	8.20	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	2.288	28,740 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 25	5.2	< 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	2.0	≤ 20
COD	mg/l	5220 C	< 15.00	47.72	< 120
Free Cl ₂	mg/l	4500-Cl G	< 0.01	0.06	≤ 1
Nitrate*	mg/l	4500-NO ₃ -I	< 0.02	6.5	≤ 10
TKN	mg/l	4500-Norg B	< 0.20	5.0	< 100
Copper (Cu)	mg/l	3120 B	< 0.001	< 0.02	≤ 2
Iron (Fe)*	mg/l	3500-Fe B	< 0.05	0.15	≤ 1
Zinc (Zn)	mg/l	3120 B	< 0.003	0.97	< 5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER, 22nd ED, 2017 (AWWA, APHA, WEF)

Pongpote Puthum
(Miss Pongpote Puthum)

Analyst

REG. NO. 7-239-0-0018

Araya Tipparak

(Mrs. Araya Tipparak)

Technical Management Team

REG. NO. 7-239-0-0004

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. ^{2/} In case of discharging effluent into water resources containing TDS of more than 3,000 mg/l, TDS in the effluent to be discharged must exceed TDS in the water resources by not more than 5,000 mg/l (Measurement Results of Coastal Water on July 09, 2025 found to be 23,740 mg/l therefore the Standard of TDS found to be 28,740 mg/l).

5. * Not registered with the Department of Industrial Works.

6. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited, REQUEST SERVICE No. : 1287/68
Branch 2 (Power Plant) SAMPLING METHOD : Grab
SAMPLING BY : SECOT Co., Ltd. SAMPLING TIME : 09:20
SAMPLING DATE : 09/07/2025 ANALYTICAL DATE : 10-16/07/2025
RECEIVED DATE : 10/07/2025 SITE OPERATOR : Mr. Chanapon Oakkharaplon
REPORT DATE : 17/07/2025 FILE CODE : 225007_SW_July
SAMPLE CONDITION : Normal
LOCATION DESCRIPTION : 1 = คลองระบายน้ำทิ้งของนิคมฯ ก่อนจุดปล่อยน้ำของโรงโกลดฟีนอล

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	32.8	≤ 40
pH	-	4500-H B	< 0.10	8.15	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	6.620	28,740 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 25	49	< 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	2.2	≤ 20
COD	mg/l	5220 C	< 15.00	28.48	< 120

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER, 22nd ED, 2017 (AWWA, APHA, WEF)

Khanchuda Insorn

(Miss Khanchuda Insorn)

Analyst

Araya Tipparak

(Mrs. Araya Tipparak)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ^{2/} No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited . REQUEST SERVICE No. : 1287/68
Branch 2 (Power Plant) SAMPLING METHOD : Grab
SAMPLING BY : SECOT Co., Ltd. SAMPLING TIME : 09:35
SAMPLING DATE : 09/07/2025 ANALYTICAL DATE : 10-16/07/2025
RECEIVED DATE : 10/07/2025 SITE OPERATOR : Mr.Chanapon Oakkharaplen
REPORT DATE : 17/07/2025 FILE CODE : 225007 SW July
SAMPLE CONDITION : Normal
LOCATION DESCRIPTION : 2 = ถังรองรับน้ำทิ้งของนิคมฯ หลังจุดปล่อยน้ำของโรงโม่หิน

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				2	
Temperature	°C	2550 B	< 0.5	31.9	2/
pH	-	4500-H ³ B	< 0.10	7.88	2/
Total Dissolved Solids	mg/l	2540 C	< 25	1.648	2/
Total Suspended Solids	mg/l	2540 D	< 25	9.2	2/
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2/
Phenols	mg/l	5530 B,C	< 0.001	ND	2/
BOD ₅	mg/l	5210 B	< 1.0	2.1	2/
COD	mg/l	5220 C	< 15.00	47.72	2/

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WFO)

Khemchula Insom

(Miss Khemchula Insom)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

- Remark : 1. Reported analysis refers to submitted sample only.
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3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).
Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.
4. ^{2/} No standard.
5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited . REQUEST SERVICE No. : 1496/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : 7-239
SAMPLING DATE : 14/08/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 15/08/2025 SAMPLING TIME : 08:51
ANALYTICAL DATE : 15-22/08/2025 SITE OPERATOR : Miss Salisa Ainree
REPORT DATE : 22/08/2025 FILE CODE : 7-239-n-0039
SAMPLE CONDITION : เหลืออีก
LOCATION DESCRIPTION : 1 = ถังปล่อยน้ำทิ้งของโรงงานฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				1	
Temperature	°C	2550 B	< 0.5	32.6	≤ 40
pH	-	4500-H ³ B	< 0.10	8.02	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	3.462	36,600 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 25	< 2.5	≤ 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.0	≤ 20
COD	mg/l	5220 C	< 15.00	27.94	≤ 120
Free Cl ₂	mg/l	4500-Cl G	< 0.01	0.15	≤ 1
TKN	mg/l	4500-Norg B	< 0.20	1.8	≤ 100
Copper (Cu)	mg/l	3120 B	< 0.001	< 0.02	≤ 2
Zinc (Zn)	mg/l	3120 B	< 0.003	0.79	≤ 5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WFO)

Pornnapa Budthum

(Miss Pornnapa Budthum)

Analyst

REG. NO. 7-239-n-0018

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-n-0004

- Remark : 1. Reported analysis refers to submitted sample only.
2. This report shall not be reproduced, except in full, without official approval.
3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).
4. ^{2/} In case of discharging effluent into water resources containing TDS of more than 3,000 mg/l, TDS in the effluent to be discharged must exceed TDS in the water resources by not more than 5,000 mg/l (Measurement Results of Coastal Water on August 14, 2025 found to be 31,600 mg/l therefore the Standard of TDS found to be 36,600 mg/l).
5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1496/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. :
SAMPLING DATE : 14/08/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 15/08/2025 SAMPLING TIME : 09:51
ANALYTICAL DATE : 15-22/08/2025 SITE OPERATOR : Miss Salisa Ainree
REPORT DATE : 22/08/2025
SAMPLE CONDITION : เติมน้ำ FILE CODE : 225007_VW_August
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ^{1/}
Nitrate	mg/l	4500-NO ₃ -E	< 0.02	0.54	≤ 10
Iron (Fe)	mg/l	3500-Fe B	< 0.05	0.27	≤ 1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Pornnapa Buddhum

(Miss Pornnapa Buddhum)

Analyst

(Mrs. Araya Tipparak)

Technical Management Team

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3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1498/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. :
SAMPLING DATE : 14/08/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 15/08/2025 SAMPLING TIME : 10:49
ANALYTICAL DATE : 15-22/08/2025 SITE OPERATOR : Miss Salisa Ainree
REPORT DATE : 22/08/2025
SAMPLE CONDITION : เติมน้ำ มีตะกอน FILE CODE : 225007_SW_August
LOCATION DESCRIPTION : 1 = คลองระบายน้ำทิ้งของนิคมฯ ก่อนปล่อยน้ำลงโรงโม่หินส์

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	32.7	25
pH		4500-H ⁺ B	< 0.10	8.59	25
Total Dissolved Solids	mg/l	2540 C	< 25	4,056	25
Total Suspended Solids	mg/l	2540 D	< 2.5	44	25
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	25
Phenols	mg/l	5530 B.C	< 0.001	ND	25
BOD ₅	mg/l	5210 B	< 1.0	2.3	25
COD	mg/l	5220 C	< 15.00	24.17	25

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Lusorn

(Miss Khemchuda Lusorn)

Analyst

(Mrs. Araya Tipparak)

Technical Management Team

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3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ^{2/} No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1498/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. :
SAMPLING DATE : 14/08/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 15/08/2025 SAMPLING TIME : 10:49
ANALYTICAL DATE : 15-22/08/2025 SITE OPERATOR : Miss Salisa Ainree
REPORT DATE : 22/08/2025
SAMPLE CONDITION : เหลืองใส มีตะกอน FILE CODE : 225007_SW_August
LOCATION DESCRIPTION : 2 = คลองระบายน้ำทิ้งของนิคมฯ หลังจุดปล่อยน้ำของโรงโม่หินฝินส์

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 2	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	32.5	^{2/}
pH	-	4500-H ¹ B	< 0.10	8.39	^{2/}
Total Dissolved Solids	mg/l	2540 C	< 2.5	7,288	^{2/}
Total Suspended Solids	mg/l	2540 D	< 2.5	10	^{2/}
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	^{2/}
Phenols	mg/l	5530 B,C	< 0.001	ND	^{2/}
BOD ₅	mg/l	5210 B	< 1.0	3.0	^{2/}
COD	mg/l	5220 C	< 15.00	31.72	^{2/}

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 22nd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)
Analyst

(Mrs. Araya Tippiaruk)
Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.
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3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).
Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.
4. ^{2/} No standard.
5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1720/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : 7-239
SAMPLING DATE : 11/09/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/09/2025 SAMPLING TIME : 10:38
ANALYTICAL DATE : 12-20/09/2025 SITE OPERATOR : Mr. Jeeerawat Khothamhian
REPORT DATE : 20/09/2025
SAMPLE CONDITION : เหลืองใส FILE CODE : 225007_WW_September
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Busin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	33.7	< 40
pH	-	4500-H ¹ B	< 0.10	7.38	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 2.5	3,574	19,120 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 2.5	3.0	≤ 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 C	< 15.00	66.71	≤ 120
Free Cl ₂	mg/l	4500-Cl G	< 0.01	0.01	≤ 1
TKN	mg/l	4500-Norg B	< 0.20	2.4	≤ 100
Copper (Cu)	mg/l	3120 B	< 0.001	< 0.02	≤ 2
Zinc (Zn)	mg/l	3120 B	< 0.003	0.90	≤ 5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 22nd ED., 2017 (AWWA, APHA, WEF)

(Miss Pornnapa Buddhin)
Analyst

REG. NO. 7-239-9-0018

(Mrs. Araya Tippiaruk)
Technical Management Team

REG. NO. 7-239-9-0004

Remark : 1. Reported analysis refers to submitted sample only.
2. This report shall not be reproduced, except in full, without official approval.
3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).
4. ^{2/} In case of discharging effluent into water resources containing TDS of more than 3,000 mg/l, TDS in the effluent to be discharged must exceed TDS in the water resources by not more than 5,000 mg/l (Measurement Results of Coastal Water on September 11, 2025 found to be 14,120 mg/l therefore the Standard of TDS found to be 19,120 mg/l).
5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1720/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : *
SAMPLING DATE : 11/09/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/09/2025 SAMPLING TIME : 10:38
ANALYTICAL DATE : 12-20/09/2025 SITE OPERATOR : Mr. Jeerawat Khotiamhan
REPORT DATE : 20/09/2025 FILE CODE : *
SAMPLE CONDITION : เหลืองใส นีละกอน FILE CODE : 225007_WW_September
LOCATION DESCRIPTION : 1 = ก่อนปล่อยสู่คลองระบองใหญ่ฝั่งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Nitrate	mg/l	4500-NO ₃ -E	< 0.02	2.2	≤ 10
Iron (Fe)	mg/l	3500-Fe B	< 0.05	0.14	≤ 1

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER, 21st ED., 2017 (AWWA, APHA, WEF)

Pominapa Budibun
(Miss Pominapa Budibun)

Analyst

Araya Tippanik
(Mrs. Araya Tippanik)

Technical Management Team

- Remark : 1. Reported analysis refers to submitted sample only.
2. This report shall not be reproduced, except in full, without official approval.
3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).
4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1719/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : *
SAMPLING DATE : 11/09/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/09/2025 SAMPLING TIME : 09:30
ANALYTICAL DATE : 12-19/09/2025 SITE OPERATOR : Miss Salisa Ainree
REPORT DATE : 20/09/2025 FILE CODE : *
SAMPLE CONDITION : เหลืองใส นีละกอน FILE CODE : 225007_SW_September
LOCATION DESCRIPTION : 1 = คลองระบายน้ำทิ้งของนิคมฯ ก่อนจุดปล่อยน้ำของโรงโม่หิน

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	30.2	2/
pH		4500-H ⁺ B	< 0.10	7.89	2/
Total Dissolved Solids	mg/l	2540 C	< 25	2,920	2/
Total Suspended Solids	mg/l	2540 D	< 2.5	36	2/
Pat Oil & Grease	mg/l	5520 B	< 2.0	ND	2/
Phenols	mg/l	5530 B,C	< 0.001	ND	2/
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	2/
COD	mg/l	5220 C	< 15.00	< 15.00	2/

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER, 21st ED., 2017 (AWWA, APHA, WEF)

Khonchuda Insom
(Miss Khonchuda Insom)
Analyst

Araya Tippanik
(Mrs. Araya Tippanik)
Technical Management Team

- Remark : 1. Reported analysis refers to submitted sample only.
2. This report shall not be reproduced, except in full, without official approval.
3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).
Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.
4. ^{2/} No standard.
5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1719/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : -
SAMPLING DATE : 11/09/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/09/2025 SAMPLING TIME : 09:30
ANALYTICAL DATE : 12-19/09/2025 SITE OPERATOR : Miss Salisa Ahree
REPORT DATE : 20/09/2025
SAMPLE CONDITION : เหลือไฮโดรเจนคลอไรด์ FILE CODE : 225007_SW_September
LOCATION DESCRIPTION : 2 - คลังขยะมูลฝอยของนิคมฯ หลังจุดปล่อยน้ำของโรงโม่หิน

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 2	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	30.9	2/
pH		4500-H B	< 0.10	7.65	2/
Total Dissolved Solids	mg/l	2540 C	< 2.5	1.632	2/
Total Suspended Solids	mg/l	2540 D	< 2.5	12	2/
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2/
Phenols	mg/l	5530 B,C	< 0.001	ND	2/
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	2/
COD	mg/l	5220 C	< 15.00	38.46	2/

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (ARWA ALPHA-WFF)

Khemchuda Insorn

(Miss Khemchuda Insorn)
Analyst

Araya Tipparak

(Mrs. Araya Tipparak)
Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ^{2/} No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1917/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : 7-239
SAMPLING DATE : 09/10/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 10/10/2025 SAMPLING TIME : 11:05
ANALYTICAL DATE : 10-20/10/2025 SITE OPERATOR : Mr. Anival Pinwanna
REPORT DATE : 20/10/2025
SAMPLE CONDITION : เก็บตัวอย่างสุดท้ายของนิคมฯ (Final Check Basin) FILE CODE : 225007_WW_October
LOCATION DESCRIPTION : 1 - ก่อนปล่อยน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	31.8	≤ 40
pH		4500-H B	< 0.10	7.70	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 2.5	2,886	33,400 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 2.5	3.4	≤ 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.8	≤ 20
COD	mg/l	5220 C	< 15.00	41.90	≤ 120
Free Cl ₂	mg/l	4500-Cl G	< 0.01	0.04	≤ 1
TKN	mg/l	4500-Norg B	< 0.20	3.4	< 100
Copper (Cu)	mg/l	3120 B	< 0.001	< 0.02	≤ 2
Zinc (Zn)	mg/l	3120 B	< 0.003	0.56	≤ 5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (ARWA ALPHA-WFF)

Pornapa Budthum

(Miss Pornapa Budthum)
Analyst

REG. NO. 7-239-9-0018

Araya Tipparak

(Mrs. Araya Tipparak)
Technical Management Team

REG. NO. 7-239-9-0004

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E. 2565 (2022).

4. ^{2/} In case of discharging effluent into water resources containing TDS of more than 3,000 mg/l. TDS in the effluent to be discharged must exceed TDS in the water resources by not more than 5,000 mg/l (Measurement Results of Coastal Water on October 09, 2025 found to be 28,400 mg/l therefore the Standard of TDS found to be 33,400 mg/l).

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1917/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : *
SAMPLING DATE : 09/10/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 10/10/2025 SAMPLING TIME : 11:05
ANALYTICAL DATE : 10-20/10/2025 SITE OPERATOR : Mr. Aniwat Pimwanna
REPORT DATE : 20/10/2025 FILE CODE : 225007 WW_October
SAMPLE CONDITION : เก็บตัวอย่าง
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ^{1/}
Nitrate	mg/l	4500-NO ₃ -H	< 0.02	0.85	≤ 10
Iron (Fe)	mg/l	3500-Fe B	< 0.05	0.66	≤ 1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (APHA, AWWA, WEF)

Pornnupa Buddham
(Miss Pornnupa Buddham)

Analyst

Araya Tipparuk
(Mrs. Araya Tipparuk)

Technical Management Team

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3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1918/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : *
SAMPLING DATE : 09/10/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 10/10/2025 SAMPLING TIME : 10:05
ANALYTICAL DATE : 10-20/10/2025 SITE OPERATOR : Miss Thipsuda Wannkran
REPORT DATE : 20/10/2025 FILE CODE : 225007_SW_October
SAMPLE CONDITION : เก็บตัวอย่าง
LOCATION DESCRIPTION : 1 = คลองระบายน้ำทิ้งของนิคมฯ ก่อนจุดปล่อยน้ำของโรงโม่หิน

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	31.0	2 ^{2/}
pH		4500-H B	< 0.10	6.89	2 ^{2/}
Total Dissolved Solids	mg/l	2540 C	< 25	1,760	2 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 2.5	29	2 ^{2/}
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2 ^{2/}
Phenols	mg/l	5530 B,C	< 0.001	ND	2 ^{2/}
BOD ₅	mg/l	5210 B	< 1.0	1.1	2 ^{2/}
COD	mg/l	5220 C	< 15.00	< 15.00	2 ^{2/}

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (APHA, AWWA, WEF)

Khuechuda Insorn
(Miss Khuechuda Insorn)

Analyst

Araya Tipparuk
(Mrs. Araya Tipparuk)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ^{2/} No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 1918/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. :
SAMPLING DATE : 09/10/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 10/10/2025 SAMPLING TIME : 10:05
ANALYTICAL DATE : 10-20/10/2025 SITE OPERATOR : Miss Thipsuda Wannakran
REPORT DATE : 20/10/2025
SAMPLE CONDITION : เหลือจุ่ม FILE CODE : 225007_SW_October
LOCATION DESCRIPTION : 2 = ถังรองรับน้ำทิ้งขงนิคมฯ หลังจุดปล่อยน้ำทิ้งโรงโม่หิน

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 2	STANDARD ¹⁾
Temperature	°C	2550 B	< 0.5	31.2	2)
pH		4500-H ¹⁾ B	< 0.10	8.77	2)
Total Dissolved Solids	mg/l	2540 C	< 25	1,354	2)
Total Suspended Solids	mg/l	2540 D	< 2.5	11	2)
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2)
Phenols	mg/l	5530 B,C	< 0.001	ND	2)
BOD ₅	mg/l	5210 B	< 1.0	1.2	2)
COD	mg/l	5220 C	< 15.00	23.74	2)

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA APHA WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)
Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)
Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

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3. ¹⁾ Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ²⁾ No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 2168/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : 7-239
SAMPLING DATE : 13/11/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 14/11/2025 SAMPLING TIME : 10:12
ANALYTICAL DATE : 14-20/11/2025 SITE OPERATOR : Mr. Jeerawat Khethamhan
REPORT DATE : 21/11/2025
SAMPLE CONDITION : เหลือจุ่มก่อน FILE CODE : 225007_WW_November
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ¹⁾
Temperature	°C	2550 B	< 0.5	31.8	≤ 40
pH		4500-H ¹⁾ B	< 0.10	7.40	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	4,184	27,500 ²⁾
Total Suspended Solids	mg/l	2540 D	< 2.5	3.8	≤ 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.5	≤ 20
COD	mg/l	5220 C	< 15.00	34.94	≤ 120
Free Cl ₂	mg/l	4500-C1 G	< 0.01	0.02	≤ 1
TKN	mg/l	4500-Norg B	< 0.20	3.8	≤ 100
Copper (Cu)	mg/l	3120 B	< 0.001	< 0.02	≤ 2
Zinc (Zn)	mg/l	3120 B	< 0.003	0.86	< 5

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2021 (AWWA APHA WEF)

Pornnupa Buddhum

(Miss Pornnupa Buddhum)
Analyst

REG. NO. 7-239-n-0018

Araya Tipparuk

(Mrs. Araya Tipparuk)
Technical Management Team

REG. NO. 7-239-n-0004

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ¹⁾ Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. ²⁾ In case of discharging effluent into water resources containing TDS of more than 3,000 mg/l. TDS in the effluent to be discharged must exceed TDS in the water resources by not more than 5,000 mg/l (Measurement Results of Coastal Water on November 13, 2025 found to be 22,500 mg/l therefore the Standard of TDS found to be 27,500 mg/l).

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 2168/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : -
SAMPLING DATE : 13/11/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 14/11/2025 SAMPLING TIME : 10:12
ANALYTICAL DATE : 14-20/11/2025 SITE OPERATOR : Mr. Jeeerawat Khotamhan
REPORT DATE : 21/11/2025 FILE CODE : -
SAMPLE CONDITION : เก็บตัวอย่างน้ำดิบก่อน FILE CODE : 225007_WW_November
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Nitrate	mg/l	4500-NO ₃ -E	< 0.02	1.0	≤ 10
Iron (Fe)	mg/l	3500-Fe B	< 0.05	0.22	≤ 1

REFERENCE STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2022 (AWWA APHA, WEF)

Pornnapa Budthum

(Miss Pornnapa Budthum)

Analyst

(Mrs. Araya Tipparak)

(Mrs. Araya Tipparak)

Technical Management Team

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3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 2167/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : -
SAMPLING DATE : 13/11/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 14/11/2025 SAMPLING TIME : 09:50
ANALYTICAL DATE : 14-19/11/2025 SITE OPERATOR : Miss Thipsuda Wannakran
REPORT DATE : 20/11/2025 FILE CODE : -
SAMPLE CONDITION : เก็บตัวอย่างน้ำดิบก่อน FILE CODE : 225007_SW_November
LOCATION DESCRIPTION : 1 = คลองระบายน้ำทิ้งของนิคมฯ ก่อนจุดปล่อยน้ำของโรงโหลาพื้นที่

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	31.0	2 ^{2/}
pH	-	4500-H ⁺ B	< 0.10	7.93	2 ^{1/}
Total Dissolved Solids	mg/l	2540 C	< 25	2,154	2 ^{1/}
Total Suspended Solids	mg/l	2540 D	< 2.5	21	2 ^{1/}
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2 ^{1/}
Phenols	mg/l	5530 B,C	< 0.001	ND	2 ^{1/}
BOD ₅	mg/l	5210 B	< 1.0	1.1	2 ^{1/}
COD	mg/l	5220 C	< 15.00	< 15.00	2 ^{1/}

REFERENCE STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2022 (AWWA APHA, WEF)

Khamechuda Insorn

(Miss Khamechuda Insorn)

Analyst

(Mrs. Araya Tipparak)

(Mrs. Araya Tipparak)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ^{2/} No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited . REQUEST SERVICE No. : 2167/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. :
SAMPLING DATE : 13/11/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 14/11/2025 SAMPLING TIME : 09:50
ANALYTICAL DATE : 14-19/11/2025 SITE OPERATOR : Miss Thipsuda Wannakrao
REPORT DATE : 20/11/2025
SAMPLE CONDITION : เหลืองใสสะอาด FILE CODE : 225007_SW_November
LOCATION DESCRIPTION : 2 = คลองระบายนํ้าทิ้งของนิคมฯ แหล่งปล่อยน้ำของโรงโม่หิน

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 2	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	31.4	21
pH	-	4500-H ⁺ B	< 0.10	7.59	21
Total Dissolved Solids	mg/l	2540 C	< 25	1.393	21
Total Suspended Solids	mg/l	2540 D	< 2.5	10	21
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	21
Phenols	mg/l	5530 B,C	< 0.001	ND	21
BOD ₅	mg/l	5210 B	< 1.0	1.5	21
COD	mg/l	5220 C	< 15.00	20.38	21

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2021 (AWWA APHA WEF)

(Miss Khemchula Insorn)
Analyst

(Mrs. Araya Tipparuk)
Technical Management Team

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Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ^{2/} No standard.

5. - Not available.



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TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited . REQUEST SERVICE No. : 2177/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : 7-239
SAMPLING DATE : 11/12/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/12/2025 SAMPLING TIME : 10:40
ANALYTICAL DATE : 12-18/12/2025 SITE OPERATOR : Mr.Chanapon Oakkharaplon
REPORT DATE : 18/12/2025
SAMPLE CONDITION : เหลืองใสสะอาด FILE CODE : 225007_WW_December
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION 1	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	30.0	≤ 40
pH	-	4500-H ⁺ B	< 0.10	6.80	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	4.344	40,660 ^{2/}
Total Suspended Solids	mg/l	2540 D	< 2.5	2.9	≤ 50
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.3	≤ 20
COD	mg/l	5220 C	< 15.00	52.05	≤ 120
Free Cl ₂	mg/l	4500-Cl G	< 0.01	0.05	≤ 1
TKN	mg/l	4500-Norg B	< 0.20	5.6	≤ 100
Copper (Cu)	mg/l	3120 B	< 0.001	< 0.02	≤ 2
Zinc (Zn)	mg/l	3120 B	< 0.003	0.62	≤ 5

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2021 (AWWA APHA WEF)

(Mrs. Pornnapa Buidthum)
Analyst

REG. NO. 7-239-B-0013

(Mrs. Araya Tipparuk)
Technical Management Team

REG. NO. 7-239-B-0004

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. ^{2/} In case of discharging effluent into water resources containing TDS of more than 3,000 mg/L, TDS in the effluent to be discharged must exceed TDS in the water resources by not more than 5,000 mg/l (Measurement Results of Coastal Water on December 11, 2025 found to be 35,660 mg/l therefore the Standard of TDS found to be 40,660 mg/l).

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 2377/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : -
SAMPLING DATE : 11/12/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/12/2025 SAMPLING TIME : 10:40
ANALYTICAL DATE : 12-18/12/2025 SITE OPERATOR : Mr.Chanapon Oukkhuraplon
REPORT DATE : 18/12/2025 FILE CODE : -
SAMPLE CONDITION : เหลือถังใส่น้ำตะกอน
LOCATION DESCRIPTION : 1 = ก่อนปล่อยลงสู่คลองระบายน้ำทิ้งของนิคมฯ (Final Check Basin)

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ¹⁾
Nitrate	mg/l	4500-NO ₃ -E	< 0.02	1.1	≤ 10
Iron (Fe)	mg/l	3500-Fe B	< 0.05	0.13	≤ 1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 22nd ED. 2021 (AWWA APHA, WEF)

Bongpa Puthum

(Miss Pormnapa Budthum)

Analyst

NT

(Mrs. Araya Tipparuk)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ¹⁾ Notification of the Ministry of Natural Resources and Environment B.E.2565 (2022).

4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 2378/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : -
SAMPLING DATE : 11/12/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/12/2025 SAMPLING TIME : 10:00
ANALYTICAL DATE : 12-17/12/2025 SITE OPERATOR : Mr. Anivat Pimwanna
REPORT DATE : 18/12/2025 FILE CODE : -
SAMPLE CONDITION : เหลือถังใส่น้ำตะกอน
LOCATION DESCRIPTION : 1 = คลองระบายน้ำทิ้งของนิคมฯ ก่อนปล่อยลงน้ำของโรงโหลาหินสี

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION I	STANDARD ¹⁾
Temperature	°C	2550 B	< 0.5	27.6	2)
pH	-	4500-H ⁺ B	< 0.10	8.46	2)
Total Dissolved Solids	mg/l	2540 C	< 25	3,812	2)
Total Suspended Solids	mg/l	2540 D	< 2.5	102	2)
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2)
Phenols	mg/l	5530 B,C	< 0.001	ND	2)
BOD ₅	mg/l	5210 B	< 1.0	2.3	2)
COD	mg/l	5220 C	< 15.00	36.04	2)

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2021 (AWWA APHA, WEF)

Khemchuda Insom

(Miss Khemchuda Insom)

Analyst

NT

(Mrs. Araya Tipparuk)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ¹⁾ Notification of the National Environment Board No.8 B.E.2537 (1994).

Subject Determining water quality standards in Surface Water Sources for Surface Water Class 5.

4. ²⁾ No standard.

5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : PTT Global Chemical Public Company Limited , REQUEST SERVICE No. : 2378/68
Branch 2 (Power Plant)
SAMPLING BY : SECOT Co., Ltd. REGISTRATION No. : *
SAMPLING DATE : 11/12/2025 SAMPLING METHOD : Grab
RECEIVED DATE : 12/12/2025 SAMPLING TIME : 10:00
ANALYTICAL DATE : 12-17/12/2025 SITE OPERATOR : Mr. Aniwat Pimwanna
REPORT DATE : 18/12/2025
SAMPLE CONDITION : เหลืองใสมีตะกอน FILE CODE : 225007_SW_December
LOCATION DESCRIPTION : 2 = คลองระบายน้ำทิ้งของนิคมฯ หลังจุดปล่อยน้ำของโรงโหล่ฟีนอล

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				2	
Temperature	°C	2550 B	< 0.5	27.2	2/
pH		4500-H ⁺ B	< 0.10	7.65	2/
Total Dissolved Solids	mg/l	2540 C	< 25	1,950	2/
Total Suspended Solids	mg/l	2540 D	< 2.5	26	2/
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	2/
Phenols	mg/l	5530 B,C	< 0.001	ND	2/
BOD ₅	mg/l	5210 B	< 1.0	2.7	2/
COD	mg/l	5220 C	< 15.00	32.03	2/

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (APHA, APCA, WPCF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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4. ^{2/} No standard.

5. - Not available.

ภาคผนวก ง.5

ใบรับรองผลการตรวจวัดระดับเสียงในพื้นที่ทำงาน



Noise Monitoring Result : Working Noise MTR-PTTGC, Branch 2 (Power Plant)

Location : Air Intake Monitor Period : Aug 14, 2025
SLM Model : SCARLET ST-21D Serial No : 820728
Site Operator : Miss Salisa Ainree

Calibrator Model : Cirrus CR:515 Serial No : 97097
Calibration Ref dB(A) : 94.0 Certified Date : Oct 02 2024
SLM Reading / Adjust dB(A) : 93.8/0.0 Expire Date : Oct 01 2025
Cal Sheet No. : CR-515-2025-189

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 14, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00	86.4	
08:00 - 09:00	86.4	
09:00 - 10:00	86.5	
10:00 - 11:00	86.3	
11:00 - 12:00	86.3	
12:00 - 13:00	86.3	
13:00 - 14:00	86.3	
14:00 - 15:00	86.3	
15:00 - 16:00	86.7	
16:00 - 17:00	86.2	
17:00 - 18:00	86.6	
18:00 - 19:00	86.5	
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(12)*	86.4	
Lmax **	89.9	
Standard-12Hr	87 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 07:00-19:00

** Maximum Sound Pressure Level between 07:00-19:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team



Noise Monitoring Result : Working Noise MTR-PTTGC, Branch 2 (Power Plant)

Location : Turbine Monitor Period : Aug 14, 2025
SLM Model : SCARLET ST-21D Serial No : 820729
Site Operator : Miss Salisa Ainree

Calibrator Model : Cirrus CR:515 Serial No : 97097
Calibration Ref dB(A) : 94.0 Certified Date : Oct 02 2024
SLM Reading / Adjust dB(A) : 93.8/0.0 Expire Date : Oct 01 2025
Cal Sheet No. : CR-515-2025-189

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 14, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00	77.5	
08:00 - 09:00	77.3	
09:00 - 10:00	77.2	
10:00 - 11:00	77.2	
11:00 - 12:00	77.1	
12:00 - 13:00	77.1	
13:00 - 14:00	77.4	
14:00 - 15:00	77.3	
15:00 - 16:00	77.8	
16:00 - 17:00	77.8	
17:00 - 18:00	77.4	
18:00 - 19:00	77.6	
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(12)*	77.4	
Lmax **	91.5	
Standard-12Hr	87 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 07:00-19:00

** Maximum Sound Pressure Level between 07:00-19:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team



Noise Monitoring Result : Working Noise MTR-PTTGC, Branch 2 (Power Plant)

Location : Air Intake Monitor Period : Nov 13, 2025
SLM Model : SCARLET ST-21D Serial No : 820728
Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : Feb 27 2025
SLM Reading / Adjust dB(A) : 93.7/0.1 Expire Date : Feb 26 2026
Cal Sheet No. : CR-515-2025-295

Time	Equivalent Sound Pressure Level (dB(A))
	Nov 13, 2025
00:00 - 01:00	
01:00 - 02:00	
02:00 - 03:00	
03:00 - 04:00	
04:00 - 05:00	
05:00 - 06:00	
06:00 - 07:00	
07:00 - 08:00	84.7
08:00 - 09:00	84.7
09:00 - 10:00	84.9
10:00 - 11:00	85.0
11:00 - 12:00	84.9
12:00 - 13:00	85.9
13:00 - 14:00	85.2
14:00 - 15:00	84.7
15:00 - 16:00	85.9
16:00 - 17:00	84.9
17:00 - 18:00	84.7
18:00 - 19:00	85.7
19:00 - 20:00	
20:00 - 21:00	
21:00 - 22:00	
22:00 - 23:00	
23:00 - 24:00	
Leq(12)*	85.1
Lmax **	89.5
Standard-12Hr	87 dB(A)
Standard-Max	140 dB(A)

Remark : * Average time between 07:00-19:00
** Maximum Sound Pressure Level between 07:00-19:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team



Noise Monitoring Result : Working Noise MTR-PTTGC, Branch 2 (Power Plant)

Location : Turbine Monitor Period : Nov 13, 2025
SLM Model : SCARLET ST-21D Serial No : 820729
Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : Feb 27 2025
SLM Reading / Adjust dB(A) : 93.7/0.1 Expire Date : Feb 26 2026
Cal Sheet No. : CR-515-2025-295

Time	Equivalent Sound Pressure Level (dB(A))
	Nov 13, 2025
00:00 - 01:00	
01:00 - 02:00	
02:00 - 03:00	
03:00 - 04:00	
04:00 - 05:00	
05:00 - 06:00	
06:00 - 07:00	
07:00 - 08:00	77.1
08:00 - 09:00	76.1
09:00 - 10:00	76.4
10:00 - 11:00	76.4
11:00 - 12:00	76.0
12:00 - 13:00	76.6
13:00 - 14:00	75.9
14:00 - 15:00	75.7
15:00 - 16:00	76.7
16:00 - 17:00	77.4
17:00 - 18:00	76.4
18:00 - 19:00	75.9
19:00 - 20:00	
20:00 - 21:00	
21:00 - 22:00	
22:00 - 23:00	
23:00 - 24:00	
Leq(12)*	76.4
Lmax **	85.2
Standard-12Hr	87 dB(A)
Standard-Max	140 dB(A)

Remark : * Average time between 07:00-19:00
** Maximum Sound Pressure Level between 07:00-19:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team

ภาคผนวก จ

ใบแสดงการตรวจเทียบเครื่องมือ

Sheet No. : CAL-M5009/01/25



CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 9 Jan 25

Initial Final Average
Barometric press, Pb 758 758 758 mmHg

Dry Gas Meter Data

Console No. M50-09

Serial No. 358794

Metering System ID

Model S110

DGM Number 333249

Correction factor (Yr) 1.0077

DGM Model ES-110

Last Calibration Date 25 Oct 24

Calibrated by : Montri P.

Orifice manometer setting, ΔH mm H ₂ O	Ref. DGM Volume V _r Liters	DGM Volume V _m Liters	Temperature (°C)				Time ⊙ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
12.5	100.1	101.3	25	25	24	24.5	8.57	0.9926	41.6238
25.0	100.2	100.4	25	25	24	24.5	6.23	1.0012	44.0131
50.0	100.1	100.5	25	25	24	24.5	4.42	0.9965	44.2732
76.0	100.2	99.7	25	25	24	24.5	3.58	1.0037	44.1905
100.0	100.3	99.6	25	25	24	24.5	3.58	1.0034	45.3098
150.0	100.3	99.2	25	25	24	24.5	2.60	1.0029	45.7895
Average								1.0000	44.2000

Approved by :

Sheet No. : CAL-PI-PS10-01/2025



PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 03-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PS10-01

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔPstd (mm H ₂ O)	ΔPs (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(A)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

C_{P(A),avg} 0.8401

B Side Calibration

Run No.	ΔPstd (mm H ₂ O)	ΔPs (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(B)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

C_{P(B),avg} 0.8401

|CP(A)-CP(B)| = 0.0000

C_{P(Avg)} = 0.8401

Approved by :

*** δ must be ≤ 0.01 for the test to be acceptable ***
*** |Cp(A)-Cp(B)| must also be < 0.01 if average of Cp(A) and Cp(B) is not used ***



PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 03-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PS20-01

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(A)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

 $C_{p(A),avg}$ 0.8401

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(B)
1	15.0	21.0	0.8367	0.0065
2	15.0	21.5	0.8269	-0.0033
3	15.0	21.5	0.8269	-0.0033

 $C_{p(B),avg}$ 0.8302 $|Cp(A) - Cp(B)| = 0.0099$ $C_{p(Avg)} = 0.8351$

Approved by :

*** δ must be ≤ 0.01 for the test to be acceptable ***
 *** $|Cp(A) - Cp(B)|$ must also be < 0.01 if average of $Cp(A)$ and $Cp(B)$ is to be used ***

CONTROL UNIT CALIBRATION
(Metric units, mm)

Date 6 Jan 25

Initial Final Average
 Barometric press, Pb 758 758 758 mmHg

Dry Gas Meter Data

Console No. M50-07

Serial No. 358794

Metering System ID

Model S110

DGM Number 90331

Correction factor (Yr) 1.0077

DGM Model MST-C2-1

Last Calibration Date 25 Oct 24

Calibrated by Montri P.

Reference Dry Gas Meter Data

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V _r Liters	DGM Volume V _m Liters	Temperature (°C)				Time Θ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
12.5	100.1	101.0	25	25	24	24.5	8.67	0.9958	42.5842
25.0	99.9	100.8	25	25	24	24.5	6.23	0.9946	44.2513
50.0	100.0	100.9	25	25	24	24.5	4.62	0.9920	48.4414
76.0	100.1	99.3	25	25	24	24.5	3.63	1.0074	45.4868
100.0	100.2	100.7	25	25	24	24.5	3.63	0.9921	47.7831
150.0	99.9	99.4	25	25	24	24.5	2.62	0.9970	46.7598

Average 0.9965 45.8844

Approved by :



PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 03-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PS10-02

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(A)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

 $C_{P(A),avg}$ 0.8401

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(B)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

 $C_{P(B),avg}$ 0.8401 $|Cp(A) - Cp(B)| = 0.0000$ $C_{P(Avg)} = 0.8401$

Approved by :

*** δ must be ≤ 0.01 for the test to be acceptable ***
 *** $|Cp(A) - Cp(B)|$ must also be < 0.01 if average of Cp(A) and Cp(B) is to be used ***



High Volume TSP&PM-10 Calibration Report

Date: 16-Jan-25

Ta (°C): 30

Pa (mm Hg): 760

Orifice Transfer Standard Calibration

Equipment: Orifice
 Model No: TE-5025A
 Serial No: 3674
 Manufacturer: TISCH
 Slope (m): 2.14057
 Intercept (b): -0.07783

Unit Under Test

Equipment: High-vol pump
 Model No: TE-5005X
 Serial No: BH-007

High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H ₂ O)	Indicate (X) (cm H ₂ O)	Actual Flow (Y) (cfm)	Remark
18	13.03	17.50	60.344	
13	10.1	13.84	53.281	
10	7.94	11.28	47.387	
7	5.12	7.37	38.305	
5	3.15	4.55	30.323	

Linear Regression

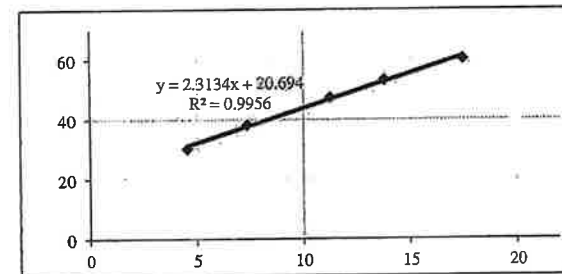
Slope: 2.3134

Intercept: 20.6942

Corr. Coeff: 0.9978

Flow PM-10: 8.3453

Flow TSP: 12.6680



Calibrated by :

Approved by :



High Volume TSP&PM-10 Calibration Report

Date:

14-Jan-25

Ta (°C):

27

Pa (mm Hg)

760

Orifice Transfer Standard Calibration

Equipment: Orifice
 Model No: TE-5025A
 Serial No: 3674
 Manufacturer: TISCH
 Slope (m): 2.14057
 Intercept (b): -0.07783

Unit Under Test

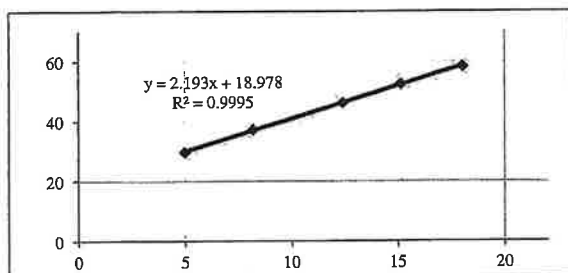
Equipment: High-vol pump
 Model No: TE-5005X
 Serial No: BH-015

High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H ₂ O)	Indicate (X) (cm H ₂ O)	Actual Flow (Y) (cfm)	Remark
18	12.04	18.06	58.339	
13	9.71	15.16	52.521	
10	7.44	12.42	46.134	
7	4.78	8.20	37.233	
5	2.98	4.98	29.669	

Linear Regression

Slope: 2.1930
 Intercept: 18.9785
 Corr. Coeff: 0.9997
 Flow PM-10: 9.5859
 Flow TSP: 14.1459



Calibrated by:

Approved by:



High Volume TSP&PM-10 Calibration Report

Date:

13-Jan-25

Ta (°C):

19

Pa (mm Hg)

763

Orifice Transfer Standard Calibration

Equipment: Orifice
 Model No: TE-5025A
 Serial No: 3674
 Manufacturer: TISCH
 Slope (m): 2.14057
 Intercept (b): -0.07783

Unit Under Test

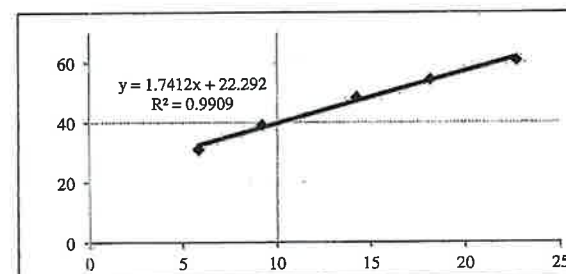
Equipment: High-vol pump
 Model No: TE-5005X
 Serial No: BH-005

High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H ₂ O)	Indicate (X) (cm H ₂ O)	Actual Flow (Y) (cfm)	Remark
18	12.7	22.71	60.796	
13	10.1	18.19	54.355	
10	7.91	14.25	48.251	
7	5.14	9.19	39.144	
5	3.18	5.82	31.063	

Linear Regression

Slope: 1.7412
 Intercept: 22.2916
 Corr. Coeff: 0.9955
 Flow PM-10: 10.1705
 Flow TSP: 15.9137



Calibrated by:

Approved by:



High Volume TSP&PM-10 Calibration Report

Date:

16-Jan-25

Ta (°C):

24

Pa (mm Hg)

762

Orifice Transfer Standard Calibration

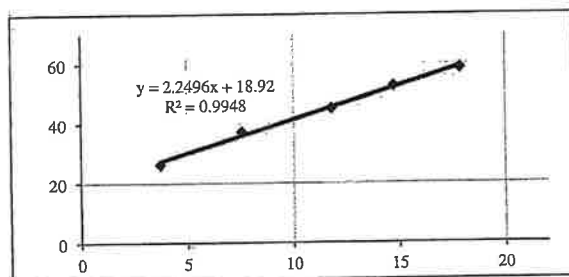
Equipment: Orifice
 Model No: TE-5025A
 Serial No: 3674
 Manufacturer: TISCH
 Slope (m): 2.14057
 Intercept (b): -0.07783

Unit Under Test

Equipment: High-vol pump
 Model No: TE-5005X
 Serial No: BH-023

High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H ₂ O)	Indicate (X) (cm H ₂ O)	Actual Flow (Y) (cfm)	Remark
18	12.01	17.91	58.630	
13	9.63	14.76	52.634	
10	7.03	11.81	45.158	
7	4.73	7.57	37.272	
5	2.29	3.71	26.325	



Calibrated by:

W. Haya K.

Approved by:



SO2 Analyzer Performance Test

Date: 10 Jan 25

Temp: (°C)

25

Barometric Pressure: Pb (mmHg)

760

Analyzer Type: SO2
 Brand: Thermo
 Model: 43C
 S/N: 60771-328/2

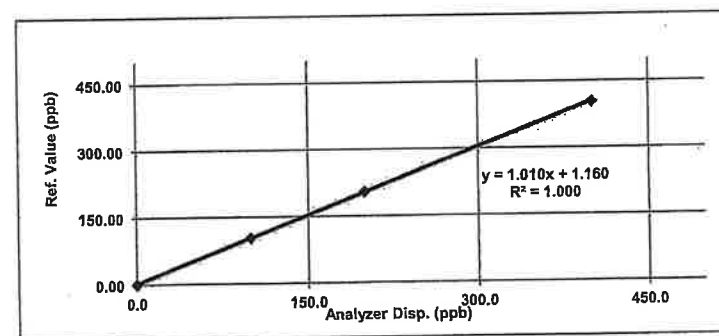
Dilutor: Teledyne T700 1367
 Zero Air: M701 S/N 1044
 STD GAS: D869358

Single Point Calibration

Supply Gas	Ref Value	Analyzer Disp.	Zero-Span Error %	Slope - Offset
Zero	0.00	0.30	-	-
Span	450.00	456.70	-	1.010

MultiPoint Calibration

Ref Value	Analyzer Disp.	Output Difference		
		Diff	Percent Diff	Percent Diff abs.
0.0	0.10	0.10	-	-
100.0	102.20	2.20	2.20	2.20
200.0	205.30	5.30	2.65	2.65
400.0	404.20	4.20	1.05	1.05
			Average Diff (%)	1.97



Calibrated by:

W. Haya K.

Approved by:



SO2 Analyzer Performance Test

Date : 10 Jan 25

Temp: (°C) 25

Barometric Pressure: Pb (mmHg) 760

Analyzer Type :	SO2
Brand :	Teledyne
Model :	T100
S/N :	120

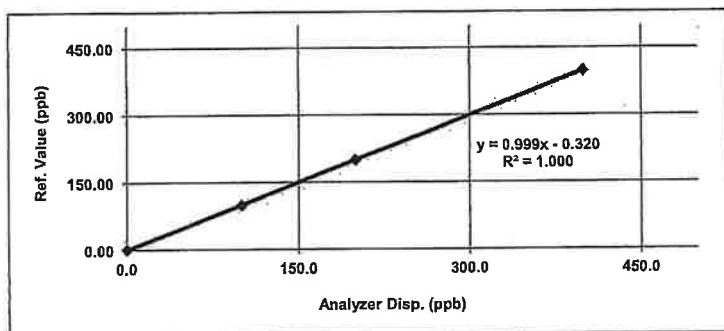
Dilutor :	Teledyne T700 1367
Zero Air :	M701 S/N 1044
STD GAS :	D869358

Single Point Calibration

Supply Gas	Ref Value	Analyzer Disp.	Zero-Span Error %	Slope - Offset
Zero	0.00	0.50	-	-
Span	450.00	447.70	-	0.999

MultiPoint Calibration

Ref Value	Analyzer Disp.	Output Difference		
		Diff	Percent Diff	Percent Diff abs.
0.0	0.10	0.10	-	-
100.0	99.10	-0.90	-0.90	0.90
200.0	199.30	-0.70	-0.35	0.35
400.0	399.40	-0.60	-0.15	0.15
Average Diff (%)				0.47

Calibrated by : Wittaya W.Approved by : [Signature]

NOX-NO Analyzer Performance Test

Date : 8 Jan 25

Temp: (°C) 25

Barometric Pressure: Pb (mmHg) 760

Analyzer Type :	Nox
Brand :	API
Model :	200A
S/N :	2387

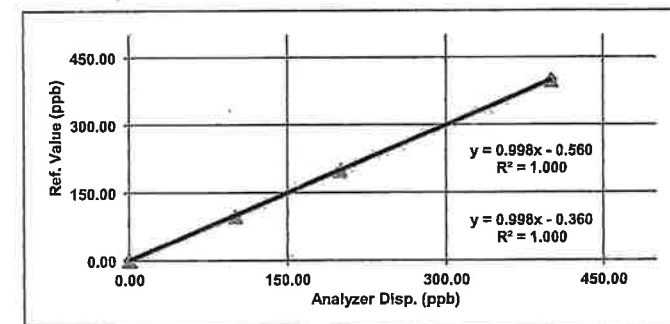
Dilutor :	Teledyne T700 1367
Zero Air :	M701 S/N 1044
STD GAS :	D869358

NOX-NO Single Point Calibration

Supply Gas	Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Slope - Offset
Zero	0.0	1.20	0.90	0.998
Span	450.0	451.2	449.60	0.998

NOX-NO MultiPoint Calibration

Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Output Difference	
			NOx Percent Diff abs.	NO Percent Diff abs.
0.00	1.20	0.90	-	-
100.00	97.80	97.60	2.2	2.4
200.00	198.60	198.60	0.7	0.7
400.00	399.60	399.30	0.1	0.2
Average Diff (%)			1.0	1.1

Calibrated by : Wittaya W.Approved by : [Signature]



NOX-NO Analyzer Performance Test

Date : 8 Jan 25

Temp: (°C) 25

Barometric Pressure: Pb (mmHg) 760

Analyzer Type :	Nox
Brand :	API
Model :	200A
S/N :	1505

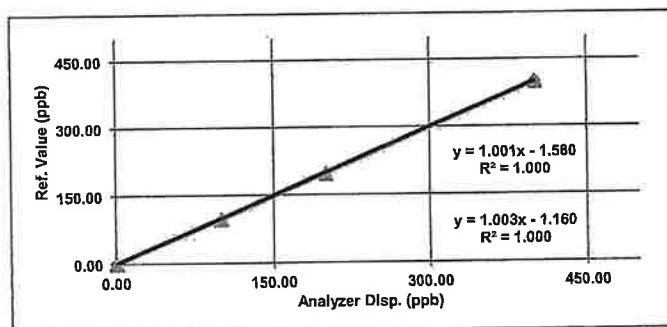
Dilutor :	Teledyne T700 1367
Zero Air :	M701 S/N 1044
STD GAS :	D869358

NOX-NO Single Point Calibration

Supply Gas	Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Slope - Offset
Zero	0.0	1.00	0.30	1.001
Span	450.0	455.7	456.10	1.001

NOX-NO MultiPoint Calibration

Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Output Difference	
			NOx Percent Diff abs.	NO Percent Diff abs.
0.00	1.00	0.30	-	-
100.00	97.60	97.00	2.4	3.0
200.00	197.30	197.10	1.3	1.5
400.00	401.30	399.90	0.3	0.0
		Average Diff (%)	1.4	1.5



Calibrated by : Wifayana K.

Approved by :



NOX-NO Analyzer Performance Test

Date : 8 Jan 25

Temp: (°C) 25

Barometric Pressure: Pb (mmHg) 760

Analyzer Type :	Nox
Brand :	RP
Model :	8400N
S/N :	096

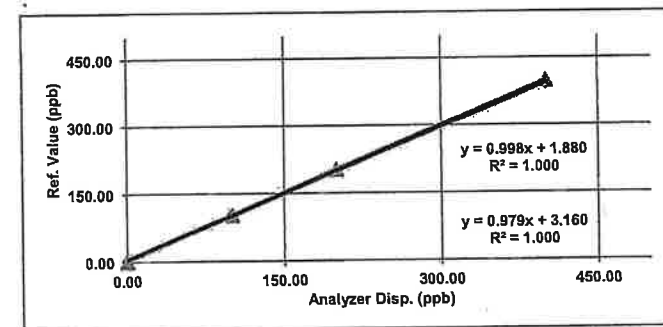
Dilutor :	Teledyne T700 1367
Zero Air :	M701 S/N 1044
STD GAS :	D869358

NOX-NO Single Point Calibration

Supply Gas	Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Slope - Offset
Zero	0.0	1.0	0.9	0.998
Span	450.0	449.8	448.60	0.998

NOX-NO MultiPoint Calibration

Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Output Difference	
			NOx Percent Diff abs.	NO Percent Diff abs.
0.00	1.00	0.90	-	-
100.00	103.30	102.30	3.3	2.3
200.00	200.00	202.60	0.0	1.3
400.00	393.80	400.50	1.6	0.1
		Average Diff (%)	1.6	1.2



Calibrated by : Wifayana K.

Approved by :



NOX-NO Analyzer Performance Test

Date: 8 Jan 25

Temp: (°C) 25

Barometric Pressure: Pb (mmHg) 760

Analyzer Type :	Nox
Brand :	API
Model :	200A
S/N :	2386

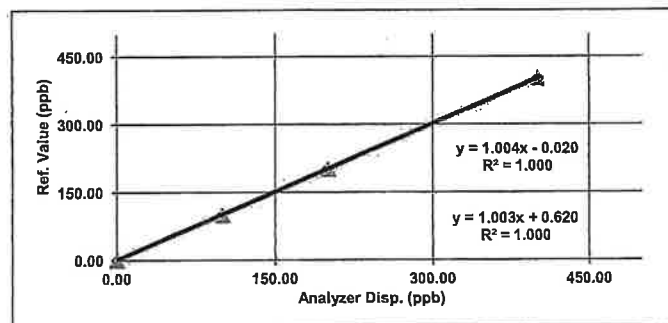
Dilutor :	Teledyne T700 1367
Zero Air :	M701 S/N 1044
STD GAS :	D869358

NOX-NO Single Point Calibration

Supply Gas	Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Slope - Offset
Zero	0.0	0.10	0.30	1.004
Span	450.0	447.6	446.50	1.004

NOX-NO MultiPoint Calibration

Ref Value	NOX Analyzer Disp.	NO Analyzer Disp.	Output Difference	
			NOx Percent Diff abs.	NO Percent Diff abs.
0.00	0.10	0.30	-	-
100.00	101.10	99.70	1.1	0.3
200.00	202.00	201.00	1.0	0.5
400.00	401.40	401.40	0.3	0.3
Average Diff (%)			0.8	0.4



Calibrated by: Wuttayun K.

Approved by:

Airgas.
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
600 Union Landing Road
Cinnaminson, NJ 08077-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E15AC084 Reference Number: 82-401409170-1
Cylinder Number: EB0102326 Cylinder Volume: 144.4 CF
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2015 PSIG
PGVP Number: B52019 Valve Outlet: 660
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Feb 05, 2019

Expiration Date: Feb 05, 2027

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 volume/volume 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	50.00 PPM	51.01 PPM	G1	+/- 0.9% NIST Traceable	01/28/2019, 02/05/2019
NITRIC OXIDE	50.00 PPM	50.86 PPM	G1	+/- 0.9% NIST Traceable	01/28/2019, 02/05/2019
SULFUR DIOXIDE	50.00 PPM	50.87 PPM	G1	+/- 1.0% NIST Traceable	01/28/2019, 02/05/2019
CARBON MONOXIDE	0.5000 %	0.5050 %	G1	+/- 0.7% NIST Traceable	01/31/2019
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13080206	CC401947	4950 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Feb 15, 2019
PRM	12367	APEX1098237	9.82 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Jun 02, 2017
NTRM	12010724	KAL004497	50.03 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Mar 12, 2024
GMIS	1114201601	CC506710	4.871 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 14, 2019
NTRM	14010327	KAL004378	49.08 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Apr 17, 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 J3-599 COHIGH	NDIR	Jan 18, 2019
Nicolet 6700 APW1100391 NO	FTIR	Jan 10, 2019
Nicolet 6700 APW1100391 NO2	FTIR	Jan 10, 2019
Nicolet 6700 APW1100391 SO2	FTIR	Jan 10, 2019

Triad Data Available Upon Request

PERMANENT NOTES: PRODUCED IN ACCORDANCE WITH ISO17025 REQUIREMENTS

NOTES:

Gross Weight: 27806.3 grams

Net Weight: 4733.2 grams

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. This certificate is certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

Page 1 of 82-401409170-1



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert.No.: 25CH1009
Page.: 1 of 3

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go
Serial No. : B924795409
ID No. : ID.12
Condition As-Received: Used item
Received Date : 26 August 2025
Calibration Date : 27 August 2025
Reference : 2508-0784DN-3
Submitted by : Secot Co.,Ltd.
239 Rimklongprapa Road,
Bangsue, Bangkok 10800
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with DC voltage
standard and direct measurement with
certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

Calibrated by : Walalak Sirtthean

Approved by :

Saithip

Approved Signatory

() Chakrit Waewwanjua
() Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 28 August 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Cert.No.: 25CH1009
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	58440003	130RC120	24E3731	25 Nov 2025
2) Ref. Standard Thermometer	4982054	110RC044	25I708	03 July 2026

- This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1114384	12 June 2027
pH 6.987	CPA chem	1034204	27 Sep 2025
pH 10.010	CPA chem	1114385	08 June 2026

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

Calibration Results

Function : mV Measurement

Performing standard curve by Document Process Calibrator at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: B924795409	4.00	177.48	177	4.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.00	0.58	2.00



Cert.No.: 25CH1009

Page: 3 of 3

Calibration Results**Function :** pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (\pm)	Coverage factor k
pH Electrode	4.007	4.02	182	0.0071	2.00
S/N.: 4320459	6.987	7.00	6	0.0095	2.00
	10.010	10.01	-167	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : inLab Expert Go

- Serial No. : 4320459

Dimension of probe

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (\pm °C)	Coverage factor k
25.0	24.999	25.1	0.101	0.13	2.00
30.0	30.001	30.2	0.199	0.13	2.00
35.0	35.001	35.2	0.199	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

-o0o-



THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Raiking 30 Puttamonthon 5 Rd., Sampran, Nakhon Pathom 73210

Tel. 0-3439-7682-5 Fax: 0-3439-7687

www.thaicat.com E-mail : sale@thaicalibration.com, lab@thaicalibration.com

NSC-TISI-TIS 17025
CALIBRATION 0189**CALIBRATION CERTIFICATE**

Certificate No.S2504633S

page 1 of 2

Customer : SECOT CO., LTD.
239 Rinklongprapa Rd.,
Bangsue, Bangkok 10800

Equipment : Non-automatic weighing instrument (Electronic instrument)

Manufacturer : Mettler Toledo
Model : AG245
Accuracy class : -
Capacity : 41 g / 210 g
Resolution : 0.00001 g / 0.0001 g
Serial No. : 1117293916
ID No. : -

Order No. : 68S1723-1
Ambient temperature : (25.3 \pm 5.0) °C
Relative humidity : (39.9 \pm 10.0) %
Received date : 23-Apr-2025
Date of calibration : 23-Apr-2025
Date of issue : 24-Apr-2025
Condition of the balance : Good working conditions

Place of calibration : LAB

Calibration method

This instrument was calibrated according to the EURAMET Calibration Guide No. 18.

Condition of reference standard weight

Instrument	Nominal value	Serial No.	Certificate No.	Due-date	Density (kg/m ³)
1 Standard weight set	1 mg to 2 kg	15885+15849	M2410001S	5-Oct-2025	7950

Traceability of the reference standard weight

This certificate is traceable to SI unit through Mass Calibration Laboratory Thai Calibration Services Co., Ltd., NSC-ONSC accredited no. Calibration 0189.

Calibrated By Teerawat Intanom
TechnicianApproved Signatory :
Somwang WongduangThis calibration certificate may not be reproduced other than in full,
except with the prior written approval of the head of TCS calibration laboratory.



THAI CALIBRATION SERVICES CO., LTD.

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NSC-TISI-TIS 17025
CALIBRATION 0189



ศูนย์บริการร่วมเพื่ออุตสาหกรรม
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Certificate

CALIBRATION CERTIFICATE

Certificate No.S2504633S

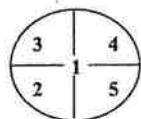
page 2 of 2

The repeatability of indication

Nominal Value (g)	Standard Deviation of reading (g)	Maximum difference between successive reading (g)	n
40	0.000008	0.00002	5
200	0.00000	0.0000	5

The effect of eccentric application of a load on the indication (test load : 100 g)

Position	Balance Reading (g)
Point 1	100.0000
Point 2	100.0000
Point 3	100.0000
Point 4	100.0000
Point 5	99.9997
Eccentric Value	0.0003



The error of indication

Nominal Value (g)	Value of Reference Standard Weight (g)	Balance Reading (g)	Correction (g)	Uncertainty (±) (g)	k
Unload	0.00000	0.00000	0.00000	0.000024	2.52
0.5	0.50000	0.49997	+0.00003	0.000028	2.13
1	1.00000	1.00000	0.00000	0.000030	2.08
10	9.99999	10.00000	-0.00001	0.000050	2.00
20	19.99999	19.99998	+0.00001	0.000068	2.00
40	39.99994	39.99999	-0.00005	0.00014	2.00
60	60.00000	60.0000	0.0000	0.00017	2.00
80	79.9999	80.0000	-0.0001	0.00023	2.00
100	100.0000	100.0000	0.0000	0.00022	2.00
120	120.0000	120.0000	0.0000	0.00028	2.00
140	140.0000	139.9999	+0.0001	0.00034	2.00
160	160.0000	160.0000	0.0000	0.00036	2.00
180	180.0000	179.9999	+0.0001	0.00043	2.00
200	200.0002	200.0000	+0.0002	0.00041	2.00

Remark : Adjustment, External weight nominal value 200 g, Standard weight of Lab

Uncertainty of measurement

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor (k), which for a normal distribution corresponds to a coverage probability of approximately 95% (confidence level).

This report will certify of the calibrated equipment only.

--End--

Certificate No.:

2503097-001-01

Client name:

SECOT CO., LTD.

Address:

239 Rimklongprapa Road,
Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment:

CHAMBER (Hot Air Oven)

Manufacturer:

MEMMERT

Model:

UF 55

Serial No.:

B213.0295

ID No.:

N/A

Order No.:

2503097

Operation No.:

2503097-001

Date of Receipt:

23 May 2025

Date of Calibration:

23 May 2025

Calibrated by

Mr.Manas Somsak
Specialist

Approved by

(Mr.Pheraphat Tuanjit)

Manager, Division of Calibration Laboratory

Responsible for the Technical Management Team

Date of Issue:

26 May 2025

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

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

F-CS-009 Revision: 01 Date: 20-04-65



Calibration Report

Certificate No.: 2503097-001-01
Equipment: CHAMBER (Hot Air Oven)
 Model: UF 55 Serial No.: B213.0295
 Resolution: 0.1 °C ID No.: N/A
 Manufacturer: MEMMERT
Date of Calibration: 23 May 2025

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition:
 Ambient Temperature (30.7 ± 1) °C
 Relative Humidity (56.0 ± 3) %
 Line Voltage (224.9 ± 1) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
- The temperature scale used was based on ITS - 90.
- All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MYS9002902	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#101-109/ RTD#101-109			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description :

Time of Record 1 Hour 9 Minute At 80.0, 104.0 and 180.0 °C
 Fresh air Damper - Open Position -
 X Close Fan 50%
 - Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



Calibration Report

Certificate No.: 2503097-001-01
Equipment: CHAMBER (Hot Air Oven)
 Model: UF 55 Serial No.: B213.0295
 Resolution: 0.1 °C ID No.: N/A
 Manufacturer: MEMMERT
Date of Calibration: 23 May 2025

Page 3 of 3

Calibration point: 80.0, 104.0 and 180.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	30.6	52.6	223.5
MAX	30.8	59.4	226.2

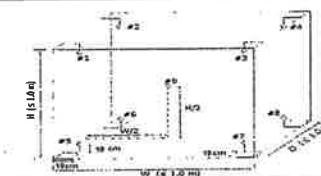


Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
80.0	79.77	79.86	79.92	79.93	79.77	79.78	80.16	80.00	80.06	0.46
104.0	103.70	103.86	103.94	103.93	103.66	103.75	104.30	104.11	104.18	0.53
180.0	179.72	179.97	179.98	180.02	179.61	179.65	180.57	180.36	180.52	0.90

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
80.0	80.0	80.0	80.0	0.041	0.29	0.47
104.0	104.0	104.0	104.0	0.055	0.52	0.73
180.0	180.0	180.0	180.0	0.086	0.92	1.1

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----




Calibration Certificate

Certificate No.: 2503097-002-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: CHAMBER (Hot Air Oven)
Manufacturer: MEMMERT
Model: UM 400
Serial No.: B499.1400
ID No.: N/A
Order No.: 2503097
Operation No.: 2503097-002
Date of Receipt: 23 May 2025
Date of Calibration: 23 May 2025

Calibrated by Mr.Manas Somsak
 Specialist

Approved by 
 (Mr.Pheraphat Tuanjit)
 Manager, Division of Calibration Laboratory
 Responsible for the Technical Management Team

Date of Issue: 26 May 2025

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

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



Calibration Report

Certificate No.: 2503097-002-01
Equipment: CHAMBER (Hot Air Oven)
 Model: UM 400 Serial No.: B499.1400
 Resolution: 1 °C ID No.: N/A
 Manufacturer: MEMMERT
Date of Calibration: 23 May 2025

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition: Ambient Temperature (30.9 ± 1) °C
 Relative Humidity (56.0 ± 3) %
 Line Voltage (224.9 ± 1) Volt

Condition of this results of Calibration:

- This Instrument was calibrated by Insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
 - The temperature scale used was based on ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY59002902	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#201-209/ RTD#201-209			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description :

Time of Record 1 Hour 9 Minute At 150 °C
 Fresh air Damper ☒ Open Position ☒
☒ Close Fan ☒
☒ Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



Calibration Report

Certificate No.: 2503097-002-01
Equipment: CHAMBER (Hot Air Oven)
 Model: UM 400 Serial No.: B499.1400
 Resolution: 1 °C ID No.: N/A
 Manufacturer: MEMMERT

Date of Calibration: 23 May 2025

Page 3 of 3

Calibration point: 150 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	30.6	52.6	223.5
MAX	31.3	59.4	226.2



Table 1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
150	150.07	150.68	149.82	150.63	148.76	149.47	149.36	148.79	149.64	1.3

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
As Mark 150	176	176	176	0.89	1.0	3.5

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----



Calibration Certificate

Certificate No.: 2503897-001-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: CHAMBER (Incubator)

Manufacturer: MEMMERT

Model: ICP 400

Serial No.: K406.0004

ID No.: N/A


Order No.: 2503897

Operation No.: 2503897-001

Date of Receipt: 14 July 2025

Date of Calibration: 14 July 2025

Calibrated by Mr.Yothin Charoensuk
 Scientist

Approved by 
 (Mr.Pheraphat Tuanjit)
 Manager, Division of Calibration Laboratory
 Responsible for the Technical Management Team

Date of Issue: 17 July 2025

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

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



Calibration Report

Certificate No.: 2503897-001-01
Equipment: CHAMBER (Incubator)
Model: ICP 400 Serial No.: K406.0004
Resolution: 0.1 °C ID No.: N/A
Manufacturer: MEMMERT
Date of Calibration: 14 July 2025

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition: Ambient Temperature (30.8 ± 1) °C
Relative Humidity (60.9 ± 1) %
Line Voltage (222.5 ± 3) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
- The temperature scale used was based on ITS - 90.
- All data show below were final values and the initial data may be obtained upon request.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	2503175-002	2 June 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#201-209/ RTD#201-209			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description :

Time of Record 1 Hour 9 Minute At 20.0 °C

Fresh air Damper: ☒ Open Position ☒ Close Fan ☒ 10%

Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



Calibration Report

Certificate No.: 2503897-001-01
Equipment: CHAMBER (Incubator)
Model: ICP 400 Serial No.: K406.0004
Resolution: 0.1 °C ID No.: N/A
Manufacturer: MEMMERT
Date of Calibration: 14 July 2025

Page 3 of 3

Calibration point: 20.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	29.6	60.3	220.0
MAX	32.3	61.5	225.0

Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
20.0	20.00	20.16	20.08	20.11	20.28	20.12	20.03	20.05	20.14	0.28

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
20.0	20.0	20.0	20.0	0.14	0.15	0.53

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----




Calibration Certificate

Certificate No.: 2503897-002-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: Water Bath
Manufacturer: MEMMERT
Model: WB 29
Serial No.: I698.0051
ID No.: N/A
Order No.: 2503897
Operation No.: 2503897-002
Date of Receipt: 14 July 2025
Date of Calibration: 14 July 2025

Calibrated by Mr.Yothin Charoensuk
Scientist

Approved by 
(Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 17 July 2025

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

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

F-CS-009 Revision: 01 Date: 20-04-65



Calibration Report

Certificate No.: 2503897-002-01
Equipment: Water Bath
Model: WB 29 Serial No.: I698.0051
Resolution: 0.1 °C ID No.: N/A
Manufacturer: MEMMERT

Date of Calibration: 14 July 2025

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition: Ambient Temperature (31 ± 1) °C
Relative Humidity (61 ± 1) %
Line Voltage (228 ± 3) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 5 standard thermometer into its liquid bath and calibration according to W-TE-011 based on ASTM E715-80 (Re-approved-2016); Standard Specification for Gravity-Convection and Forced-Circulation Water Baths.
- The temperature scale used is ITS - 90.
- All data show below were final values and the initial data may be obtained upon request.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	2503175-002	2-Jun-26	NATIONAL FOOD INSTITUTE
	RTD	RTD#301-305 / CH#301-305			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description:

Time of Record 1 Hour 9 Minute At 95.0 °C

7. Result of Calibration :
- | | |
|-------------------------------------|--------------------|
| <input checked="" type="checkbox"/> | Without adjustment |
| <input type="checkbox"/> | After adjustment |

F-CS-012 Revision: 01 Date: 20-04-65



Calibration Report

Certificate No.: 2503897-002-01
Equipment: Water Bath
Model: WB 29 Serial No.: I698.0051
Resolution: 0.1 °C ID No.: N/A
Manufacturer: MEMMERT
Date of Calibration: 14 July 2025

Page 3 of 3

Calibration point: 95.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	29.6	62	225.0
Max	32.3	60	230.0

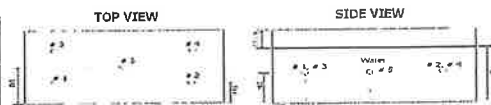


Table 1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	
95.0	95.15	95.11	95.14	94.96	94.99	0.36

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
95.0	94.9	95.2	95.0	0.21	0.16	0.58

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity)"
UUC* = Unit Under Calibration
Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors,
for at least half an hour after reaching steady state.
Uniformity = The maximum difference of measured temperatures at any sensors and the measured
temperature at the reference location which are observed at the same time.
Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k=2$,
providing a level of confidence of approximately 95 %.

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

CALIBRATION CERTIFICATE

Certificate No.S2504635S

page 1 of 2

Customer : SECOT CO., LTD.
239 Rinklongprapa Rd.,
Bangsue, Bangkok 10800

Equipment : Non-automatic weighing instrument (Electronic instrument)

Manufacturer : Sartorius **Order No. :** 68S1640-1

Model : ME5 **Ambient temperature :** (24.2 ± 5.0) °C

Accuracy class : - **Relative humidity :** (40.2 ± 10.0) %

Capacity : 5.1 g **Received date :** 23-Apr-2025

Resolution : 0.000001 g **Date of calibration :** 23-Apr-2025

Serial No. : SWB26602268 **Date of issue :** 24-Apr-2025

ID No. : - **Condition of the balance :** Good working conditions

Place of calibration : LAB

Calibration method

This instrument was calibrated according to the EURAMET Calibration Guide No. 18.


Condition of reference standard weight

Instrument	Nominal value	Serial No.	Certificate No.	Due-date	Density (kg/m ³)
1 Standard weight set	1 mg to 2 kg	15883+15849	M2410001S	5-Oct-2025	7950

Traceability of the reference standard weight

This certificate is traceable to SI unit through Mass Calibration Laboratory Thai Calibration Services Co., Ltd., NSC-ONSC
accredited no. Calibration 0189.

Calibrated By : Teerawat Intanom
Technician

Approved Signatory : 
Somwang Wongduang

This calibration certificate may not be reproduced other than in full,
except with the prior written approval of the head of TCS calibration laboratory.

TCS-F-138 Issue 01/Rev.01/12 Jun 2023

NO. 32965





THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Raiking 30 Puttamonthon 5 Rd., Sampran, Nakornpatom 73210
Tel. 0-3439-7682-5 Fax: 0-3439-7687

www.thaicat.com E-mail : sale@thaicalibration.com, lah@thaicalibration.com



CALIBRATION CERTIFICATE

Certificate No.S2504635S

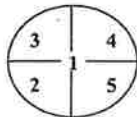
page 2 of 2

The repeatability of indication

Nominal Value (g)	Standard Deviation of reading (g)	Maximum difference between successive reading (g)	n
5	0.000007	0.000002	5

The effect of eccentric application of a load on the indication (test load : 2 g)

Position	Balance Reading (g)
Point 1	2.000001
Point 2	2.000006
Point 3	2.000007
Point 4	2.000007
Point 5	2.000004
Eccentric Value	0.000006



The error of indication

Nominal Value (g)	Value of Reference Standard Weight (g)	Balance Reading (g)	Correction (g)	Uncertainty (±) (g)	k
Unload	0.000000	0.000000	0.000000	0.0000020	2.43
0.001	0.001002	0.001004	-0.000002	0.0000046	2.00
0.005	0.004998	0.005004	-0.000006	0.0000046	2.00
0.01	0.010002	0.010006	-0.000004	0.0000056	2.00
0.05	0.049997	0.050000	-0.000003	0.0000086	2.00
0.1	0.100001	0.100004	-0.000003	0.000012	2.00
0.2	0.200004	0.200004	0.000000	0.000014	2.00
0.5	0.499996	0.499995	+0.000001	0.000018	2.00
1	0.999996	1.000006	-0.000010	0.000022	2.00
1.5	1.499992	1.500000	-0.000008	0.000039	2.00
2	2.000011	2.000001	+0.000010	0.000028	2.00
3	3.000007	3.000007	0.000000	0.000049	2.00
5	4.999968	4.999942	+0.000026	0.000036	2.00

Remark : Adjustment, Internal weight

Uncertainty of measurement

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor (k), which for a normal distribution corresponds to a coverage probability of approximately 95% (confidence level).

This report will certify of the calibrated equipment only.

--End--

SECOT Co.,Ltd.
PTDS23051001

OQ
Page 1 of 57

Atomic Absorption Spectrometry

PinAAcle900T

Operational Qualification (OQ)

Company Name:	SECOT Co.,Ltd.
Address:	239 Rimkhlong Prapa Rd. Khwang Bang Sue, Khet Bang Sue, Bangkok 10800, Thailand
Location, Room:	SECOT INST.1
Serial Number or System Name:	PTDS23051001
Issue Date:	29-Apr-2025
Date Tested: Valid if tested within 1 year of Issue Date	30-Apr-2025
Recertification Period	Recommended at 12 Months
Recertification Due Date:	30-Apr-2026

Release History

Part Number	Release	Publication Date	
09350815	G	August 2023	

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Introduction

Objective

The objective of this document is to detail the proper operation of the PinAAcle900T. The completed qualification process demonstrates that the equipment meets the vendor-developed standards of operation and safety, and performs the functions specified by the manufacturer.

Scope and Responsibility

PerkinElmer is responsible for providing trained personnel, the OQ elements outlined in this plan and verifying that these elements are fully executed and documented.

SECOT Co.,Ltd. is responsible for accepting the terms of this plan and providing personnel and assistance to PerkinElmer for implementing the OQ outlined in this document.

Warranty Period and Service

Full details of PerkinElmer's instrument warranty have previously been provided with quotations, order acknowledgements and invoices. PerkinElmer's instrument warranty covers all parts and labor, but excludes consumable materials. Exceptions may apply to instruments purchased used. Contact your PerkinElmer service provider for a service plan which may be purchased to extend coverage beyond warranty. PerkinElmer recommends contracting regular preventive maintenance. Over time, failure to perform the recommended preventive maintenance may reduce the reliability of some systems.

Need to Re-Qualify

The instrument may need to be qualified again following modifications made to the original configuration or if the instrument is serviced or moved

Notices

Except as specifically set forth in its terms and conditions of sale, PerkinElmer makes no warranty of any kind with regard to this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

PerkinElmer shall not be liable for incidental or consequential damages in connection with the furnishing or use of this document.

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Protocol Documentation

Documentation protocol may be superseded by customer SOP

Writing Instruments

All writing will be done with a black or blue ink pen.

Signatures

A signature of each party involved with the ownership, management, testing, and quality assurance of each instrument will be required before testing will proceed and for final approval at completion.

On any page where a written entry is made, or data is gathered by a PerkinElmer representative, that page must be signed and dated by the PerkinElmer representative.

Up to three signature entries are provided each for Customer and PerkinElmer on the Preliminary Report Approval Page and Final Approval Page. If any signature lines are unused, draw a single diagonal line filling the Signature area and then write initials and date next to the line.

All signatures will be the signer's full legal name as legibly as can be written and dated.

Initials

At any point when initials are to be used, they will contain at least two of the initials and include a date.

Date

Dates will be given in the format of DD-MMM-YYYY (e.g. 09-Apr-2010). If the day of the month has only one digit, a zero will be employed to maintain the two-digit format for each entry.

Error Codes

When an error is corrected, a single horizontal line through the error will be used. The line will then be initialed and dated along with an error code from the list found in the protocol.

Spaces

For columns where the protocol is asking whether something has been verified, a "Yes" will be written. If not, a "No" will be written and an explanation will be stated in the Comments section. A check mark or "N" is unacceptable. "NA" may be used where the verification was not applicable.

Pass/Fail

For areas where the protocol requires a "Pass/Fail", the words "Pass" or "Fail" will be written in. If the instrument passes, Pass will be entered. If the instrument fails, Fail will be entered.

Visual Inspections

All visual inspections will be filled out with a word that indicates the physical condition being observed. If no damage is observed, use the word "None" if no damage is present. If damage is observed, write a description of the damage observed. This will apply to any visual inspections.

Calibration/Expiration Dates

MMM-YYYY (e.g. Apr-2010) format will be used to denote calibration and reagent expiration dates. The instrument or reagent is valid until the last day of the month noted.

Temperature

All temperatures will be given in the unit of Celsius (°C).

Blank Areas

If there are no comments for a "Comments" section, "None" is written and the rest of the lines are left blank.

If a section is not applicable, such as an alarm function, "NA" is sufficient.

Once an entry has been made (other than "None") any remaining space in the Comments (either single or multiple blank lines) requires a single diagonal line filling the area, along with initials and date next to the line.

EXCEPTION: DO NOT cross out blank lines on the "Error Code Abbreviation, Definition and Making Corrections" page. These pages or sections are either copied for future documentation needs or provide space to maintain records into the future.

Acceptance Criteria

All tests must include values for acceptance criteria and the results of that test must be included.

Precision and Accuracy Measurements

The following areas of precision and accuracy will be noted on a per-test basis.

All instrument precision values (when available) will be noted within the OQ document. All data entered into the OQ document will reflect these values.

For example: If a precision value of four significant digits is supplied for a test by the manufacturer, then all four digits will be entered with the last digit being rounded down if the fifth digit is below 5, rounded up if above 5, and rounded up if fifth digit is 5.

Deviation

Deviations are events that are a departure from the specific protocol procedures as they were approved.

Deviations to the plan are permitted if those deviations are clearly detailed, approved by all parties and entered in Appendix - Deviations

Change Control

Change control procedures are in place to maintain the validation process after modifications are made to the original configuration. Any changes to the hardware, firmware or software of a validated system must be clearly specified and the validation confirmed and recorded.

1. A blank Change Control form is located in Appendix B. Consider making photocopies when blank.
2. If used, insert a completed Change Control Form and its associated data as an Attachment.

Error Code Abbreviation, Definition, and Making Corrections

The error code abbreviation and definition list below is provided for clients and reviewers to make necessary entries and corrections after the document has been approved.

PerkinElmer technical staff and reviewers make all necessary efforts to ensure that this document and related attachments are free of errors and mistakes. However, some typographical, formatting, and inadvertently erroneous entries may exist within the document that can be corrected by client(s). Once an error is found, (1) simply strike the erroneous word or entry with a blue or black pen, (2) enter the correct word or entry above the erroneous word or entry, (3) enter the code (for example; IE for incorrect entry), and (4) then initial and date.

Space is also provided to create new codes or to enter the codes specified by the customer SOP.

CE	Calculation Error	NA	Not Applicable
IE	Incorrect Entry	SE	Spelling Error
IM	Instrument Malfunction	TE	Transcription Error
IO	Inadvertently Omitted	TYP	Typographical Error
IR	Instrument Recalibrated	WD	Wrong Date Entered
LE	Late Entry (of initials or date)	WO	Writeover

Additional Codes

Code	Definition	Initials	Date (DD-MMM-YYYY)

Preliminary Approval Page

Preliminary Protocol Approval

This is to certify that the Operational Qualifications procedures for the PinAAcle900T Serial number PTDS23051001 have been reviewed and both PerkinElmer and SECOT Co.,Ltd. have agreed to proceed with the procedures described in this document.

SECOT Co.,Ltd.			
Signature	Name	Title	Date (DD-MMM-YYYY)
PerkinElmer			
Signature	Name	Title	Date (DD-MMM-YYYY)

Operational Qualification

1 System Summary

1.1 Instrument Identification

Manufacturer	PerkinElmer	
Model	PinAAcle900T	
Equipment Serial #	PTDS23051001	
Spectrometer Firmware, Kernel, FPGA System Board Version Detector Board Version Lamp Board Version		
Flame Firmware Version		
Furnace & Autosampler Firmware Versions Furnace Board Version		
Instrument Software Version		
Comments:		
PerkinElmer Representative Signature:	Date:	
	(DD-MMM-YYYY)	
Customer Representative Signature:	Date:	
	(DD-MMM-YYYY)	

1.2 Specifications

Instrument Utilities/Environment

System Power Requirements: 230V (+/-10%), 50/60 Hz (+/- 0.3 Hz) Single phase alternating current.

The PinAAcle 900T will ship standard with an IEC 60309 32 A power connector.

Power Consumption: 10,100 VA maximum.

Electrical Protection: Insulation class I; pollution degree 2.

Certification: Designed and tested to be in compliance with the legal requirements for laboratory instruments. The instrument is developed and produced in compliance with ISO 9001. The WinLab32 for AA /Syngistix- AA™ Software provides required control parameters for GLP and instrument performance validation.

Temperature & Humidity: The Room Temperature should be between 15 and 35 °C (59-95 °F) with a maximum rate of change of 3 °C (5 °F) per hour. The relative humidity should be between 20 and 80%, non-condensing.

Environment: A relatively dust-free environment is necessary. This is especially important when working with ultra-trace techniques, such as graphite furnace sampling. Other important considerations are to locate the instrument in an area free of corrosive fumes and vibration and in an area that does not receive direct sunlight.

Instrument

System: The AA Flame/THGA system is a fully-integrated bench top design atomic absorption spectrometer, incorporating all spectrometer, flame atomizer and graphite furnace atomizer components in a single instrument.

Optical System

Photometer: Real-time double-beam optical system. The optics are front-surfaced, reflecting, and have a protective coating. The optical system is sealed with a protective cover.

Monochromator: Littrow design with motorized drive for automatic wavelength selection and peaking.

Wavelength Range: 190 – 900 nm.

Diffraction grating: 1800 lines/mm blazed at 236 nm and 597 nm.

Spectral Bandwidths: User selectable automatic slit widths of 0.2, 0.7 and 2.0 nm at their optimized slit height.

Detector: Wide-range segmented solid-state detector, including a built-in low-noise CMOS charge amplifier array.

Automatic Lamp Selection: 8-lamp mount with built-in power supplies for PerkinElmer® cable less Lumina™ hollow cathode and patented electrode less discharge lamps. Computer-controlled lamp selection and alignment via WinLab32 for AA/Syngistix- AA™ Software. Lamp elements and recommended operating currents are automatically recognized and set when using Lumina hollow cathode lamps and PerkinElmer EDL lamps with coding plug.

Background Correction

Deuterium Arc Lamp (flame): Built-in continuum source double-beam background correction using a high-intensity deuterium arc lamp.

Zeeman-Effect Background Correction (furnace): Longitudinal AC Zeeman-effect background correction using a modulated 0.8 Tesla magnetic field oriented longitudinal to the optical path. The magnet is automatically switched on during the atomization step only. Rollover detection is built-in.

Flame Atomizer:

Gas controls: Fully computer-controlled with oxidant and fuel monitoring. There is a keyboard-actuated remote ignition system with air-acetylene. Acetylene flow is automatically adjusted prior to the oxidant change when switching to or from nitrous oxide-acetylene operation.

Safety Functions: Interlocks prevent ignition if the proper burner head, the nebulizer/end cap, or the burner drain system is not correctly installed; the liquid level in the drain vessel is incorrect; or gas pressures are too low. Interlocks also will automatically shut down burner gases if a flame is not detected, or if any of the other interlock functions are activated. Provision is included for safe shutdown from all operating modes in the event of a power failure.

Sample Introduction System: Modular sample introduction system consisting of the quick-change spray chamber, burner head and nebulizer units. Alignment of the flame in the light beam is fully automatic, using a motorized burner mount for vertical and horizontal burner adjustment and automatic software-controlled self-optimization of the burner position. The optimization of the operating flame condition is also fully automatic and software controlled. The introduction system is equipped with a high-strength inert mixing chamber, angled to ensure proper drainage. There is a choice of high sensitivity corrosion-resistant plastic nebulizer or durable stainless steel nebulizer. The standard is all-titanium, 10-cm, single-slot burner head for air-acetylene operation.

Graphite Furnace Atomizer:

THGA: Built-in fully computer-controlled Transversely Heated Graphite Atomizer (THGA™). The graphite tube is transversely heated providing a uniform temperature profile over the entire tube.

Furnace Features: An external protective gas stream around the graphite tube prevents the entrance of outside air to maximize tube life. An internal purge gas goes through the graphite tube to remove the volatilized matrix vapors during drying and thermal pretreatment. The two gas streams are computer-controlled independently. There is pneumatic opening and closing of the furnace for easy tube change.

Furnace Program: Analytical programs with up to 12 steps can be set up. Each step can be programmed with the following parameters:

Temperature: Ambient up to 2600°C in steps of 10 °C

Ramp Time: 0 to 99 s in steps of 1 s.

Hold Time: 0 to 99 s in steps of 1 s.

Internal Gas Flow: 0 mL/min (gas stop), 50 mL/min (mini-flow), 250 mL/min (full flow); can be switched over to another type of gas (Alternate Gas).

Furnace Opening & Closing: Pneumatically-operated by software command.

Furnace Gas: Argon (or Nitrogen). Inlet pressure 350-400 kPa (3.5-4 bar, 51-58 psi). Maximum gas consumption is 700 mL/min. The external flow rate is fixed at 100 mL/min each side.

Cooling System

Description: Self-priming re-circulating system with fan-assisted heat exchanger for constant cooling of the graphite furnace. The water temperature during operation is approximately 38 °C; the water flow is 2.5 L/min.

Power Requirements: 230V (+/-10%), 50/60 Hz (+/-1%); approx. 140 VA maximum power consumption. A means of electrically grounding the instrument and all accessories must be available.

Dimensions: 20 cm wide x 375 cm high x 50 cm deep.

Weight: 18 kg with coolant.

Certification: Designed and tested to be in compliance with the legal requirements for cooling systems.

Furnace Autosampler

Sampler Table: Installed in front of the furnace unit. Removable sample tray with 88 and 146 sampling positions for sample and reference solutions and 1 overflow container for pipette washing. Minimum sample requirement: 0.1 mL.

Dispensable Volume: Sample and Reagent: 1...99 µL, selectable in increments of 1 µL.

Electronics: The auto sampler is powered from the spectrometer and is software-controlled.

Computer & Instrument Software

Computer Requirements: WinLab32 for AA version 7.x and AA/Syngistix- AA version 1.x™ require Microsoft Windows 7 ®. Windows 7 service pack 1 is required for Syngistix installation. A computer with 2 GB RAM and a 60.0 GB or larger hard disk drive is recommended. It is also recommended to use a video display setting greater than 256 colors with a screen resolution at 800 x 600 or higher.

System Environment: Provides complete control of the instrument and its major accessories plus data handling and storage.

Data Handling: Instrument readings linear in absorbance (-0.500 A to +2.000 A), concentration or emission intensity with continuously variable scale expansion from 0.01 to 100 times. Integration times operator-selectable from 0.1 to 60 sec. in increments of 0.1 sec. Reading modes include time-averaged integration, non-averaged integration (peak area), and peak height measurement. Software includes built-in statistics. Up to fifteen (15) standards and a choice of proven calibration equations are included. Re-slope of the analytical curve using a single operator-selected calibration standard is available. There is a built-in Ethernet interface for computer connection and use of optional accessories. There is a data collection time of up to 20 minutes.

1.3 Location Requirements

Dimensions: 95 cm wide x 73 cm high x 68 cm deep

Make sure there is space in the back and sides of the system for air to circulate freely. Do not block the fan located on each side of the instrument. The back of the instrument should not be placed permanently against a wall, as the instrument must be accessible from the back for servicing purposes, and the gas lines cannot be bent. An accessible space of at least 60 cm (24 in.) should be available behind the instrument. If space behind the instrument is not possible, the table or bench on which the instrument is mounted should be on wheels so that it can be easily moved.

Weight: AA - THGA: 141 kg (without controller and cooling system).

Exhaust Vent: A venting system is required to remove the combustion fumes and vapors from the flame or graphite furnace for atomic absorption instruments. Exhaust venting is important for a number of reasons:

- It will protect laboratory personnel from toxic vapors which may be produced by some samples.
- It will tend to remove the effects of room drafts and the laboratory atmosphere on flame stability.
- It will help to protect the instrument from corrosive vapors which may originate from the samples.
- It will remove dissipated heat which is produced by the flame or furnace.

The venting system should provide a flow rate 5600 liters/min (200 cubic feet/min) for an air/acetylene flame or furnace and 7000-8500 liters/min (250-300 cubic feet/min) for a nitrous oxide /acetylene flame. It is strongly recommended that the instrument not be placed in a chemical hood! If a chemical hood must be used, arrangements should be made to keep out corrosive vapors and back drafts from other hoods. The chemical hood would have to be dedicated to the instrument. Sample preparation cannot be carried out in the same hood where the instrument is located.

PerkinElmer offers an accessory Blower and Vent Kit (Part No. 03030448 for 230 V, 03030447 for 115 V) which will fulfill the exhaust requirements for all atomic absorption instruments (see Figure 1). Included in the kit is a rotary blower with capacitor and hardware, a vent to be located above the instrument, and an adapter to permit connection of the blower and vent with suitable metal tubing. The adapter and vent are made of stainless steel sheets.

Notice: Local electrical codes do not permit PerkinElmer Service Engineers to install the blower and vent assembly.

The metal tubing required to connect the vent to the blower and to provide suitable exhaust from the blower is not included in the accessory Blower and Vent Kit. Flexible stainless steel tubing is recommended for this purpose and can be obtained from the companies listed in PerkinElmer's Preparing Your Laboratory brochure and from various other firms. In some instances this type of flexible metal tubing is sold only in minimum lengths of 3 meters (10 feet).

The capacity of the blower depends on the duct length and the number of elbows or bends used to install the system. If an excessively long duct system or a system with many bends is used, a stronger blower may be necessary to provide sufficient exhaust volume. Alternatively, smooth stainless steel tubing may be used instead of flexible stainless steel tubing where flexibility is not required to reduce system friction loss or "drag." A length of smooth stainless steel ducting has 20-30% less friction loss than a comparable length of flexible ducting. When smooth stainless steel tubing is used, elbows must be used to turn corners. These elbows should turn at a center line radius of 45 degrees to reduce friction losses, and the number of elbows should be minimized.

The dimensions for the various parts of the Blower and Vent Kit are shown in Figure 1. The vent i.d. is slightly larger than the tubing o.d. to allow for tubing tolerances. A slight gap between the two units is normal.

When installing such a venting system, all connections should be made with metal screws or rivets. Solder must not be used. The blower should be located at least 4 meters (12 feet) and not more than 6.5 meters (20 feet) from the flame or the graphite furnace and should exhaust to the atmosphere or into a considerably wider exhaust duct. Under these conditions, the following temperatures have been measured during operation of a nitrous oxide-acetylene flame: 310 °C at the vent intake; 160 °C at 2.4 meters (8 feet) from the vent intake; 105 °C at the blower intake; and 50 °C at the blower motor housing near the front bearing.

Instructions for installation (Part No. 09936775) are provided with the Blower and Vent assembly. The blower provided in the PerkinElmer accessory kit requires a line voltage of 115 V or 230 V, depending on which kit is purchased.

Additional recommendations on the venting system include:

- Make sure the duct casing is installed using fireproof construction. Route ducts away from sprinkler heads.
- Locate the discharge outlet as close to the blower as possible. All joints on the discharge side should be airtight, especially if toxic vapors are being carried.
- Equip the outlet end of the system with a back draft damper and take the necessary precautions to keep the exhaust outlet away from open windows or inlet vents and to extend it above the roof of the building for proper dispersal of the exhaust.
- Equip the exhaust end of the system with an exhaust stack to improve the overall efficiency of the system.
- Make sure the length of the duct that enters into the blower is a straight length at least ten times the duct diameter. An elbow entrance into the blower inlet causes a loss in efficiency.
- Design local exhaust ventilation systems individually for each specific atomic absorption instrument. Also, the opening of the exhaust vent should be large enough to cover the graphite furnace or flame area completely.
- Provide make-up air in the same quantity as is exhausted by the system. An "airtight" lab will cause an efficiency loss in the exhaust system.

- Ensure that the system is drawing properly by releasing smoke into the mouth of the collector hood vent. A synthetic "smoke" can be generated by placing open bottles of hydrochloric acid and ammonium hydroxide in proximity under the hood.
- Equip the blower with a pilot light located near the instrument to indicate to the operator when the blower is on.

Atomic Absorption Gases:

Note: Standards for cylinder dimensions, regulator connections, gas fittings, etc. vary from country to country. The information provided here is for the U.S. Contact your PerkinElmer representative for information on the specific requirements of your area.

Compressed Air: For flame operation, the air supply should provide a minimum of 28 liters/min (1 cubic foot/min) at a minimum pressure of 350 kPa (3.5 bar, 50.0 psig). The maximum pressure is 400 kPa (4 bar, 58 psig).

It is desirable to have a water and oil trap or filter between the compressor and the instrument gas control system. The use of an Air Filter Accessory (Part No. **N0775325**) or an Air/Acetylene Filter Accessory (Part No. **N9301398**) is strongly recommended to remove entrained water, oil, water aerosols and solid particles from compressed air lines.

WARNING: The input pressure to the air filter assembly should never exceed 1000 kPa (10 bar, 150 psig). Make sure house air is not above this pressure.

If there is any doubt regarding the usability of a central air supply (insufficient volume or pressure or excessive oil or water contamination), the quality of the supply should be checked prior to the arrival of the instrument.

A small, oil-less air compressor meeting the stated requirements is available from PerkinElmer (Part No. **03030313** or **N0777602** for 115 volts, 60 Hz), (Part No. **03030314** or **N0777603** for 220 volts, 50 Hz); or (Part No. **N0777604** for 220 volts, 60 Hz). These compressors have a relatively high noise level and should be located outside of the laboratory.

An air compressor that is enclosed in a sound insulation box and comes with a built in filter/dryer is part number (**N0777605** for 115 volts, 60 Hz), (**N0777606** for 220 volts, 50 Hz), or (**N0777607** for 220 volts, 60 Hz).

Cylinders of compressed air can also be used but are recommended only as an emergency or short-term solution for the following reasons:

- A standard #1 size air cylinder contains about 6200 liters (220 cubic feet) of air at standard temperature and pressure (STP). A premix burner-nebulizer system uses about 20 liters/min (0.7 cubic feet/min), and, therefore, a cylinder will last only about five hours. Unless an instrument is used only a few hours per day, changing cylinders becomes a nuisance as well as being expensive.

- Occasionally, cylinder air may be obtained from a liquefaction process during which the oxygen-to-nitrogen ratio can change. Therefore, it is not uncommon to find other than 20% oxygen in air cylinders. This can cause erratic burner operation and non-reproducible analytical results and, in extreme cases, may provide a potential safety hazard. In general, if cylinder air is to be used, it is important to specify compressed air rather than breathing air (i.e. medical grade) or an unspecified form.

WARNING: For safe operation, oxygen must NEVER be used with PerkinElmer premix burner systems.

The use of air cylinders requires the use of a suitable dual-stage regulator. A regulator for cylinders with a CGA 590 connection is available from PerkinElmer (Part No. **03030264**).

Acetylene. For the overwhelming majority of analyses, acetylene is the preferred fuel gas with atomic absorption spectrometers. Air-acetylene is the preferred flame for the determination of about 35 elements by atomic absorption. The temperature of the air-acetylene flame is approximately 2300 °C. For most air-acetylene flames, the acetylene flow used is about 4 liters/min or 0.14 cubic feet/min. Using a heat combustion value of 1,450 BTU per cubic foot, the heat given off would be approximately 12,300 BTU per hour (3,600 W). An air-acetylene flame can be used with all PerkinElmer burner heads but is most commonly used with the supplied 10-cm (4-inch) burner head (Part No. **N3160134**).

Suitable acetylene typically has a minimum purity specification of 99.6% with the actual assay being about 99.8%. In general, ordinary welding grade acetylene is adequate for most atomic absorption analyses, though sometimes a particular tank may be contaminated. Special higher purity "atomic absorption" grade acetylene is also available from some vendors, and its use is recommended when the available welding grade acetylene is not sufficiently pure.

A size 1A acetylene cylinder contains about 8,500 liters (300 cubic feet) of acetylene and usually lasts about 30 hours of burning time with an air-acetylene flame. The cylinder requires an acetylene pressure regulator, which can be obtained from the supplier of the acetylene or from PerkinElmer (Part No. **03030106**).

CAUTION: Acetylene may react with copper to form a potentially explosive compound. Copper tubing or fittings for acetylene gas must be strictly avoided.

The PerkinElmer Acetylene Regulator Assembly includes an adapter so that the pressure regulator can be connected to cylinders requiring either CGA 300 or CGA 510 fittings and a connector for attaching the fuel hose assembly supplied with the instrument. The fuel hose assembly is constructed of red neoprene, reinforced with high tensile strength rayon cord, and provides a rated working pressure of about 1700 kPa (250 psig). The connectors are permanently mounted at each end of the hose assembly for connection to the pressure regulator and instrument gas controls, and use left-hand threads as per accepted practice for fuel gas connections. (See Section 5 for more details.)

It may be desirable to have an acetylene filter between the acetylene tank and the instrument gas control system to remove particulates and acetone droplets from acetylene, protecting the gas controls and AA burner system from contamination and corrosion. An Acetylene Filter (Part No. **N9301399**) and an Air/Acetylene Filter Accessory (Part No. **N9301398**) are available from PerkinElmer. Some countries also require the use of a flashback arrestor such as PerkinElmer Part No. **N9300068** in the acetylene fuel line.

Acetylene is normally supplied dissolved in acetone, and a small amount of acetone carryover with the acetylene is normal. However, as tank pressure falls, the relative amount of acetone entering the gas stream increases and can give erratic results, particularly for elements such as calcium, tin, chromium, molybdenum and others whose sensitivity is highly dependent on the fuel/oxidant ratio. For this reason, acetylene tanks should be replaced when the cylinder pressure drops to about 600 kPa (85 psig).

WARNING: Failure to change the acetylene cylinder before the cylinder pressure drops below 600 kPa (5.9 bar, 85 psig) may cause damage to valves or tubing within the burner gas control system due to high acetone carryover. Such damage from acetone is not covered by instrument warranties.

Since the acetylene is dissolved in acetone, the pressure drop is not linear with gas removal, and a pressure of 600 kPa (5.9 bar, 85 psig) indicates that the cylinder is nearly empty, assuming the cylinder is at room temperature.

Acetylene tanks should always be stored and operated in a vertical position, rather than horizontally, to prevent liquid acetone from reaching the cylinder valve. New tanks should be positioned vertically for at least 8 hours prior to use. The practice of "cracking the valve" of an acetylene tank (that is, opening the valve slightly for a very short period prior to attaching the regulator) is not recommended. While such an action will clear the valve opening of dust or dirt particles and may remove acetone from the cylinder valve, it is a potentially hazardous practice and one which should never be attempted in the presence of an open flame, sparks or other possible sources of ignition.

CAUTION: Acetylene line pressure from the cylinder to the instrument should never be allowed to exceed 103 kPa (1 bar, 15 psig). At higher pressures, acetylene can spontaneously decompose or explode. PerkinElmer recommends that a maximum acetylene line pressure of 80-95 kPa (12-14 psig) be used to provide a reasonable margin of safety.

Both fuel and oxidant gas lines should be relieved of pressure at the end of the working day, or if the instrument is to be unused for an extended period. Cylinder valves should be closed to avoid the possibility of pressure regulators failing and gas lines being subjected to the full cylinder pressure.

Nitrous Oxide: The nitrous oxide-acetylene flame has a maximum temperature of approximately 2800 °C and is used for the determination of elements that form refractory oxides. It is also used to overcome chemical interferences that may occur in flames of lower temperatures. For the nitrous oxide-acetylene flame, the acetylene flow is about 14 liters/min or 0.5 cubic feet per min. Using a heat of combustion value of 1,450 BTU per cubic foot, the heat given off would be approximately 43,000 BTU per hour (12,500 W).

The use of nitrous oxide requires a number of accessories and precautions. A size 1A cylinder of nitrous oxide contains about 14,800 liters (520 cubic feet) and will typically last for 10 to 12 hours of burning time. Cylinders of nitrous oxide (99.0% minimum purity) are available from local suppliers. A dual-stage regulator is recommended (and is mandatory in some countries.)

Nitrous oxide is supplied in the liquid state, initially at a pressure of about 5000 kPa (52 bar, 750 psig). Since the nitrous oxide is in a liquid form, the pressure

gauge does not give a true indication of how much nitrous oxide remains in the cylinder until the pressure starts to fall rapidly as the residual gas is drawn off.

When nitrous oxide is rapidly removed from the cylinder, the expanding gas causes cooling of the cylinder pressure regulator and the regulator diaphragm sometimes freezes. This can create erratic flame conditions or, in the most extreme case, a flashback. It is therefore advisable to heat the regulator using either a built-in heater or an externally supplied heat source, such as an electrical resistance heating tape.

CAUTION: All lines carrying nitrous oxide should be free of grease, oil or other organic material, as it is possible for spontaneous combustion to occur. Cylinders of nitrous oxide should be considered high-pressure cylinders and should be handled with care at all times.

A dual-stage heated nitrous oxide pressure regulator for use with gas cylinders with a CGA 326 connection is available from PerkinElmer [Part No. **03030204** (115 volts) or **03030349** (230 volts)]. These regulators provide pressure control from 350-520 kPa (3.4-5.2 bar, 50-75 psig) and contain an integral thermostatic heater to prevent freezing of the regulator diaphragm. A color-coded hose with suitable connectors at each end is supplied with the regulators to provide connection to the instrument gas controls.

A nitrous oxide burner head (Part No. **N0400100** for the PinAAcle series of instruments) must be used with nitrous oxide-based flames. The instructions provided with the nitrous oxide burner head should be strictly followed.

Argon: Argon is required for external and internal gas streams through the THGA or HGA graphite furnace to prevent combustion of the graphite tube at temperatures above 500 degrees C. The quality criteria is listed in Table II. Normally, for graphite furnace operation, gaseous argon is used, although either liquid or gaseous argon can be used. The choice of liquid argon or gaseous argon tanks is determined primarily by the availability of each and the usage rate. Liquid argon is usually less expensive per unit volume to purchase, but cannot be stored for extended periods. If liquid argon is used, the tank should be fitted with an over-pressure regulator which will vent the tank as necessary in order to keep the liquid argon cool enough to remain in the liquid state. Gaseous argon tanks do not require venting and consequently can be stored for extended periods without loss.

A dual-stage cylinder regulator that can be used with either gaseous argon or nitrogen is available from PerkinElmer (Part No. **03030284**). The regulator has a CGA 580 fitting, and includes a color-coded hose with 1/4-inch Swagelok® fittings to permit direct connection to the regulator and to the instrument gas controls.

Table II.

Quality Criteria for Argon

Criteria	Specification
Purity	≥ 99.996%
Oxygen	≤ 5 ppm
Nitrogen	≤ 20 ppm
Water	≤ 4 ppm

CAUTION: It is not recommended to use nitrogen as the furnace purge gas. Its use may lead to reduced sensitivity for some elements, and it is also possible for nitrogen to react with the graphite tube at temperatures above 2300 °C to form cyanogen, a toxic gas.

Gas Line Connections: PerkinElmer atomic absorption instruments include the hoses necessary for connection to gas lines (see Table III). It is the responsibility of the user to provide the appropriate gas lines, regulators, connectors and valves to which the hoses are connected.

Note: Regulator, connector and fitting needs vary by country. For information on what is required in your area, consult your local PerkinElmer Service Representative.

N.P.T. = Normal Pipe Thread, L.H.T. = Left-Hand Thread

Handling of Gas Cylinders & Other Safety Practices:

Notice: The permanent installation of gas supplies is the responsibility of the user and should conform to local safety and building codes.

- Flammable gas cylinders (such as acetylene) should not be stored with oxygen, or nitrous oxide cylinders, or adjacent to oxygen charging facilities.
- Fasten all gas cylinders securely to an immovable bulkhead or a permanent wall.
- When gas cylinders are stored in confined areas, such as a room, ventilation should be adequate to prevent toxic or explosive accumulations. Move or store gas cylinders only in a vertical position with the valve cap in place.
- Locate gas cylinders away from heat or ignition sources, including heat lamps. Cylinders have a pressure-relief device that will release the contents of the cylinder if the temperature exceeds 52 °C (125 °F).
- When storing cylinders external to a building, the cylinders should be stored so that they are protected against temperature extremes (including the direct rays of the sun) and should be stored above ground on a suitable floor.
- Mark gas cylinders clearly to identify the contents and status (full, empty, etc.).
- Do not attempt to refill gas cylinders.
- Use only approved regulators and hose connectors. Left-hand thread fittings are used for fuel gas tank connections, whereas right-hand fittings are used for oxidant and support gas connections.

• Use galvanized iron tubing, steel, wrought iron or other tubing that will not react chemically with acetylene. Never use copper tubing with acetylene. Joints may be welded or made up of threaded or flanged fittings, typically stainless steel, aluminum or brass composed of less than 65% copper. Rolled, forged or cast steel or malleable iron fittings may also be used. Cast iron fittings cannot be used safely for acetylene lines.

• Arrange gas hoses where they will not be damaged or stepped on and where things will not be dropped on them.

• Never run acetylene at a pressure higher than 100 kPa (15 psig). At pressures above this level, acetylene may spontaneously explode.

• Perform periodic gas leak tests by applying a soap solution to all joints and seals.

WARNING: Contact between acetylene gas and copper or silver (or high concentrations of silver salts), liquid mercury or gaseous chlorine can produce potentially unstable acetylides. Always clean the burner thoroughly after analyzing solutions with high silver or mercury concentrations, and aspirate solution continuously during the analysis to prevent any residues from drying.

• Periodically check for the presence of acetylene in the laboratory atmosphere, especially near the ceiling.

• When the equipment is turned off (for example, at the end of the working day), close all gas cylinder valves tightly at the tank. Bleed the remainder of the line to the atmosphere before the exhaust fan (vent) is turned off.

• When using premix burners with cyanide solutions, check the pH of the liquid trap and drain vessel. The pH of the liquid should be greater than 10. If the liquid is even slightly acidic, highly toxic hydrogen cyanide gas may be released.

• Take suitable precautions when using volatile organic solvents. A potentially flammable organic vapor "cloud" can form around the opening of the sample vessel. Feeding the capillary tubing through a small hole in a covered sample container is one way of reducing the possibility for ignition.

• Never view the flame, hollow cathode lamps, electrode less discharge lamps or deuterium background corrector lamps directly without protective eyewear. Potentially hazardous ultraviolet radiation may be emitted. Ordinary safety glasses will in general provide sufficient protection, but additional side shields will ensure a further margin of safety. Safety glasses will also provide mechanical protection for the eyes.

• Never leave the flame unattended.

• Zeeman background-corrected AA instruments generate a strong magnetic field. People with cardiac pacemakers are advised not to operate or frequent the vicinity of Zeeman-corrected instruments while they are in operation.

Drain Vessels: A specially-configured drain vessel is supplied with all PerkinElmer atomic spectroscopy instruments with burner systems. That vessel must be used to gather the effluent from the AA burner drain.

The drain vessel should NOT be stored in an enclosed storage area. Rather, the drain vessel should be stored in plain sight of the operator, usually on the floor in front of the instrument or on an open shelf underneath the instrument table.

The drain system should be checked regularly and replaced when necessary. Follow the directions in the instrument manuals regarding the proper placement of the drain tube in the drain vessel and the proper liquid level in the drain vessel.

Atomic Absorption Source Lamps: Atomic absorption spectrometers require different source lamps, depending on the elements to be determined and the instrument to be used. Multi-element lamps are available for some elements, but most lamps are constructed using a single element to avoid potential spectral interferences and reduced performance, especially when using a graphite furnace.

PerkinElmer manufactures all of its hollow cathode and electrode less discharge lamps. The Lumina™ and Atomax™ series of hollow cathode lamps are especially noted for spectral purity, brightness, stability and long life.

Hollow cathode lamps are excellent for most elements; however, there are a number of "difficult" elements for which an improved light source is desirable. PerkinElmer System 2 Electrode less Discharge Lamps (EDLs) provide improved performance in most instances. EDLs are more intense than their corresponding hollow cathode lamps. Most also provide better lamp life and stability and some also provide better sensitivity. EDLs do not require a separate power supply as it is built-in the PinAAcle system.

A lamp mount or turret is supplied with all PerkinElmer AA instruments and will accommodate all PerkinElmer hollow cathode or electrode less discharge lamps. Users who may have lamps with 1.5-inch diameters rather than the standard PerkinElmer 2-inch diameter can adapt those lamps for use in PerkinElmer lamp mounts with the Small Diameter Lamp Adapter Kit, (Part No. 03030870) and the adapter plug (Part No. N3050197).

Furnace Requirements: The furnace power supply is built into the PinAAcle 900T.

Graphite furnaces require electrical power, cooling water and a supply of inert gas, normally argon. A minimum input voltage of 208 volts under load is strongly recommended to enable the furnace to reach maximum potential operating temperatures and required heating rates. The minimum input voltage of 208, under load is also needed for the Zeeman effect background correction, to guarantee proper magnetic field strength. For installations where the line voltage may drop below this level, the use of a "buck boost"-type transformer is strongly recommended to maintain proper analytical operating conditions. Operating the system without the above recommendations, might void the instrument warranty.

An appropriately-rated female electrical connector is required to provide power for the graphite furnace. Please contact your local Service Engineer to determine the appropriate connector for your laboratory.

The THGA furnace and Zeeman magnet of the PinAAcle 900T system operates from a single, dedicated electrical supply of 230 volts ($\pm 10\%$), under full instrument load, 30 amp, 50 or 60 Hz (± 0.3 Hz), single phase, capable of delivering 10.1 KVA. The PinAAcle 900T system is provided with a 30-amp plug. It is recommended that 8-gauge (6 mm²) wire be used for the electrical supply for the PinAAcle 900T system, and that the length of the wiring (circuit breaker to instrument connection) not exceed 20 meters (65 feet). If the length of the wiring exceeds 20 meters, 6 gauge wiring is needed.

For all furnace systems, the electrical supply should contain a "slow blow" circuit breaker capable of handling 300% of the rated current for periods of 3 seconds. Also, the AA spectrometer, graphite furnace, Zeeman magnet, computer and other accessories should all be connected to the same electrical ground. There should be no more than 10 volts peak to peak noise between hot and neutral and no more than 0.5 volts noise between neutral and ground. If noise exceeds either or both values, a line conditioner is needed.

Additional Furnace Requirements:

A water supply is required to cool the furnace quickly to ambient temperature after reaching high atomization temperatures. A suitable recirculating cooling system is included with the PinAAcle 900T.

When operating the HGA Graphite Furnace systems at high temperatures, do not look directly at the tube without suitable eye protection.

1.4 Maintenance and Troubleshooting

Routine maintenance can be performed by a trained analyst using the instructions found in the respective documents for maintenance and troubleshooting. PerkinElmer has trained service representatives, who perform other planned maintenance service annually or as required. Departmental Standard Operating Procedures (SOPs) shall also be consulted to implement and document the necessary repairs.

1.5 Hazards and Safety Precautions

Refer to respective documents for the safety summary outlines and explanation.

2 Documentation

2.1 PerkinElmer Service Engineer Training

Persons authorized by PerkinElmer to perform validations have been properly trained. Training is documented, and a certificate is issued by PerkinElmer to that effect.

See Attachment #1 for PerkinElmer Training Certificate.

2.2 Standard Operating Procedures

It is responsibility of the customer to follow a SOP for use and maintenance of the equipment to ensure consistent operations. The customer SOP may be written after the Qualification and can be added as an attachment after PerkinElmer completes this OQ.

2.3 Operational Qualification Instruction

2.3.1	In the Operational Qualification Test Description: Record Model (or Part Number) and Serial Number of any accessories or components not covered in the OQ.
2.3.2	Record the Serial Number and Calibration Date for each item of Test Equipment used.
2.3.3	Record the Batch/Lot Number and Expiration Date of each Standard, Reagent and Solvent used, including those supplied by the customer.
2.3.4	Label all solutions prepared at customer site in accordance with the customer requirements.
2.3.5	Provide the Standard certificates as Attachments.
2.3.6	Conduct Parameter Testing and record test data, Pass/Fail and Comments.
2.3.7	Verify the completed OQ in Section 5.
2.3.8	Sign, date and number attachments of all recordings or printouts made during the test procedure.
2.3.9	Fill in All Appendices, as required.
2.3.10	Complete and sign off the Final Protocol Approval.
2.3.11	Complete and affix an OQ Certification Sticker to the instrument.

3 Operational Qualification Test Description

Configurations Covered	PinAAcle900T	
Accessories/Components not covered	Model	Serial Number
Estimated Certificate Testing Time		
Pre-test Stabilization	1.0 Hour	
Testing Time	7.0 Hours	
Materials Required		
Documentation	Part Number	
Service Manual	09936989	
Hardware Manual	09936985 or 09931148	
PinAAcle Family Preparing Your Laboratory for PerkinElmer Atomic Absorption Spectrometers	009362_03	
Analytical Methods for AAS Manual	03030152 (FlmCkbk)	
Safety with Organic Solvents	B0190413	
Recommended Single-Element Conditions for THGA Furnaces	09935220	
AS-900 User's Manual	09936997 or 09931157	
Cooling System User's Guide	09935299 (Coolsys-1)	
Automatic Matrix Modification for THGA Graphite Furnace AA	D-6124	
OQ Certification Sticker	09934513	
Comments:		
PerkinElmer Representative Signature:	Date: (DD-MMM-YYYY)	
Customer Representative Signature:	Date: (DD-MMM-YYYY)	

Test Equipment	Manufacturer	Model	Serial Number	Calibration Date (MMM-YYYY)
0.2A Neutral density filter	PerkinElmer	N1013000		
0.7A Neutral density filter	PerkinElmer	N1013001		
1.0A Neutral density filter	PerkinElmer	N1013002		
2.0A Neutral density filter	PerkinElmer	N1013003		
Nitrous Oxide burner head (if applicable)	PerkinElmer	N0400100	N/A	N/A
Test Jig	PerkinElmer	B0505495	N/A	N/A
Flow Meter		B3100652, or N9307029 or other suitable Flow Meter		
125 mL plastic bottles (optional)	N/A	N/A	N/A	N/A
Standards, Reagents and Solvents	Manufacturer	Part Number	Batch/Lot	Expiration (MMM-YYYY)
PE pure GFAAS-MIXSTD	PerkinElmer	N9300244		
1% Nitric Acid (250 mL) (Optional)	PerkinElmer	N8145050		
0.5% Nitric Acid (250 mL) (Optional)	PerkinElmer	N8125033		
Lamps	Manufacturer	Model / PN	Serial Number	
Lumina HCL Ba - coded	PerkinElmer	N3050109		
Lumina HCL Cr - coded	PerkinElmer	N3050119		
Lumina HCL Cu - coded	PerkinElmer	N3050121		
EDL/2 lamp As -- with coding plug	PerkinElmer	N3050605		
Customer Supplied	Manufacturer	Part Number	Batch/Lot	Expiration (MMM-YYYY)
DI Water (if applicable)	N/A	N/A	N/A	N/A
Comments:				
PerkinElmer Representative Signature:			Date:	
			(DD-MMM-YYYY)	
Customer Representative Signature:			Date:	
			(DD-MMM-YYYY)	

All solutions prepared at customer site must be labeled in accordance with the customer requirements	
Tests	
Name of Test	Description
Detector Linearity with Barium	Ensures that the detector is linear in the Visible Range
Baseline Noise at 1.0 Absorbance with Barium	Ensures that a high absorbance will not produce excessive noise.
AA Baseline with Copper	Checking baseline noise.
D ₂ Background Compensation, Copper	Verifies the instruments ability to compensate for Background absorption
AA-BG Baseline Noise with Copper	Ensures that background correction does not produce excessive noise.
AA-BG Baseline Noise with Arsenic	Ensures that background correction does not produce excessive noise at a low wavelength.
Flame safety checks	Checks to ensure that all safety interlocks are closed
Standard flame check	Checks for a moderately blue flame
Flame interlock shutdown	Checks that the flame extinguishes safely
Nitrous Oxide flame check (if applicable)	Checks that the Nitrous Oxide / Acetylene flame ignites and extinguishes correctly
Flame Sensitivity and Precision	Instrument sensitivity and reproducibility checked against Copper standard.
Furnace Gas Flows	Ensures the flow rates are within specification
Chromium Baseline Noise	Signal to noise check
Chromium Characteristic Mass and Precision	Calculate the characteristic mass using characteristic mass tool and precision from the integrated absorbance values
Copper Characteristic Mass and Zeeman Ratio	Calculate the characteristic mass using the characteristic mass tool. Check the Zeeman Ratio
Autosampler Linearity	Checks the Correlation Coefficient
PerkinElmer assumes no responsibility for failure of test results except as covered by instrument warranty or contract.	

4 Parameter Testing

Refer to the information in this section for procedures to perform the tests.

Preparation

- Make sure that the gas supplies are switched on and at the correct pressure.
- Install the Lumina Cu HCL in position 1.
- Install the As EDL, driver and coded plug in position 2.
- Install the Lumina Cr HCL in position 3.
- Install the Lumina Ba HCL in position 4.
- Use the Lamp Setup window to turn on the As EDL, and two of the HCL lamps. It is recommended to warm up the HCL lamps for at least 5 minutes, and the EDL lamp approximately 45 minutes before running a test. The lamps can be turned on after the software initializes.
- Power up the instrument and computer. Launch WinLab32 for AA, or Syngistix for AA software, then *Change Technique to Flame* if not already in the flame mode.
- It is recommended to warm-up the system for 30 minutes.

Note: The first eleven tests are performed using the flame mode. The remaining tests are performed using the furnace mode. All needed methods are stored in the **Service library**. Results may be stored as a results data set.

1. If Syngistix AA Software is installed, the path is: (C:\Users\Public\PerkinElmer\Syngistix\AA\SystemFiles\Service) if the default directory is used when installing the software.
2. If WinLab for AA Software is installed, the path is: (C:\Users\Public\PerkinElmer\AA\SystemFiles\Service) if the default directory is used when installing the software.

Note: Absorbance Filters will vary by wavelength, and will never be exactly 0.2, 1.0, or 2.0 absorbance. The filter calibration data sheet provides an absorbance at individual wavelengths.

4.1 Detector Linearity with Barium

4.1.1 Test Conditions

- Install the Barium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Barium lamp and select Setup for the Barium lamp.
- Close the Lamp Setup Window.

4.1.2 Test Prerequisites

- Burner Head below the light beam.

4.1.3 Test Steps

- Open the **Det Linearity** (WinLab32), or **PFHT-Detector Lin-Ba** (Syngistix) method in the Service PinAAcle directory. If there is an interlock message concerning the burner head, and/or nitrous oxide, change the oxidant to air in the burner control window.
- Open Continuous Graphics.
- Autozero
- Place the 2.0 A Neutral Density Filter in the Filter holder in the Sample Compartment. Record the Absorbance in the table below. Remove the filter from the filter holder.
- Repeat with the 1.0 A Neutral Density Filter.
- Repeat with the 0.2 A Neutral Density Filter.
- Remove the filter from the filter holder
- Close Continuous Graphics
- Record the test results, and/or print to file.
- If desired, Manual Analysis can be used, so data can be saved, but a blank may need to be added to the service method.

4.1.4 Test Results

Parameter	Specification	Calibrated Filter Absorbance at 553.6	Test Result	Pass/Fail
Absorbance of "2.0 Filter"	± 10% from Calibrated Filter Value			
Absorbance of "1.0 Filter"	± 10% from Calibrated Filter Value			
Absorbance of "0.2 Filter"	± 10% from Calibrated Filter Value			
Comments:				
PerkinElmer Representative Signature:			Date:	
			(DD-MMM-YYYY)	
Customer Representative Signature:			Date:	
			(DD-MMM-YYYY)	

4.2 Baseline Noise at 1.0 Absorbance with Barium

4.2.1 Test Conditions

- Install the Barium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Barium lamp and select Setup for the Barium lamp.
- Close the Lamp Setup Window.

4.2.2 Test Prerequisites

- Burner Head below the light beam.

4.2.3 Test Steps

- Open the AA **AA BL Noise 1 A** (WinLab), and **PFHT- AA BL Noise 1A-Ba** (Syngistix) method in the Service PinAAcle directory. If there is an interlock message concerning the burner head, and/or nitrous oxide, change the oxidant to air in the burner control window.
- Place the 1.0 A neutral density Filter in the filter holder.
- Open the Analysis window.
- Click the Analyze Sample button and 99 replicates will be measured.
- Remove the filter from the filter holder.
- Record the results in the table below.
- Print the test results if desired.

4.2.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.010		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.3 AA Baseline with Copper

4.3.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.

4.3.2 Test Prerequisites

- Burner Head below the light beam.

4.3.3 Test Steps

- Open the **AA BL Noise** (WinLab), and **PFHT- AA BL Noise- Cu** (Syngistix) method in the Service PinAAcle directory.
- In the (Manual) Analysis window, select Analyze Sample for 99 replicates to be measured, using a 0.5 second integration time.
- Record the results in the table below.
- Print the test results if desired.

4.3.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.001		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.4 D₂ Background Compensation with Copper

4.4.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.

4.4.2 Test Prerequisites

- Burner Head below the light beam.

4.4.3 Test Steps

Open the **D2 Compensation** (WinLab), **PFHT- D2 Compensation- Cu** (Syngistix) method in the Service PinAAcle directory.

- Open the Continuous Graphics window.
- Select the Autozero icon in the Continuous Graphics window.
- Place the 0.7 A neutral density filter in the filter holder.
- Record the Absorbance in the table below.
- Remove the filter from the filter holder.
- Close the Continuous Graphics window.
- If desired, the analysis window can be used instead of Continuous Graphics.
- Print the test results if desired..

4.4.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Absorbance	≤ 0.010		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.5 AA-BG Baseline Noise with Copper

4.5.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup window.

4.5.2 Test Prerequisites

- Burner Head below the light beam.

4.5.3 Test Steps

- Open the **AA-BG BL Noise** (WinLab), **PFHT AA-BG BL Noise Cu** (Syngistix) method in the Service PinAAcle directory.
- In the (Manual) Analysis window, click on *Analyze Sample*, 99 replicates will be measured, with an integration time of 2.0 seconds.
- Record the results in the table below.
- Print the test results if desired.

4.5.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.005		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.6 AA-BG Baseline Noise with Arsenic

4.6.1 Test Conditions

- Install the Arsenic EDL Lamp.
- If there is no coding plug, enter the element in the Lamp Setup window.
- Turn on the Arsenic EDL lamp and select Setup for the Arsenic lamp.
- Close the Lamp Setup Window.

4.6.2 Test Prerequisites

- Burner Head below the light beam.

4.6.3 Test Steps

- Open the **AA-BG BL N As** (WinLab), **PFHT AA-BG BL N As** (Syngistix) method.
- In the (Manual) Analysis window, select Analyze Sample, 99 replicates will be measured with an integration time of 2.0 seconds.
- Record the results below.
- Print the test results if desired.

4.6.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.005		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.7 Flame Safety Checks

4.7.1 Test Conditions

- Before igniting the flame, make sure the following conditions are satisfied.
- Make sure the vent is on and has the correct flow rate as specified in the Preparing Your Laboratory for AA document.
- Ensure the spray chamber is correctly installed.
- Ensure the end cap is secured by the latches.
- Ensure the burner head is correctly installed.
- Ensure that the correct sample introduction O-rings are installed, they are compatible with the solutions being run, and they are in good condition.
- Make sure the stainless steel nebulizer (if applicable), has an outer O-ring and the end cap retainer is over the nebulizer flange.
- Ensure the fuel and oxidant hoses are correctly fitted to the instrument.
- Ensure the drain system is installed and is operating correctly.
- Make sure the drain system is out in the open (not in a cabinet).
- Ensure the flame atomizer door is in the closed position.
- Ensure all safety interlocks are satisfied.
- Ensure Cyanide solutions, which produce a poisonous gas when mixed with acidic solutions, are not present in the drain bottle.

If the interlocks are not closed, one or more of the following may be the cause:

- The burner head, the nebulizer, or the drain system is not correctly installed.
- The acetylene or oxidant pressure is too low.
- There is not enough liquid in the drain trap/loop.
- The liquid level in the drain vessel is too high.

4.7.2 Test Steps

- Document the above conditions in the check box below.

4.7.3 Test Results

Parameter	Specification	Test Result	Pass/Fail
Flame Safety Check	Items specified above were checked		
Flame Safety Check	Interlocks are correctly closed		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.8 Standard Flame Check

4.8.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Ensure the standard burner head is installed.
- Ensure that the exhaust vent is turned on.

4.8.2 Test Prerequisites

- Burner Head below the light beam.

4.8.3 Test Steps

- Open the FL Sens&Prec(HS or SS) or PFHT-FI Sen Pred-Cu method located in the PinAAcle directory under the Service directory.
- Open the Flame Control window.
- Light the Flame
- Confirm that the flame is a moderately lean, blue flame.
- Record the results in the box below.

4.8.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Flame Check	Moderately blue		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.9 Flame Interlock Check

4.9.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Flame on.

4.9.2 Test Prerequisites

- The flame safety checks passed.

4.9.3 Test Steps

- Cover the flame sensor with a very long screwdriver with a wide blade, or other appropriate tool. Make sure the flame extinguishes safely. You will see a flame interlock error message.
- Re-ignite the flame and unplug the drain sensor cable. Make sure the flame extinguishes safely. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A drain not connected pop-up error message will appear. **Syngistix:** You will see a drain not connected error message in the flame control window, and a drain not connected pop-up error message.
- Re-connect the drain sensor cable.
- Re-ignite the flame and carefully rotate the nebulizer side arm counterclockwise. Make sure the flame extinguishes safely. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A Nebulizer missing pop-up error message will appear. **Syngistix:** You will see a nebulizer missing error message in the flame control window and a nebulizer missing pop up message.
- Re-position the nebulizer correctly.
- Re-ignite the flame. **If accessible**, turn off the acetylene valve. Make sure the flame extinguishes in a safe manner. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A no fuel pressure pop-up error message will appear. **Syngistix:** You will see a no fuel pressure error message in the flame window and a no fuel pressure pop up message.
- Turn the acetylene back on.
- Re-ignite the flame. **If accessible**, turn off the air pressure valve. Make sure the flame extinguishes in a safe manner. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A no air pressure pop-up error message will appear. **Syngistix:** You will see a no air pressure interlock in the flame control window and a no air pressure pop up message.
- Turn the air back on.

- In the Flame Control window, when the **flame is off**, an **air burner head** is installed, and there is **no nitrous oxide pressure**; check that when Nitrous Oxide is chosen as the oxidant, the flow rates change in the flame control window, and an interlock occurs. **WinLab32**: The Safety Interlock "X" will turn red in the Flame Control Window. When the red box with an X is selected, there should appear the following pop-up message: No N2O pressure. No N2O burner head. **Syngistix**: You will see No N2O pressure, and No N2O burner head in the flame control window.
- Change back to Air in the Burner Control Window. Light the flame.
- In the Flame Control window, when the **flame is on**, an **air burner head** is installed, and there is **no nitrous oxide pressure**; check that when Nitrous Oxide is chosen as the oxidant, the safety interlock stays green, the gas flow rates change, but when apply is selected, the following pop-up message appears: **WinLab32**: No N2O pressure, and No N2O burner head. **Syngistix**: No N2O pressure, and No N2O burner head.
- Check the appropriate Test Result box below after each test.
- Extinguish the flame.

4.9.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Flame Sensor - Flame Interlock Shutdown Check	Air/Acetylene Flame correctly shuts down		
Drain Sensor - Flame Interlock Shutdown Check	Air/Acetylene Flame correctly shuts down		
Nebulizer Sensor - Flame Interlock Shutdown Check	Air/Acetylene Flame correctly shuts down		
Acetylene pressure Sensor (optional)	Air/Acetylene Flame shuts down in a safe manner		
Air pressure Sensor (optional)	Air/Acetylene Flame shuts down in a safe manner		
Air Burner Head Sensor - Interlock Check	Choosing Nitrous Oxide as the oxidant should trigger an interlock		
Comments:			
PerkinElmer Representative Signature:		Date:	
		(DD-MMM-YYYY)	
Customer Representative Signature:		Date:	
		(DD-MMM-YYYY)	

4.10 Nitrous Oxide Flame Check (if applicable)

4.10.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.
- Nitrous oxide burner head installed (make sure standard burner head is cool before removing).
- Nitrous gas line is installed between the instrument and a tank that has a pressure above 500 psi (3447 kilopascal or 34.5 bar). The tank is empty if the pressure is below 500 psi (3447 kilopascal or 34.5 bar).
- A heated nitrous oxide regulator is installed on the nitrous oxide tank.
- The nitrous oxide regulator line pressure is set to the correct pressure according to the installation procedure.
- Ensure the vent flow is between 250 and 300 CFM.

4.10.2 Test Prerequisites

- All safety interlocks have been checked.
- A copper method such as the **FL Sens&Prec(HS or SS)** or **PFHT-FI Sen Pred-Cu** method is open.

4.10.3 Test Steps

- In the Flame Control window click on the N2O radio button.
- Switch on the flame by clicking on the Flame On button. A standard flame will be ignited and after a short moment the changeover to Nitrous Oxide will take place.
- Make sure the Nitrous Flame is not too lean (all blue) and not too rich (all white). There should be a pink feather that is 2-5 cm high.
- Select the flame off button. Make sure the Nitrous Oxide Flame extinguishes safely.
- Re-ignite the flame. **If accessible**, turn off the acetylene valve. Make sure the flame extinguishes in a safe manner.
- Re-ignite the flame. **If accessible**, turn off the nitrous oxide valve. Make sure the flame extinguishes in a safe manner.
- Check the appropriate Test Result box for each of the tests.

- Explain to the customer that it is recommended to warm up the burner head for five minutes before switching to the Nitrous Oxide / Acetylene flame to minimize carbon build-up.
- Explain to the customer that the nebulizer is never adjusted while running a Nitrous Oxide / Acetylene flame.
- Explain to the customer that a Nitrous Oxide / Acetylene flame should never be all blue since all blue is too lean, and is prone to a flashback. The flame should also never be all white, as an all-white flame is too rich, and is likely to clog the burner head, producing a flash back as well.

4.10.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Nitrous Oxide flame lights correctly when the flame on button is selected.	Flame first lights with air/acetylene, then switches to Nitrous Oxide/Acetylene		
Nitrous Oxide flame is slightly rich	Nitrous Oxide flame has the desired red feather		
Acetylene valve is turned off (optional)	Nitrous Oxide/Acetylene flame shuts down in a safe manner		
Nitrous Oxide valve is turned off (optional)	Nitrous Oxide/Acetylene flame shuts down in a safe manner		
Nitrous Oxide flame shuts down correctly	Flame switches back to air/acetylene, then turns off.		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.11 Flame Sensitivity and Precision

4.11.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.

4.11.2 Test Prerequisites

- For the **Stainless Steel Nebulizer**: Accurately pipette 10 ml of the GFAAS-MIXED STANDARD (part number N930 0244) into an acid-washed 100 ml class A volumetric flask and dilute to volume with deionized water or the 1% Nitric Acid solution. The diluted solution contains **5.0 mg/L copper**. A clean plastic 125 mL bottle can also be used if the standard is made up by weight using a transfer pipet.
- For the **Plastic Nebulizer**: Accurately pipette 4 ml of the GFAAS-MIXED STANDARD (part number N930 0244) into an acid-washed 100 ml class A volumetric flask and dilute to volume with deionized water or the 1% Nitric Acid solution. The diluted solution contains **2.0 mg/L copper**. A clean plastic 125 mL bottle can also be used if the standard is made up by weight using a transfer pipet.
- Ensure the burner head is parallel to the light beam (not tipped).
- Open the Continuous Graphics and flame control windows.
- Ensure the burner head is below the beam from the lamp, and autozero.
- With the flame off, optimize the burner height.
- With the flame on, while aspirating the appropriate standard for the nebulizer being used, align the horizontal and rotational positions.
- Now optimize the nebulizer. Unlock the nebulizer locking nut. Slowly turn the nebulizer adjustment nut counterclockwise until you see bubbles in the copper solution or until the absorbance goes to zero. Turn the nebulizer adjustment nut clockwise until the absorbance goes to its maximum. The minimum absorbance is listed in the table below.
- Optimize gas flows to obtain the highest absorbance.
- Close the Continuous Graphics window.

4.11.3 Test Steps

- Open the **FL Sens&Prec(HS or SS)** or **PFHT-FI Sen Pred-Cu** method. Change the gas flows to the values that gave the highest absorbance during optimization. Define the Blank in the method if needed.
- Open the Manual Analysis and Result windows.

- Aspirate the blank solution. Select Analyze Blank in the Manual Analysis Window. Wait until the 10 replicates are finished.
- Aspirate the copper standard for the nebulizer being used. The Stainless Steel Nebulizer uses the 5 mg/L standard and the Plastic Nebulizer uses the 2 mg/L standard. Select Analyze Sample. Wait until the 10 replicates are finished.
- Record the results in the table below for the selected nebulizer.
- Print the test results if desired.
- Aspirate DI water for 5 minutes, then aspirate air for 30 seconds.
- Turn off the flame.
- The PinAAcle 900 T IQ/OQ test parameters only covers the nebulizers that ship with the PinAAcle 900 T, either the Metal Body Stainless Steel Nebulizer (N3160143), or the Plastic High Sensitivity Nebulizer (N3160144). Other nebulizer assemblies will produce different results.

4.11.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Flame Sensitivity with SS nebulizer (if applicable)	Mean Absorbance ≥ 0.250 for a 5 mg/L Cu standard		
Flame Sensitivity with plastic nebulizer , without the spacer installed (if applicable)	Mean Absorbance ≥ 0.250 for a 2 mg/L Cu standard		
Flame Precision with the SS nebulizer (if applicable)	RSD ≤ 0.50 %		
Flame Precision with the plastic nebulizer (if applicable)	RSD ≤ 0.50 %		
Comments:			
PerkinElmer Representative Signature:		Date:	
		(DD-MMM-YYYY)	
Customer Representative Signature:		Date:	
		(DD-MMM-YYYY)	

4.12 Furnace Gas Flows

4.12.1 Test Conditions

- Open the furnace base module.

4.12.2 Test Steps

- Turn on the gas flow, standard flow, not mini flow.
- Open the graphite furnace and remove the graphite tube.
- Insert the **test jig (B0505495)** into the rear contact cylinder.
- Connect the gas outlet of the jig to a **flow meter**.
- Measure the flow rate for front and back (internal) and record the values.
- Determine the difference in flow rate between the two sides for the internal flows.
- Remove the test jig and put the graphite tube back into the furnace.
- Check the external flow rates by connecting the flow meter to the external hoses at the QCM connectors and record the values for both sides.
- Determine the difference in flow rate between the two sides for the external flows.
- Adjust the regulator if needed to either increase all flow rates or to decrease **all** flow rates.
- Check hose connections for any leaks. Make sure the gas lines seal in the connector.
- Close the base module.

4.12.3 Test Results

Parameter	Specification	Test Result	Pass/Fail
Internal Flow Rate, Left Side	250 mL/min \pm 20 mL/min		
Internal Flow Rate, Right Side	250 mL/min \pm 20 mL/min		
Difference between Internal Flow Rates	20 mL/min maximum		
External Flow Rate, Front	100 mL/min \pm 10 mL/min		
External Flow Rate, Back	100 mL/min \pm 10 mL/min		
Difference between External Flow Rates	20 mL/min maximum		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.13 Chromium Baseline Noise (Furnace)

4.13.1 Test Conditions

- Install the Chromium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Chromium lamp and select Setup for the Chromium lamp.
- Close the Lamp Setup Window.
- Make sure a **standard THGA tube** is in the furnace. In the *Furnace Control* window click on the **Condition Tube** button to condition and clean the THGA tube.
- Use the 88 position sample tray of the AS-900, check the tray configuration.
- Align the AS-900 carefully, as described in the Hardware Manual.
- Immerse the rinse liquid capillary into a bottle of **Isopropanol**.
- In the *Furnace Control* window click at least 5 times on the **Flush Sampler** button to remove dirt and oils from the pump and capillary system of the AS-900.
- Connect the rinse liquid capillary back into the rinse liquid vessel.
- In the *Furnace Control* window click at least 5 times on the **Flush Sampler** button to remove any Isopropanol from the pump and capillary system of the AS-900. Repeat this step if necessary to remove all air bubbles.

4.13.2 Test Steps

- Open the **THGA Cr Tests** (WinLab), **PZT- BL Char Mass- Cr** (Syngistix) method.
- From the *Tools* (WinLab) or *Analysis & Results* (Syngistix) choices, open the following windows; *Results*, *(Transient) Peaks (Display)* and *(Automated) Analysis (Control)*.
- Before starting the test, run at least one **dry firing** (without any sample) to make sure that there is **no residual signal (less than 0.005 integrated absorbance, which is peak area)** from any previous injections or tube contamination.
- Repeat the dry firing as needed to ensure there is no peak from contamination.
- It is also recommended to inject the blank at least once to make sure all contamination is removed from the sampling capillary and to ensure that the blank solution is clean.
- Change *All Defined* to *Locations* and type in 3 (empty), as the sample location in the *Analysis* window. Click on the *Analyze Samples* button to measure **5 furnace dry firings** (without any sample).
- Record the results in the table below.
- Print the test results if desired.

4.13.3 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.0004		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.14 Chromium Characteristic Mass and Precision (Furnace)

4.14.1 Test Conditions

- Install the Chromium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Chromium lamp and select Setup for the Chromium lamp.
- Close the Lamp Setup Window.

4.14.2 Test Prerequisites

- Make sure the dry firing reveals no contamination for Chromium.
- Prepare the test standard according to the following directions.
- Accurately pipette 100 ul (0.1 ml) of the **GFAAS Mixed Standard (N9300244)** into an acid-washed 200 ml class A volumetric flask and dilute to volume with deionized water or the 0.5% Nitric Acid solution. This diluted solution contains the following concentrations of the test elements and is ready to use. This Standard should be stable for about 1 day. The acid solution can be used to clean the flask. A clean plastic 125 mL bottle can also be used if the standard is made up by weight.

Element	Concentration (ug/L)
Cu	25.0
Cr	10.0

4.14.3 Test Steps

- Use the same method as the previous test.
- Rinse a clean, dry, sample cup 3 times with the standard solution, fill the cup with the standard solution and place it in position 2 of the sample tray.
- Rinse a clean, dry sample cup 3 times with deionized water, fill the cup with deionized water and place it in position 1 of the sample tray.
- Inject the blank (position 1) using "Select Loc" on the Analyze/Analysis page at least once to make sure all contamination is removed from the sampling capillary and to ensure that the blank solution is clean.
- Change *All Defined to Locations* and type in 2 as the sample location in the *Analysis* window, click on the *Analyze Samples* button to measure five 20 uL injections of the Cr standard.
- Calculate the characteristic mass using the *Characteristic Mass* tool from the *Analyses* pull down menu.
- The characteristic mass (m_0) results in picograms, is calculated from the mean integrated absorbance (peak area) values and should not exceed the value listed in the following table.
- **NOTE:** If the characteristic mass is exceptionally low, check for possible contamination of the water, acid, volumetric flask and sample container used for sample preparation. Prepare a new solution if needed.
- The relative standard deviation (%RSD) of the mean sample solution readings, calculated from the integrated absorbance (peak area) values for Cr must not exceed the **maximum value of 2.0%**.
- Record the characteristic mass and precision results in the table below.
- Print the test results if desired.

4.14.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Chromium Characteristic Mass	≤ 7.0		
Chromium Precision (RSD)	≤ 2.0 %		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.15 Copper Characteristic Mass and Zeeman Ratio (Furnace)

4.15.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.

4.15.2 Test Prerequisites

- Perform a dry firing after setting up for Copper. Make sure the dry firing reveals no contamination for Copper.
- If a peak is seen, due to contamination, repeat dry firings until no peak is seen.

4.15.3 Test Steps

- Open the THGA Cu Tests (WinLab), PZT- BL Char Mass- Cu (Syngistix) method.
 - From the *Tools (WinLab)* or *Analysis (Syngistix)* choices, open the Analysis window.
 - Change *All Defined to Locations*, and type in 2 as the sample location in the *Analysis* window, click on the *Analyze Samples* button to measure 5 furnace firings using 20 µL sample injections.
 - Calculate the characteristic mass using the *Characteristic Mass* tool from the *Analyses* pull down menu.
 - The characteristic mass (m_0) results in picograms, is calculated from the mean integrated absorbance (peak area) values and should be less than or equal to the value listed in the following table.
 - **NOTE:** If the characteristic mass is exceedingly low, check for possible contamination of the water, acid, volumetric flask and sample container used for sample preparation. Make sure a standard ZL graphite tube is used, instead of an end-capped tube. Prepare a new solution if needed.
 - Record the characteristic mass results in the table below.
 - From the mean integrated absorbance (peak area) measurements the Zeeman ratio should be calculated using the following equation:
- $$R = \frac{\text{Atomic Signal (Peak Area)}}{[\text{Atomic Signal (Peak Area)} + \text{Background Signal (Peak Area)}]}$$

- The Zeeman Ratio, R, results calculated from the integrated absorbance (peak area) values should lie within the ranges for Cu listed in the table below.
- Record the results for Zeeman ratio in the table below.
- Print the test results if desired.

4.15.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Copper Characteristic Mass	≤ 17		
Cu Zeeman Ratio	0.52 ± 0.04		
Comments:			
PerkinElmer Representative Signature:		Date:	
		(DD-MMM-YYYY)	
Customer Representative Signature:		Date:	
		(DD-MMM-YYYY)	

4.16 Autosampler Linearity (Furnace)

4.16.1 Test Conditions

- Install the Chromium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Chromium lamp and select Setup for the Chromium lamp.
- Close the Lamp Setup Window.

4.16.2 Test Prerequisites

- Perform flushes with isopropanol. Remove the isopropanol by flushing with the normal rinse solution.

4.16.3 Test Steps

- Open the THGA AS-900 Lin (WinLab), PZT – AS900 Linearity- Cr (Syngistix) method.
- From the *Tools (WinLab)* or *Analysis & Results (Syngistix)* choices, open the windows; Results, (Transient) Peaks (Display), Calibration (Display) and (Automated) Analysis.
- Click on the *Analysis* window and then on the *Calibrate* button to start the calibration.

- When the calibration is finished check the **Correlation Coefficient Result** in the *Calibration Display* window.
- The correlation Coefficient Result for Cr must be equal to or exceed the **minimum value of 0.999**.
- Record the results in the table below.
- Print the test results if desired.

4.16.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Autosampler Linearity with four standards	Minimum Correlation Coefficient of 0.999		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

5 Operational Qualification Verification

The PinAAcle900T, Serial Number PTDS23051001, operates and performs according to the stated Operational Qualification, and all appropriate forms and documents supporting the system have been filled out and are available.	
PerkinElmer Representative Signature:	Date: (DD-MMM-YYYY)

Final Approval Page

Final Protocol Approval

This is to certify that the Operational Qualifications procedures for the PinAAcle900T Serial number PTDS23051001 have been performed and the configuration installed **meets** [] **does not meet** [] the procedures and specifications described in this document.

SECOT Co.,Ltd.			
Signature	Name	Title	Date (DD-MMM-YYYY)
PerkinElmer			
Signature	Name	Title	Date (DD-MMM-YYYY)

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Appendices

Appendix A – Deviations

Upon discovery of a deviation, stop qualification testing and notify SECOT Co.,Ltd. representative. PerkinElmer and SECOT Co.,Ltd. will collaborate to document and resolve the deviation. Duplicate this form for each "Deviation" and attach completed form(s) to this protocol. List all attachments in Appendix C.

Describe in detail the deviation, correction/justification and outcome.

Description: _____

Correction or Justification: _____

Outcome: _____

PerkinElmer			
Signature	Name	Role (Performer or Approver)	Date (DD-MMM-YYYY)

SECOT Co.,Ltd.			
Signature	Name	Role (Performer or Approver)	Date (DD-MMM-YYYY)

Appendix B – Change Control

Note: Create copies of this page, leaving original blank. Read instructions below.

Change Control procedures maintain the validation process after modifications are made to the original configuration (by OEM, SECOT Co.,Ltd., or PerkinElmer).

The Change Control Form is located in Appendix B – Change Control and instructions are located in the Introduction. Insert the completed Change Control Form and its data into this validation document as an Attachment.

Change Control Revision Attachment #: ____

Component / Software Changed

Reasoning and Justification for Change

Verification of New Component / Software

Acceptance Criteria Used

Results of Verification (Attach original data)

Validation Results

Validation	Pass/Fail
Signature	Date (DD-MMM-YYYY)
Performed By:	
Approved By:	

Appendix C – Attachments List

In the table below enter: each attachment; total pages for each attachment; company (OEM, SECOT Co.,Ltd., or PerkinElmer). Sign and date. Additionally, label each page of each Attachment as follows:

- Attachment Number (as per this table)
- Page X of Y (total) Pages of the Attachment
- Reference the page number of the procedure, if the attachment is the result of a test procedure
- Initials of Reviewer
- Date

#	Description	# Pgs	Company	Signature	Date (DD-MMM-YYYY)
1	PerkinElmer Service Engineer Training Certificate		PerkinElmer		
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Appendix D – Document History

Revision	Description of Change	Page(s)	Date
A	First release	-	April 2012
B	Made lamp warm up time recommended. Changed copper to chromium or chromium to copper to correct error.	28	January 2015
	Changed how Nitrous Oxide/Acetylene is checked	39-41	
	Revised documentation list	25	
	Added a choice of using 1% and 0.5% Nitric Acid solutions instead of deionized water	26, 41, 42, 47	
	Added the option of using a plastic bottle and scale to make up the standard solutions	26, 42, 47	
	Changed copper to chromium (to correct error)	50	
	Changed computer specification	13	
	Changed parameter testing preparation	28	
	Added column for calibrated filter absorbance	29	
	Changed filter specification to $\pm 10\%$ to correspond to the specification on previous instruments	29	
	Corrected specification on test # 3	31	
	Added: option of printing results	29-50	
	Added: nebulizer O-ring compatibility statement	35	
	Added: make sure the drain bottle is out in the open	35	

B	Added: make sure the vent is on	35	January 2015
	Split test of nitrous oxide burner head interlock to a flame off test and a flame on test.	40	
	Added: open up a flame method	40	
	Added: option of flame gas pressure testing	38, 40	
	Added: nebulizer clarification for IQ/OQ tests	43	
	Changed the method names to how they appear in the service directory	29-50	
	Added: Autozero. Remove filter from the filter holder. Close continuous graphics. Record the test results and/or print to file. If desired manual analysis can be used so data can be saved, but a blank will need to be added to the method.	29, 30, 32	
	Added: Before igniting the flame, make sure the following conditions are satisfied.	35	
	External Flow measurements changed to Front and Back. Close the base module.	44	
	Removed furnace alignment check. Repeat the dry firing as needed to ensure there is no peak from contamination. It is also recommended to inject the blank at least once to make sure all contamination is removed from the sampling capillary and to ensure that the blank solution is clean.	46	
	Update for Syngistix- AA Software Update for Syngistix- AA Software Service method names are listed for both WinLab32 and Syngistix software. Error messages seen when interlocks are triggered are listed for WinLab32 and Syngistix software.	All	

C	Changed flame nebulizer precision to $\leq 0.5\%$ RSD, since the previous specification was for a new system.	40	July 2015
	Changed the furnace characteristic mass to a maximum value instead of a range.	45- 47	
D	Changed calibration due date to calibration date	24	August 2016
E	Corrected error – characteristic mass should be a maximum value for copper	47	December 2018
F	Addition of the 0.7A Neutral Density Filter to the Material List.	24	December 2021
	Change the Cu D2 Compensation test criteria to use the 0.7A Neutral Density Filter instead of the 1.0A filter.	30	
G	Corrected Test Steps Section 4.12 sequence for Furnace Gas Flows	41	August 2023



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Aug 22, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref.Calibrated (dB)	Eff.Calibrated (dB)
Cirrus	CR:515	94296	1000.00	94.0	93.7

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
14	Cirrus	CR162B	G300709	94.3	-0.6
15	Cirrus	CR162B	G300769	93.7	0.0

Calibrated by :

Approved by :

Preeda S.



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Nov 13, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref.Calibrated (dB)	Eff.Calibrated (dB)
Cirrus	CR:515	94296	1000.00	94.0	93.8

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
7	SCARLET	ST-21D	820728	93.7	0.1
8	SCARLET	ST-21D	820729	93.7	0.1

Calibrated by :

Approved by :

Suh Suthanamon



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,

Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280

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Certificate No.: CP20250074EA
Operation No.: CP2025020068

Certificate of Calibration

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 94296
ID No.:
Customer: SECOT Co.,Ltd.
Address: 239 Rimklongprapa Rd., Bangsue,
Bangkok 10800 Thailand
Received Date: 19 February 2025
Calibrated Date: 27 February 2025
Issued Date: 28 February 2025
Calibrated by: Ms. Juntaporn Kunhakom

Approved by:

(Mr. Sittichai Swaksuriyawong)
Group Manager

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



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250074EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 94296
ID No.:
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :-
IEC 60942:2017

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1007-24	6 June 2025
2) Waveform Generator	33511B	MY52302264	CK20240047EA	23 June 2025
3) Audio Analyzing DMM	2015-P	4079144	E1U2402195	23 May 2025
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P240022 CD20240180EA	20 March 2025 7 August 2025

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

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

- Reference standards instrument for Acoustic function
 - National Institute of Metrology (Thailand)
- Reference standards instrument for Electrical function
 - Electrical and Electronics Institute; NSC Accredited Calibration No.0119
 - NA Caltechnologies Co., Ltd.; ANAB Accredited Calibration No.AC-2658.

Result of Calibration:-

1. Function : Sound pressure level

Normal	Specified Sound	Measured value	Deviated value ^[1]	Acceptance limit ^[3]
Frequency (Hz)	Pressure level (dB)	(dB)	(dB)	(dB)
1000	94	93.86	-0.14	±0.25

2. Function : Frequency

Normal Sound	Specified Frequency	Measured value	Deviated value ^[2]	Acceptance limit ^[3]
Pressure level (dB)	(Hz)	(Hz)	(%)	(%)
94	1000	1000.34	0.03	±0.70

Certificate No.: CP20250074EA

Calibration Report

3. Function : Total distortion + noise

Normal Sound Pressure Level (dB)	Normal Frequency (Hz)	Measured value ^[4] (%)	Acceptance limit ^[5] (%)
94	1000	0.72	2.50

Uncertainty of measurement

Function	Uncertainty	Maximum-permitted uncertainty of measurement
Sound pressure level	0.10 dB	0.15 dB
Frequency	0.10 %	0.20 %
Total distortion + noise	0.40 %	0.50 %

- Note:
- [1] The deviated value is the absolute value of the difference between the measured value and the corresponding specified sound pressure level.
 - [2] The deviated value is the absolute value of the difference in percent between the measured value and the corresponding specified frequency.
 - [3] The acceptance limit is for the deviated value.
 - [4] The measured value is the total distortion + noise, measured over the frequency range from 20 Hz to 20 kHz.
 - [5] The acceptance limit is for the Measured value.

- Remarks:
- 1. Acceptance limit was IEC 60942:2017 Class 1.
 - 2. Maximum-permitted uncertainty of measurement was IEC 60942:2017 Class 1.
 - 3. The coverage factor $k = 2.00$

-- End of Report --

Sheet No. : CR-515-2025-189



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Aug 14, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref. Calibrated (dB)	Eff. Calibrated (dB)
Cirrus	CR:515	97097	1000.00	94.0	93.8

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
7	SCARLET	ST-21D	820728	93.8	0.0
8	SCARLET	ST-21D	820729	93.8	0.0

Calibrated by :



Approved by : 



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,

Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280

Tel: +66 2709 4860 Fax: +66 2324 0917



Certificate No.: CP20240363EA
Operation No.: CP2024090339

Certificate of Calibration

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 97097
ID No.:
Customer: SECOT Co.,Ltd.
Address: 239 Rimklongprapa Rd., Bangsue,
Bangkok 10800 Thailand
Received Date: 30 September 2024
Calibrated Date: 2 October 2024
Issued Date: 4 October 2024
Calibrated by: Ms. Juntaporn Kunhakom

Approved by:

(Mr. Sittichai Swaksuriyawong)
Group Manager

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20240363EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 97097
ID No.:
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :-
IEC 60942:2017

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1007-24	6 June 2025
2) Waveform Generator	33511B	MY52302264	CK20240047EA	23 June 2025
3) Audio Analyzing DMM	2015-P	000136E	E1U2303776	7 December 2024
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P240022 CD20240180EA	20 March 2025 7 August 2025

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

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

- Reference standards instrument for Acoustic function
 - National Institute of Metrology (Thailand)
- Reference standards instrument for Electrical function
 - Electrical and Electronics Institute; NSC Accredited Calibration No.0119
 - NA Caltechnologies Co., Ltd.; ANAB Accredited Calibration No.AC-2658.

Result of Calibration:-

1. Function : Sound pressure level

Normal	Specified Sound	Measured value	Deviated value ^[1]	Acceptance limit ^[3]
Frequency (Hz)	Pressure level (dB)	(dB)	(dB)	(dB)
1000	94	94.09	0.09	±0.25

2. Function : Frequency

Normal Sound	Specified Frequency	Measured value	Deviated value ^[2]	Acceptance limit ^[3]
Pressure level (dB)	(Hz)	(Hz)	(%)	(%)
94	1000	1000.31	0.03	±0.70

Certificate No.: CP20240363EA

Calibration Report

3. Function : Total distortion + noise

Norminal Sound Pressure level (dB)	Norminal Frequency (Hz)	Measured value ^[4] (%)	Acceptance limit ^[5] (%)
94	1000	0.60	2.50

Uncertainty of measurement

Function	Uncertainty	Maximum-permitted uncertainty of measurement
Sound pressure level	0.10 dB	0.15 dB
Frequency	0.10 %	0.20 %
Total distortion + noise	0.40 %	0.50 %

- Note:
- [1] The deviated value is the absolute value of the difference between the measured value and the corresponding specified sound pressure level.
 - [2] The deviated value is the absolute value of the difference in percent between the measured value and the corresponding specified frequency.
 - [3] The acceptance limit is for the deviated value.
 - [4] The measured value is the total distortion + noise, measured over the frequency range from 20 Hz to 20 kHz.
 - [5] The acceptance limit is for the Measured value.

- Remarks:
- 1. Acceptance limit was IEC 60942:2017 Class 1.
 - 2. Maximum-permitted uncertainty of measurement was IEC 60942:2017 Class 1.
 - 3. The coverage factor $k = 2.00$

- - End of Report - -

ภาคผนวก จ

หนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
จากกรมโรงงานอุตสาหกรรม



ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐๑ ๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๐ กรกฎาคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๗ เมษายน ๒๕๖๖

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๙ แผ่น

ตามหนังสือที่อ้างถึง บริษัท ซีคอฟ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙ สถานที่ ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ซีคอฟ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๘ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ พฤษภาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม คำรงพงษ์)

ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอฟ จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐๑ ๖

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย

๑) นายขรรชัย เกรียงไกรอุดม

๒) นางสมฤดี เกรียงไกรอุดม

๓) นางอารยา ทิพรัักษ์

๔) นางสาวเชมชุตตา อินทร์สร

๕) นางสาวปรีดา สมใจ

๖) นางสาวอรุณญา มาตา

๗) นางสาวลดาวัลย์ วงศ์เจริญ

๘) นางสาวณัฏฐพร เกตะวันดี

๙) นางสาวนริสา ภูวสรเพ็ชญ์

๑๐) นางสาวศิริวรรณ นิมนต์สง่า

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๒

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๓

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๔

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๕

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๖

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๗

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๘

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๙

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๑๐

ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๑๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ชีคอฟ จำกัด

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐ ๑ ๖

เลขทะเบียน ว-๒๓๙

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๘ ราย

- ๑) นางสาวสุทธพร สุนทร.
- ๒) นางสาวสุทธาทิพย์ เทียนเตี้ย
- ๓) นางสาวสุนันทา ศิริวัฒนานนท์
- ๔) นายบวร ดิษฐ์ยะ
- ๕) นางสาวเกศรินทร์ วรเดชาวิทยา
- ๖) นายอนันต์ พิรมวันนา
- ๗) นายชิตพล สมประสงค์
- ๘) นางสาวศศิธร พรหมประเสริฐ
- ๙) นายศิวะนนท์ กุลวงษ์
- ๑๐) นางสาวอลิษา คณิรานนท์
- ๑๑) นางสาวสิริวรรณ แก้วชิงดวง
- ๑๒) นางสาวปัทมวรรณ สุวรรณวิโรจน์
- ๑๓) นางสาวกนิษฐา เจริญเชื้อ
- ๑๔) นายวัชรกานต์ ประมาคเต
- ๑๕) นายทอง เสงฆ์กุล
- ๑๖) นางสาวกฤษณา จันทุม
- ๑๗) นางสาวพรนภา บุตรธรรม
- ๑๘) นางสาวธาริณี อาจปสิว
- ๑๙) นายธนโชติ ช่างลือ
- ๒๐) นางสาวพัชรา สมานฉันท
- ๒๑) นางสาวจุฑาจันทร์ แจ่มเรือน
- ๒๒) นางสาวฉนิษฐา กุ้ยอ่อน
- ๒๓) นายกิตติพงศ์ ณะกิจสุข
- ๒๔) นายจิรวัฒน์ โคตรคำหาญ
- ๒๕) นายชนะพล อัครผล
- ๒๖) นางสาวทิพย์สุดา วรรณการ
- ๒๗) นายสิทธิชัย สว่างวงศ์ไชย
- ๒๘) นายพิษณุ สีนามเพ็ง
- ๒๙) นายรัตนชัย ขอบท่ากิจ
- ๓๐) นายธนาวุฒิ ต่วนแสง
- ๓๑) นายณัฐชัย ไชยโคตร
- ๓๒) นายณัฐดนัย กฤษณะโสม
- ๓๓) นายศุภชัย สุขใหม่
- ๓๔) นายรอมฎอน เหลี่ยมพาด
- ๓๕) นางสาวสุภาวดี บัวแก้ว
- ๓๖) นางสาวมาริยาณี ฮานว
- ๓๗) นางสาววิระยา ปิจนิมบุรณ์
- ๓๘) นางสาวศลิษา อินริย์

- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๑
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๓
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๔
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๕
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๖
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๗
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๘
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๙
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๐
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๑
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๒
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๓
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๔
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๕
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๖
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๗
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๘
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๙
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๐
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๑
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๒
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๓
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๔
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๕
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๖
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๗
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๘
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๙
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๐
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๑
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๒
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๓
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๔
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๕
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๖
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๗
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๘
- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๙

วิภา

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ชีคอฟ จำกัด

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐ ๑ ๖

เลขทะเบียน ว-๒๓๙

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๕ รายการ

น้ำเสีย จำนวน 45 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
4	α-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
5	β-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
6	δ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
7	γ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

วิภา

สิ่งที่ส่งมาด้วย ๓

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^[4] 2) 5-Day BOD Test, Membrane Electrode Method ^[4]
9	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
10	Chemical Oxygen Demand	1) Open Reflux, Titrimetric method ^[4] 2) Closed Reflux, Colorimetric method ^[4] 3) Closed Reflux, Titrimetric Method ^[4]
11	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[4]
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
15	Cyanide	Distillation, Colorimetric method ^[4]
16	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
18	4,4'-DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
19	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
20	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
21	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
22	Endosulfan Sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
23	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
24	Endrin Aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Formaldehyde	Distillation, Colorimetric Method ^[3]
26	Free Chlorine	1) Iodometric Method ^[4] 2) DPD Colorimetric Method ^[4]
27	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass-Spectrometric Method ^[4]
28	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Hexavalent Chromium	1) Colorimetric Method ^[4] 2) Extraction, Air-Acetylene Flame Method ^[4]
30	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
31	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
32	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
33	Methoxychlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
34	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4]

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		3) Digestion, Inductively Coupled Plasma Method ^[4]
35	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^[4] 2) Soxhlet Extraction Method ^[4]
36	pH	Electrometric Method ^[4]
37	Phenols	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4]
38	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
39	Sulfide	1) Iodometric method ^[4] 2) Methylene blue method ^[4]
40	Temperature	Laboratory and Field Methods ^[4]
41	Total Dissolved Solids	Dried at 180 °C ^[4]
42	Total Kjeldahl Nitrogen	1) Macro Kjeldahl Method ^[4] 2) Semi-Micro Kjeldahl Method ^[4]
43	Total Suspended Solids	Dried at 103-105 °C ^[4]
44	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4]
45	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]

น้ำใต้ดิน...

น้ำใต้ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
8	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap Gas Chromatographic/Mass spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾ 317)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾ 317)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method; Colorimetric Method; Calculation ^[4]
35	Chromium (VI)	1) Colorimetric Method ^[4] 2) Extraction, Air-Acetylene Flame Method ^[4]
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4] <i>สมป</i>

37 Cyanide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
37	Cyanide	1) Distillation, Titrimetric Method ^[4] 2) Distillation, Colorimetric Method ^[4]
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] <i>สมป</i>

50 1,1-Dichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] <i>วิธี</i>

2) Liquid-Liquid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
65	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
66	Ethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
72	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
73	n-Hexane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] <i>วิธี</i>

2) Liquid-Liquid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	γ-HCH	2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] 1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
77	Hexachlorocyclopentadiene	2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
84	Methanol	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
86	Methyl bromide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]

87 Methylene chloride...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
87	Methylene chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
96	Polychlorinated Biphenyls - PCB-1016 - PCB-1221 - PCB-1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
98	pH	Electrometric method ^[4]

99 Phenanthrene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
100	Phenol	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4] 3) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
103	Silver	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
104	Styrene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
107	Toluene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
108	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[12,25]
109	TPH (C ₈ -C ₁₆)	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21] 2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method ^[9,25]
110	TPH (C ₁₆ -C ₃₅)	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21] <i>จิม</i>

2) Separatory...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method ^[9,25]
111	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
112	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
113	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
114	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
115	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
116	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
117	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
118	Vanadium	Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
119	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
120	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
121	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
122	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
123	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
124	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] <i>จิม</i>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
125	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]

อากาศเสีย (ปล่อยระบาย) จำนวน 27 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
5	Carbon monoxide	Instrumental Analyzer Method ^[5]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
7	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] <i>วิธีใหม่</i>

8 Cobalt...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
9	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic Method ^[5]
11	Dioxin/Furans	Isokinetic Sampling ^[5]
12	Hydrogen chloride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
15	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] <i>วิธีใหม่</i>

19 Opacity...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Opacity	Ringelmann's Method ^[2]
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method ^[5] 2) Absorption Sampling, Ion Chromatographic Method ^[5] 3) Instrumental Analyzer Method ^[5]
21	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
22	Sulfur dioxide	1) Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 3) Instrumental Analyzer Method ^[5]
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
24	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
25	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ^[5] 2) Paired Train, Isokinetic Sampling, Gravimetric Method ^[5]
26	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
27	Xylene	1) Adsorption Sampling, Gas Chromatographic Method ^[5] 2) Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method ^[5]

สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 34 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,6,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,6,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
2	Antimony	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
4	Barium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15]

2) Waste Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Chlordane	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
8	Chromium	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] <i>3) Digestion...</i>

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,15,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,14,17]
10	Chromium (VI)	3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,15,17] 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,14,17]
11	Cobalt	1) Waste Extraction, Colorimetric Method ^[1,17] 2) Alkaline Digestion, Colorimetric Method ^[8,17]
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] <i>3) Digestion...</i>

13 2,4-D...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	2,4-D	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,25] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]

17 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14]

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Lindane	3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1,18] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[19] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]


24 Molybdenum...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,23]
27	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,25] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25]
28	pH	Electrometric Method ^[31,32]
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,20] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,20]


4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
30	Silver	4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
32	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1,12,26] 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[12,26]
33	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
34	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]

ดิน จำนวน 124 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27] 

2 Acetone...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
5	Antimony	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic Method ^[11,24]
8	Barium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] 

14 Benzo(a)pyrene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^(7,14)
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14)
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method ^(11,22) 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
32	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14)
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^(7,8,15,17) 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(7,8,14,17)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,17)
36	Chrysene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,27)
37	Cyanide	1) Extraction, Distillation, Titrimetric Method ^(28,29,30) 2) Extraction, Distillation, Colorimetric Method ^(28,29,30)
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(12,21)
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method ^(11,22) 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
42	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
43	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
47	3,3'-Dichlorobenzidine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]

54 1,2-Dichloropropane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
58	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
61	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
62	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
63	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]

67 Fluoranthene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
67	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
68	Fluorene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
71	Hexachlorobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
74	α-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
75	β-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
76	γ-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
77	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]

78 Hexachloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
78	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
79	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
80	Isophorone	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[19] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
84	Methanol	Ultrasonic Extraction, Direct Aqueous Injection, Gas Chromatographic Method ^[11,21]
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]

90 Methyl tert-butyl ether...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
91	Naphthalene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14)
93	Nitrobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
94	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
95	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	Soxhlet Extraction, Gas Chromatographic Method ^(10,23)
97	Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²⁴⁾
98	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
99	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
100	Pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,20)

2) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
102	Silver	2) Digestion, Inductively Coupled Plasma Method ^(7,14) 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14)
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
107	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
108	TPH (C ₈ -C ₁₆)	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,21) 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method ^(10,26)
109	TPH (C ₁₆ -C ₃₅)	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,21) 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method ^(10,26)
110	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
111	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
112	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
113	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)

114 2,4,5-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
114	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
115	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
116	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
117	Vanadium	Digestion, Inductively Coupled Plasma Method ^(7,14)
118	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass spectrometric Method ^(13,26)
119	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
120	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
121	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
122	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
123	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
124	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14) <i>Signature</i>

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว.ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แก๊สเป็นเชื้อเพลิง.ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

- APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.
- United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2023.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. SW-846, 2020.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Acid Digestion of Sediments, Sludges, and Soils. SW-846 Method 3050B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Ultrasonic Extraction. SW-846 Method 3550C, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030C, 2003.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-optical Emission Spectrometry. SW-846 Method 6010D, 2018.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Flame Atomic Absorption Spectrophotometry. SW-846 Method 7000B, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Antimony and Arsenic (Atomic Absorption, Borohydride Reduction). SW-846 Method 7062, 1994. *Signature*

17. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric), SW-846 Method 7196A, 1992.

18. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Liquid Waste (Manual Cold-Vapor Technique, SW-846 Method 7470A, 1994.

19. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique, SW-846 Method 7471B, 2007.

20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Selenium (Atomic Absorption, Borohydride Reduction), SW-846 Method 7742, 1994.

21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Nonhalogenated Organics Using GC/FID. SW-846 Method 8015D, 2003.


22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Organochlorine Pesticide by Gas Chromatography. SW-846 Method 8081B, 2007.

23. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Polychlorinated Biphenyls (PCBs) By Gas Chromatography. SW-846 Method 8082A, 2007.

24. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Organophosphorus Compounds by Gas Chromatography. SW-846 Method 8141B, 2007.

25. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chlorinated Herbicides By GC Using Methylation or Pentafluorobenzoylation Derivatization. SW-846 Method 8151A, 1996.

26. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.

27. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. SemiVolatile Organic Compounds by Gas Chromatography/Mass Spectrometry. SW-846 Method 8270E, 2018. 


28. United States...

28. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation. SW-846 Method 9010C, 2004.

29. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oils. SW-846 Method 9013A, 2014.

30. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric. SW-846 Method 9014, 2014.

31. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C, 2004.

32. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Solid and Waste pH. SW-846 Method 9045D, 2004. 

ที่ อก ๐๓๑๐(๑)/ ๕๐ ๕๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๗ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๑ พฤษภาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท ซีคอฟ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙
สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร
ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๒ ราย ได้แก่

- | | |
|------------------------|----------------------------|
| ๑) นายวีรภรณ์ ประมาคเต | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๕ |
| ๒) นายรัตนชัย ขอบทำกิจ | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๐ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายพรศักดิ์ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

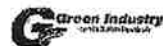
กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๕๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



ที่ อก ๐๓๑๐(๑)/ ๑๑ ๕๕ ๗



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๑ พฤศจิกายน ๒๕๖๗

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๕ พฤศจิกายน ๒๕๖๗

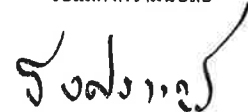
ตามคำขอที่อ้างถึง บริษัท ซีคอฟ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙
สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ขอยกเลิกบุคลากร
ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๓ ราย ได้แก่

- | | |
|--------------------------|----------------------------|
| ๑) นางสาวพัชรา สมานฉันท | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๑ |
| ๒) นางสาวสุภาวดี บัวแก้ว | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๖ |
| ๓) นางสาวมาเรียณี ฮาแว | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๗ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๕๔

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ภาคผนวก ข

ใบรับรองความสามารถห้องปฏิบัติการและขอขยายการรับรอง
ห้องปฏิบัติการทดสอบ ตามมาตรฐาน ISO/IEC 17025
จากสำนักงานมาตรฐานอุตสาหกรรม (สมอ.)



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(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

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(Secot Company Limited, Environmental Laboratory Division)

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(Address)

๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร
(239 Rimklongprapa Road, Bangsue, Bangkok)

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๑๗๐๒๕ - ๒๕๖๑
(Standard No. TIS 17025-2561 (2018) (ISO/IEC 17025: 2017))

ข้อกำหนดทั่วไปว่าด้วยความสามารถของ ห้องปฏิบัติการทดสอบและห้องปฏิบัติการสอบเทียบ
(General requirements for the competence of testing and calibration laboratories)

หมายเลขการรับรองที่ ทดสอบ ๐๓๙๔
(Accreditation No. Testing 0394)

โดยมีรายละเอียดสาขาและขอบข่ายที่ใบรับรอง 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 ๖ ธันวาคม พ.ศ. ๒๕๖๖
(Issue date : 6 December B.E. 2566 (2023))

(นายวีระศักดิ์ เพ็ญหลัง)

ผู้อำนวยการสำนักงานคณะกรรมการการมาตรฐานแห่งชาติ

ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)



รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
(Certification No. 24-LB0026)



ชื่อห้องปฏิบัติการ
(Laboratory Name)

หมายเลขการรับรองที่
(Accreditation No.)

ฉบับที่ 03
(Issue No. 03)

สถานภาพห้องปฏิบัติการ
(Laboratory status)

บริษัท ซีคोट จำกัด ฝ่ายห้องปฏิบัติการทดสอบด้านสิ่งแวดล้อม
(Secot Company Limited, Environmental Laboratory Division)

ทดสอบ 0394
(Testing 0394)

ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))

☒ ถาวร
(Permanent)

☐ นอกสถานที่
(Site)

☐ชั่วคราว
(Temporary)

ถึงวันที่ 8 กันยายน พ.ศ. 2571
(Until 8 September B.E.2571 (2028))

☐เคลื่อนที่
(Mobile)

☐หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสังแวดล้อม (Environmental field)		
1. น้ำและน้ำเสีย (Water and wastewater)	<ul style="list-style-type: none">Heavy metals<ul style="list-style-type: none">Arsenic (As) 0.000 5 mg/L to 0.090 0 mg/LArsenic (As) 0.05 mg/L to 4.50 mg/LBarium (Ba) 0.02 mg/L to 4.50 mg/LCadmium (Cd) 0.01 mg/L to 4.50 mg/LChromium (Cr) 0.01 mg/L to 4.50 mg/L	<ul style="list-style-type: none">Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th edition, 2023, Part 3030 F and Part 3114 CStandard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th edition, 2023, Part 3030 E and Part 3120 B

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry, Thai Industrial Standards Institute)

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
(Certification No. 24-LB0026)



ฉบับที่ 03
(Issue No. 03)

ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))

ถึงวันที่ 8 กันยายน พ.ศ. 2571
(Until 8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ
(Laboratory status)

☒ ถาวร
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(Site)

☐ชั่วคราว
(Temporary)

☐ เคลื่อนที่
(Mobile)

☐ หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>1. น้ำและน้ำเสีย (ต่อ) (Water and wastewater) (cont.)</p>	<p>- Heavy metals</p> <ul style="list-style-type: none"> Copper (Cu) 0.02 mg/L to 4.50 mg/L Iron (Fe) 0.05 mg/L to 9.00 mg/L Lead (Pb) 0.03 mg/L to 4.50 mg/L Manganese (Mn) 0.01 mg/L to 9.00 mg/L Nickel (Ni) 0.01 mg/L to 4.50 mg/L Zinc (Zn) 0.02 mg/L to 9.00 mg/L <p>- Chemical oxygen demand (COD) 10.00 mg/L to 9 000 mg/L</p>	<p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th edition, 2023, Part 3030 E and Part 3120 B</p> <p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th edition, 2023, Part 5220 D</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
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ฉบับที่ 03
(Issue No. 03)

ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))

ถึงวันที่ 8 กันยายน พ.ศ. 2571
(Until 8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ
(Laboratory status)

☒ ถาวร
(Permanent)

☐ นอกสถานที่
(Site)

☐ชั่วคราว
(Temporary)

☐ เคลื่อนที่
(Mobile)

☐ หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>2. บริเวณทำงาน (Workplace)</p>	<p>- Total dust 0.10 mg/filter to 2.00 mg/filter</p> <p>- Respirable dust 0.10 mg/filter to 2.00 mg/filter</p> <p>- Benzene 0.70 µg/tube to 420 µg/tube</p> <p>- Toluene 0.70 µg/tube to 420 µg/tube</p> <p>- Total xylenes 1.40 µg/tube to 840 µg/tube</p> <p>- m, p-Xylene 0.70 µg/tube to 420 µg/tube</p>	<p>- NIOSH Manual of Analytical Methods (NMAM), Method 0500, 4th edition, 15th August 1994 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Methods (NMAM), Method 0600, 4th edition, 15th January 1998 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Methods (NMAM), Method 1501, 4th edition, 15th March 2003 (Exclude Sampling)</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 24-LB0026

(Certification No. 24-LB0026)



ฉบับที่ 03
(Issue No. 03)

ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))

ถึงวันที่ 8 กันยายน พ.ศ. 2571
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สถานภาพห้องปฏิบัติการ
(Laboratory status)

☒ ถาวร
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(Site)

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☐เคลื่อนที่
(Mobile)

☐หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>2. บริเวณทำงาน (ต่อ) (Workplace) (Cont.)</p> <p>3. ปล่องระบายอากาศ (Stack)</p>	<p>- o-Xylene 0.70 µg/tube to 420 µg/tube</p> <p>- Sulfur dioxide 1.00 mg/L to 16 000 mg/L</p> <p>- Hydrogen fluoride 5 µg/sample to 400 µg/sample</p> <p>- Hydrogen chloride 5 µg/sample to 400 µg/sample</p>	<p>- NIOSH Manual of Analytical Methods (NMAM), Method 1501, 4th edition, 15th March 2003 (Exclude Sampling)</p> <p>- US.EPA, Code of Federal Regulations, 40 CFR 60 appendix A, Method 6, July 2024 (Exclude Sampling)</p> <p>- WI-7.2-1-22 based on US.EPA, Code of Federal Regulations, 40 CFR 60 appendix A, Method 26, 26A, 2024</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 24-LB0026

(Certification No. 24-LB0026)



ฉบับที่ 03
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ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
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ถึงวันที่ 8 กันยายน พ.ศ. 2571
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สถานภาพห้องปฏิบัติการ
(Laboratory status)

☒ ถาวร
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(Temporary)

☐เคลื่อนที่
(Mobile)

☐หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>4. บรรยากาศทั่วไป (Ambient air)</p>	<p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> Chloroethene 0.05 µg/m³ to 51.00 µg/m³ (0.02 ppbv to 20.00 ppbv) 1,3-butadiene 0.04 µg/m³ to 44.00 µg/m³ (0.02 ppbv to 20.00 ppbv) Bromomethane 0.08 µg/m³ to 77.00 µg/m³ (0.02 ppbv to 20.00 ppbv) Acrolein 0.05 µg/m³ to 45.00 µg/m³ (0.02 ppbv to 20.00 ppbv) Acrylonitrile 0.04 µg/m³ to 43.00 µg/m³ (0.02 ppbv to 20.00 ppbv) Dichloromethane 0.14 µg/m³ to 69.00 µg/m³ 0.04 ppbv to 20.00 ppbv 	<p>- WI-7.2-1-24 based on US EPA, Compendium Method TO-15, EPA/625/R-96/010b, Second edition, January 1999</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
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ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
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สถานภาพห้องปฏิบัติการ
(Laboratory status)

☒ ถาวร (Permanent)
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☐ชั่วคราว (Temporary)

☐ เคลื่อนที่ (Mobile)
☐ หลายสถานที่ (Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>4. บรรยากาศทั่วไป (ต่อ) (Ambient air) (cont.)</p>	<p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> Carbon disulfide 0.06 $\mu\text{g}/\text{m}^3$ to 62.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Trichloromethane 0.20 $\mu\text{g}/\text{m}^3$ to 97.00 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 1,2-dichloroethane 0.08 $\mu\text{g}/\text{m}^3$ to 80.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Benzene 0.06 $\mu\text{g}/\text{m}^3$ to 63.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Carbon tetrachloride 0.25 $\mu\text{g}/\text{m}^3$ to 125 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) Trichloroethylene 0.21 $\mu\text{g}/\text{m}^3$ to 107 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 	<p>- WI-7.2-1-24 based on US EPA, Compendium Method TO-15, EPA/625/R-96/010b, Second edition, January 1999</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
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ฉบับที่ 03
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สถานภาพห้องปฏิบัติการ
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☐ชั่วคราว (Temporary)

☐ เคลื่อนที่ (Mobile)
☐ หลายสถานที่ (Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (environmental field)</p> <p>4. บรรยากาศทั่วไป (ต่อ) (Ambient air) (Cont.)</p>	<p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> 1,2-dichloropropane 0.18 $\mu\text{g}/\text{m}^3$ to 92.00 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) Tetrachloroethylene 0.27 $\mu\text{g}/\text{m}^3$ to 135 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 1,2-dibromoethane 0.31 $\mu\text{g}/\text{m}^3$ to 153 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 1,1,2,2-tetrachloroethane 0.69 $\mu\text{g}/\text{m}^3$ to 137 $\mu\text{g}/\text{m}^3$ (0.10 ppbv to 20.00 ppbv) Benzyl chloride 0.52 $\mu\text{g}/\text{m}^3$ to 103 $\mu\text{g}/\text{m}^3$ (0.10 ppbv to 20.00 ppbv) 1,4-dichlorobenzene 0.24 $\mu\text{g}/\text{m}^3$ to 120 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 	<p>- WI-7.2-1-24 based on US EPA, Compendium Method TO-15, EPA/625/R-96/010b, Second edition, January 1999</p>

ภาคผนวก ข

ใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์การทำงาน
จากกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กภ.บุญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ใบอนุญาตเลขที่ ๑๔๑๓-๑๓-๒๕๖๕-๑๑๔๔

อนุญาตให้...บริษัท ชีคอฟ จำกัด

เลขทะเบียนนิติบุคคล.....๐๑๑๕๕๒๖๐๐๐๙๗๖

ตั้งอยู่เลขที่ ๒๓๙ ถนนวิมลคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๗ ราย และรายการเครื่องมือตรวจวัด จำนวน ๖๕ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒ มิถุนายน พ.ศ. ๒๕๖๕

(นายศักดิ์ศิลป์ ตูลาธร)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม
๓-๑๑-๐๔๐๓-๐๕๓-๐๒-๖๘

(ลงนาม).....(นายทะเบียน)
(นางสาวสุวดี ทวีสุข)
ตำแหน่ง ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
 ของบริษัท ซีคोट จำกัด
 ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

๑. นางสาวสุนันทา ศิริวัฒนานนท์
๒. นางสาวกนิษฐา เจริญเชื้อ
๓. นางสาวอลิษา คณิธรานนท์
๔. นางสาวชนิตา หล้าสาย
๕. นางสาวศลิษา อินริย์
๖. นางสาววิระยา ปัจฉิมบุรณ์
๗. นายพงศ์ศิริ จักรแก้ว

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒ มิถุนายน พ.ศ. ๒๕๖๘



(นายกิตติ์ศิลป์ ตูลาธร)
 ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
 อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือตรวจวัดแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
 ของบริษัท ซีคोट จำกัด
 ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

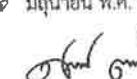
ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องวัดเสียง และเครื่องวัดเสียงกระทบหรือเสียงกระแทก	ยี่ห้อ	Cirrus	๑๐
		รุ่น	CR162B	
		Serial No.	G302737	
			G302738	
			G302740	
			G302742	
			G302743	
			G301014	๓
			G302333	
			G302330	
			G302237	
			G300709	
		มาตรฐาน	IEC 61672-1	๒
		ยี่ห้อ	Cirrus	
		รุ่น	CR162C	
		Serial No.	G300832	๑๕
			G300838	
			G300841	
		มาตรฐาน	IEC 61672-1	
		ยี่ห้อ	Cirrus	
		รุ่น	CR171B	
		Serial No.	G303411	๑๕
			G303415	
		มาตรฐาน	IEC 61672-1	
		ยี่ห้อ	SCARLET TECH	
		รุ่น	ST-21D	
		Serial No.	820722	
			820723	
			820724	
			820725	
			820726	
			820727	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
			820728 820729 820730 820731 821078 821079 821080 821081 821082	
		มาตรฐาน	IEC 61672	
๒	เครื่องวัดปริมาณเสียงสะสม	ยี่ห้อ	Cirrus	๒๐
		รุ่น	CR:110A	
		Serial No.	CB1023 CB1025 CB1026 CB1040 CB1041 CB1042 CB1043 CB1047 CB1048 CB1049 CB1050 CB1052 CB1053 CB1054 CB1055 CB1056 CB1101 CB1102 CB1103 CB1104	
		มาตรฐาน	IEC 61252	
		ยี่ห้อ	Pulsar	๑๐
		รุ่น	Model 22R	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
		Serial No.	PB614 PB617 PB618 PB621 PB632 PB636 PB637 PB638 PB643 PB644	
		มาตรฐาน	IEC 61252	
๓	อุปกรณ์ตรวจสอบความถูกต้อง	ยี่ห้อ	Cirrus	๒
		รุ่น	CR:515	
		Serial No.	94296 97097	
		มาตรฐาน	IEC 60942	
๔	อุปกรณ์ตรวจสอบความถูกต้อง (เสียงสะสม)	ยี่ห้อ	Cirrus	๒
		รุ่น	RC:110A	
		Serial No.	95167 95168	
		มาตรฐาน	IEC 60942	
		ยี่ห้อ	Pulsar	๑
		รุ่น	Model 22R	
		Serial No.	79781	
		มาตรฐาน	IEC 60942	

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒ มิถุนายน พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ทุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน