ภาคผนวก

ภาคผนวก ก หนังสือรับรองผลการตรวจวิเคราะห์

ภาคผนวก ข หนังสือรับรองมาตรฐานบริษัท เอสจีเอส (ประเทศไทย) จำกัด

ภาคผนวก ค สำเนาใบรับรองการสอบเทียบเครื่องมือตรวจวัด

ภาคผนวก

ภาคผนวก ก

หนังสือรับรองผลการตรวจวิเคราะห์

คุณภาพอากาศ

คุณภาพอากาศจากแหล่งกำเนิด (Emission Stack)

Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : 2025-500005090-3 / 001-1 (Page 1 of 1) **Issued date:** October 2, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Emission Air
Sampling Location : HRSG 1, GPSC CUP4
Sampling By : Nawat Chailoed (ว-197-จ-0009)
Korravitch Malakul Na Ayuthaya (ว-197-จ-0014)
Laboratory Name : SGS (Thailand) Limited (ว-197)

Sampling Date : August 18, 2025
Sampling Time : 10:50-11:50 hrs. (For TSP)
: 14:21-14:50 hrs. (For SO_2 and NO_x)
Received Date : August 20, 2025
Analysis Date : August 20-27, 2025

Parameter		Unit	Value	Standard[1/]	Standard[2/]	Standard[3/]	Analytical Method
Fuel Type		-	Natural Gas	-	-	-	-
Stack Diameter		cm.	330	-	-	-	-
Stack Temperature		^{O}C	140.4	-	-	-	-
Dry Gas Temperature		^{O}C	32.0	-	-	-	-
Absolute Stack Pressure		mm.Hg	756.7	-	-	-	-
Air Velocity		m/s	19.17	-	-	-	U.S.EPA Method 2
Volumetric Flow Rate at actual O_2		Nm^3/hr	385,955	-	-	-	U.S.EPA Method 2
Moisture		%	8.86	-	-	-	U.S.EPA Method 4
O_2		%	14.08	-	-	-	U.S.EPA Method 3A
CO_2		%	3.83	-	-	-	U.S.EPA Method 3A
TSP	at actual O_2	mg/Nm^3	0.42	-	-	-	U.S.EPA Method 5
	at 7% O_2	mg/Nm^3	0.80	7.108	60	60	
	Emission Rate	g/s	0.045	0.416	-	-	by Calculation
Sulfur Dioxide (SO_2)	at actual O_2	ppm	0.20	-	-	-	U.S.EPA Method 6C
	at 7% O_2	ppm	0.40	1.66	20	20	
	Emission Rate	g/s	0.055	0.255	-	-	by Calculation
Oxide of Nitrogen as NO_2	at actual O_2	ppm	10.78	-	-	-	U.S.EPA Method 7E
	at 7% O_2	ppm	21.95	26.58	120	120	
	Emission Rate	g/s	2.173	3.000	-	-	by Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 ^{O}C, pressure of 1 atm or 760 mmHg, dry basis.

Sources : 1/ Environmental Impact Assessment Report of GLOW ENERGY PUBLIC COMPANY LIMITED (GPSC CUP4).
2/ Notification of the Ministry of Natural Resources and Environment; Establishment of Standards for the Control of Emission from Power Plants, B.E. 2566 (2023).
3/ Notification of the Ministry of Industry; Determination of Emission Standards for Air Pollutants from Power Plants, B.E. 2567 (2024).

(Phatsakorn Soonthornwiphat)
Technical Specialist Section Head
License ID: ว-197-ค-0004

(Thepsan Yommana)
Technical Specialist Manager
License ID: ว-197-ค-0005

SGS (THAILAND) LIMITED

TY/OC/DS/DS

LABORATORY ADDRESS: 1/209, and 1/211 Moo1, Soi Sukhumvit 2, Banchang, Banchang, Rayong, 21130

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คุณภาพอากาศในบรรยากาศ (ambient Air)

Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : 2025-500005090-3 / 003-1 (Page 1 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดประชุมมิตรบำรุง
Coordination (UTM) : 47P 26450E, 1407369N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Station	Sampling Date	Result	
		TSP (mg/m^3)	PM-10 (mg/m^3)
วัดประชุมมิตรบำรุง	August 18-19, 2025	0.040	0.020
	August 19-20, 2025	0.045	0.023
	August 20-21, 2025	0.040	0.018
	August 21-22, 2025	0.043	0.016
	August 22-23, 2025	0.036	0.017
	August 23-24, 2025	0.035	0.021
	August 24-25, 2025	0.046	0.019
Standard (avg. 24 hr)[1/]		**≤0.33**	**≤0.12**

Remarks : - Sampling and analytical technique for TSP based on High Volume Air Sampler / Gravimetric Method.
- Sampling and analytical technique for PM10 based on Size Selective High Volume Air Sampler / Gravimetric Method.

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

(Thepsan Yommana)
Technical Manager

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Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดประชุมมิตรบำรุง
Coordination (UTM) : 47P 26450E, 1407369N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	NO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
10:00-11:00	0.006	0.008	0.009	0.005	0.010	0.009	0.011
11:00-12:00	0.006	0.006	0.006	0.007	0.013	0.008	0.011
12:00-13:00	0.010	0.011	0.006	0.012	0.012	0.007	0.011
13:00-14:00	0.008	0.011	0.006	0.011	0.013	0.003	0.009
14:00-15:00	0.005	0.007	0.004	0.010	0.010	0.004	0.007
15:00-16:00	0.005	0.008	0.004	0.007	0.010	0.012	0.011
16:00-17:00	0.007	0.008	0.004	0.007	0.009	0.011	0.009
17:00-18:00	0.009	0.009	0.006	0.009	0.008	0.011	0.011
18:00-19:00	0.004	0.009	0.007	0.012	0.007	0.009	0.010
19:00-20:00	0.005	0.008	0.007	0.012	0.005	0.012	0.011
20:00-21:00	0.006	0.008	0.007	0.005	0.005	0.011	0.008
21:00-22:00	0.011	0.006	0.006	0.005	0.008	0.010	0.011
22:00-23:00	0.011	0.006	0.006	0.009	0.011	0.011	0.007
23:00-00:00	0.007	0.010	0.008	0.009	0.008	0.011	0.005
00:00-01:00	0.006	0.009	0.006	0.009	0.009	0.011	0.005
01:00-02:00	0.006	0.011	0.011	0.011	0.009	0.008	0.006
02:00-03:00	0.006	0.007	0.011	0.008	0.006	0.008	0.005
03:00-04:00	0.008	0.008	0.009	0.008	0.007	0.007	0.007
04:00-05:00	0.008	0.009	0.011	0.007	0.007	0.005	0.005
05:00-06:00	0.011	0.005	0.008	0.011	0.006	0.005	0.009
06:00-07:00	0.005	0.005	0.008	0.011	0.011	0.009	0.007
07:00-08:00	0.006	0.005	0.007	0.009	0.012	0.007	0.007
08:00-09:00	0.006	0.009	0.005	0.011	0.010	0.005	0.007
09:00-10:00	0.008	0.009	0.005	0.011	0.010	0.010	0.008
1 hr-Minimum	**0.004**	**0.005**	**0.004**	**0.005**	**0.005**	**0.003**	**0.005**
1 hr-Maximum	**0.011**	**0.011**	**0.011**	**0.012**	**0.013**	**0.012**	**0.011**
Standard[1/] (avg. 1 hr)	**≤0.17**						

Analytical Method : - Chemiluminescence Method.

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

(Thepsan Yommana)
Technical Manager

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Report No. : 2025-500005090-3 / 003-1 (Page 3 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดประชุมมิตรบำรุง
Coordination (UTM) : 47P 26450E, 1407369N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	SO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
10:00-11:00	0.003	0.004	0.002	0.002	0.002	0.004	0.004
11:00-12:00	0.002	0.004	0.001	0.001	0.001	0.003	0.004
12:00-13:00	0.002	0.001	0.003	0.003	0.002	0.003	0.003
13:00-14:00	0.002	0.001	0.003	0.004	0.004	0.003	0.004
14:00-15:00	0.003	0.002	0.002	0.002	0.003	0.002	0.002
15:00-16:00	0.003	0.004	0.002	0.004	0.004	0.002	0.004
16:00-17:00	0.002	0.002	0.002	0.001	0.004	0.002	0.001
17:00-18:00	0.003	0.003	0.004	0.002	0.002	0.001	0.001
18:00-19:00	0.002	0.003	0.003	0.003	0.004	0.003	0.004
19:00-20:00	0.002	0.003	0.002	0.003	0.002	0.004	0.003
20:00-21:00	0.003	0.003	0.004	0.001	0.002	0.002	0.004
21:00-22:00	0.004	0.002	0.004	0.002	0.001	0.003	0.003
22:00-23:00	0.001	0.004	0.002	0.003	0.003	0.002	0.004
23:00-00:00	0.001	0.002	0.001	0.002	0.004	0.003	0.001
00:00-01:00	0.004	0.002	0.001	0.003	0.003	0.001	0.004
01:00-02:00	0.003	0.002	0.002	0.002	0.001	0.001	0.003
02:00-03:00	0.002	0.001	0.004	0.002	0.002	0.001	0.004
03:00-04:00	0.003	0.002	0.002	0.002	0.004	0.001	0.004
04:00-05:00	0.004	0.004	0.002	0.003	0.002	0.001	0.002
05:00-06:00	0.002	0.004	0.002	0.003	0.003	0.003	0.003
06:00-07:00	0.003	0.003	0.004	0.004	0.002	0.002	0.002
07:00-08:00	0.002	0.003	0.001	0.003	0.004	0.001	0.003
08:00-09:00	0.004	0.004	0.002	0.004	0.004	0.004	0.003
09:00-10:00	0.003	0.002	0.002	0.004	0.002	0.004	0.004
1 hr-Minimum	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
1 hr-Maximum	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**
Average 24 hr	**0.003**	**0.003**	**0.002**	**0.003**	**0.003**	**0.003**	**0.003**
Standard[1/] (avg. 1 hr)	**≤0.30**						
Standard[2/] (avg. 24 hr)	**≤0.12**						

Analytical Method : - UV Fluorescence Method

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

(Thepsan Yommana)
Technical Manager

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Report No. : 2025-500005090-3 / 003-2 (Page 1 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : บ้านสำนักมะม่วง
Coordination (UTM) : 47P 788238E, 1403406N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Station	Sampling Date	Result	
		TSP (mg/m^3)	PM-10 (mg/m^3)
บ้านสำนักมะม่วง	August 18-19, 2025	0.050	0.020
	August 19-20, 2025	0.043	0.026
	August 20-21, 2025	0.039	0.015
	August 21-22, 2025	0.036	0.017
	August 22-23, 2025	0.038	0.016
	August 23-24, 2025	0.036	0.016
	August 24-25, 2025	0.039	0.015
Standard (avg. 24 hr)[1/]		**≤0.33**	**≤0.12**

Remarks : - Sampling and analytical technique for TSP based on High Volume Air Sampler / Gravimetric Method.
- Sampling and analytical technique for PM10 based on Size Selective High Volume Air Sampler / Gravimetric Method.

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

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CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : บ้านสำนักมะม่วง
Coordination (UTM) : 47P 788238E, 1403406N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	NO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
11:00-12:00	0.010	0.011	0.021	0.005	0.004	0.016	0.008
12:00-13:00	0.007	0.005	0.013	0.005	0.004	0.015	0.007
13:00-14:00	0.007	0.007	0.007	0.004	0.004	0.014	0.006
14:00-15:00	0.007	0.011	0.006	0.004	0.004	0.013	0.006
15:00-16:00	0.007	0.007	0.006	0.004	0.004	0.012	0.006
16:00-17:00	0.007	0.007	0.005	0.004	0.004	0.012	0.006
17:00-18:00	0.006	0.012	0.005	0.004	0.003	0.011	0.007
18:00-19:00	0.007	0.008	0.005	0.004	0.004	0.011	0.007
19:00-20:00	0.006	0.006	0.005	0.004	0.004	0.010	0.007
20:00-21:00	0.006	0.006	0.005	0.004	0.004	0.011	0.007
21:00-22:00	0.009	0.006	0.005	0.003	0.004	0.010	0.007
22:00-23:00	0.007	0.007	0.005	0.003	0.004	0.010	0.008
23:00-00:00	0.008	0.008	0.006	0.003	0.004	0.009	0.008
00:00-01:00	0.012	0.024	0.006	0.004	0.005	0.009	0.008
01:00-02:00	0.008	0.021	0.006	0.004	0.012	0.009	0.007
02:00-03:00	0.007	0.015	0.006	0.004	0.016	0.009	0.006
03:00-04:00	0.008	0.016	0.006	0.004	0.014	0.008	0.006
04:00-05:00	0.009	0.013	0.006	0.004	0.015	0.010	0.007
05:00-06:00	0.007	0.011	0.006	0.005	0.030	0.017	0.008
06:00-07:00	0.009	0.011	0.008	0.005	0.026	0.026	0.006
07:00-08:00	0.008	0.015	0.007	0.005	0.022	0.009	0.006
08:00-09:00	0.007	0.009	0.006	0.004	0.020	0.009	0.008
09:00-10:00	0.007	0.009	0.006	0.004	0.018	0.014	0.008
10:00-11:00	0.028	0.012	0.005	0.004	0.017	0.012	0.011
1 hr-Minimum	**0.006**	**0.005**	**0.005**	**0.003**	**0.003**	**0.008**	**0.006**
1 hr-Maximum	**0.028**	**0.024**	**0.021**	**0.005**	**0.030**	**0.026**	**0.011**
Standard[1/] (avg. 1 hr)	**≤0.17**						

Analytical Method : - Chemiluminescence Method.

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

(Thepsan Yommana)
Technical Manager

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Report No. : 2025-500005090-3 / 003-2 (Page 3 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : บ้านสำนักมะม่วง
Coordination (UTM) : 47P 788238E, 1403406N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	SO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
11:00-12:00	0.004	0.003	0.004	0.004	0.002	0.003	0.003
12:00-13:00	0.004	0.004	0.002	0.004	0.002	0.002	0.003
13:00-14:00	0.001	0.003	0.003	0.003	0.002	0.003	0.003
14:00-15:00	0.001	0.002	0.004	0.003	0.004	0.004	0.004
15:00-16:00	0.002	0.003	0.004	0.003	0.004	0.003	0.002
16:00-17:00	0.002	0.002	0.004	0.003	0.003	0.004	0.001
17:00-18:00	0.003	0.002	0.003	0.002	0.002	0.004	0.002
18:00-19:00	0.003	0.002	0.003	0.003	0.001	0.003	0.002
19:00-20:00	0.003	0.002	0.002	0.004	0.003	0.003	0.002
20:00-21:00	0.002	0.003	0.002	0.001	0.004	0.002	0.001
21:00-22:00	0.004	0.002	0.003	0.002	0.002	0.002	0.002
22:00-23:00	0.001	0.001	0.003	0.001	0.004	0.002	0.004
23:00-00:00	0.002	0.004	0.002	0.002	0.004	0.004	0.001
00:00-01:00	0.003	0.003	0.003	0.004	0.003	0.004	0.004
01:00-02:00	0.003	0.003	0.001	0.004	0.002	0.004	0.001
02:00-03:00	0.004	0.003	0.004	0.004	0.001	0.003	0.002
03:00-04:00	0.002	0.003	0.002	0.002	0.002	0.003	0.002
04:00-05:00	0.003	0.002	0.003	0.003	0.003	0.002	0.003
05:00-06:00	0.004	0.001	0.004	0.003	0.003	0.002	0.002
06:00-07:00	0.004	0.003	0.004	0.002	0.004	0.002	0.003
07:00-08:00	0.002	0.001	0.003	0.004	0.002	0.004	0.002
08:00-09:00	0.003	0.004	0.004	0.004	0.004	0.003	0.002
09:00-10:00	0.004	0.001	0.004	0.003	0.002	0.002	0.004
10:00-11:00	0.002	0.003	0.003	0.004	0.002	0.004	0.003
1 hr-Minimum	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.002**	**0.001**
1 hr-Maximum	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**
Average 24 hr	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.002**
Standard[1/] (avg. 1 hr)	**≤0.30**						
Standard[2/] (avg. 24 hr)	**≤0.12**						

Analytical Method : - UV Fluorescence Method

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

(Thepsan Yommana)
Technical Manager

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Report No. : 2025-500005090-3 / 003-3 (Page 1 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดชากลูกหญ้า
Coordination (UTM) : 47P 730067E, 1409688N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Station	Sampling Date	Result	
		TSP (mg/m^3)	PM-10 (mg/m^3)
วัดชากลูกหญ้า	August 18-19, 2025	0.055	0.031
	August 19-20, 2025	0.049	0.022
	August 20-21, 2025	0.042	0.025
	August 21-22, 2025	0.040	0.019
	August 22-23, 2025	0.041	0.020
	August 23-24, 2025	0.043	0.022
	August 24-25, 2025	0.046	0.021
Standard (avg. 24 hr)[1/]		**≤0.33**	**≤0.12**

Remarks : - Sampling and analytical technique for TSP based on High Volume Air Sampler / Gravimetric Method.
- Sampling and analytical technique for PM10 based on Size Selective High Volume Air Sampler / Gravimetric Method.

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

(Thepsan Yommana)
Technical Manager

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CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดชากลูกหญ้า
Coordination (UTM) : 47P 730067E, 1409688N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	NO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
13:00-14:00	0.007	0.009	ppm	0.006	0.011	0.010	0.012
14:00-15:00	0.007	0.007	0.010	0.008	0.014	0.009	0.012
15:00-16:00	0.011	0.012	0.007	0.013	0.013	0.008	0.012
16:00-17:00	0.009	0.012	0.007	0.012	0.014	0.004	0.010
17:00-18:00	0.006	0.008	0.007	0.011	0.011	0.005	0.008
18:00-19:00	0.006	0.009	0.005	0.008	0.011	0.013	0.012
19:00-20:00	0.008	0.009	0.007	0.008	0.010	0.012	0.010
20:00-21:00	0.010	0.010	0.005	0.010	0.009	0.012	0.012
21:00-22:00	0.005	0.010	0.007	0.008	0.008	0.010	0.011
22:00-23:00	0.006	0.009	0.008	0.012	0.006	0.013	0.012
23:00-00:00	0.007	0.009	0.008	0.006	0.006	0.012	0.009
00:00-01:00	0.012	0.007	0.008	0.006	0.009	0.011	0.012
01:00-02:00	0.012	0.007	0.007	0.010	0.012	0.012	0.008
02:00-03:00	0.008	0.011	0.007	0.010	0.009	0.012	0.006
03:00-04:00	0.007	0.010	0.009	0.010	0.010	0.012	0.006
04:00-05:00	0.007	0.012	0.007	0.012	0.010	0.009	0.007
05:00-06:00	0.007	0.008	0.012	0.009	0.007	0.009	0.006
06:00-07:00	0.009	0.009	0.012	0.009	0.008	0.008	0.008
07:00-08:00	0.009	0.010	0.010	0.008	0.008	0.006	0.006
08:00-09:00	0.012	0.006	0.012	0.012	0.007	0.006	0.010
09:00-10:00	0.006	0.006	0.009	0.012	0.012	0.010	0.008
10:00-11:00	0.007	0.006	0.009	0.010	0.013	0.008	0.008
11:00-12:00	0.007	0.009	0.008	0.012	0.011	0.006	0.008
12:00-13:00	0.009	0.009	0.006	0.012	0.011	0.011	0.008
1 hr-Minimum	**0.005**	**0.006**	**0.005**	**0.006**	**0.006**	**0.004**	**0.006**
1 hr-Maximum	**0.012**	**0.012**	**0.012**	**0.013**	**0.014**	**0.013**	**0.012**
Standard[1/] (avg. 1 hr)	**≤0.17**						

Analytical Method : - Chemiluminescence Method.

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

(Thepsan Yommana)
Technical Manager
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CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดซากลูกหญ้า
Coordination (UTM) : 47P 730067E, 1409688N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	SO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
13:00-14:00	0.002	0.004	0.004	0.004	0.002	0.002	0.004
14:00-15:00	0.004	0.003	0.001	0.005	0.001	0.002	0.005
15:00-16:00	0.003	0.003	0.004	0.005	0.004	0.004	0.002
16:00-17:00	0.003	0.003	0.004	0.004	0.003	0.005	0.001
17:00-18:00	0.004	0.005	0.003	0.004	0.002	0.003	0.002
18:00-19:00	0.003	0.002	0.003	0.002	0.001	0.002	0.002
19:00-20:00	0.005	0.003	0.004	0.005	0.004	0.004	0.003
20:00-21:00	0.003	0.004	0.003	0.003	0.004	0.003	0.004
21:00-22:00	0.002	0.002	0.003	0.005	0.005	0.003	0.005
22:00-23:00	0.003	0.002	0.001	0.004	0.005	0.002	0.003
23:00-00:00	0.002	0.002	0.005	0.002	0.002	0.003	0.004
00:00-01:00	0.002	0.003	0.003	0.004	0.005	0.003	0.002
01:00-02:00	0.003	0.004	0.005	0.002	0.001	0.002	0.002
02:00-03:00	0.003	0.002	0.004	0.002	0.003	0.003	0.002
03:00-04:00	0.003	0.004	0.002	0.003	0.005	0.002	0.005
04:00-05:00	0.005	0.003	0.005	0.001	0.004	0.003	0.005
05:00-06:00	0.001	0.002	0.004	0.005	0.003	0.002	0.004
06:00-07:00	0.003	0.003	0.004	0.003	0.001	0.004	0.003
07:00-08:00	0.004	0.005	0.003	0.004	0.003	0.002	0.005
08:00-09:00	0.001	0.002	0.002	0.004	0.004	0.005	0.002
09:00-10:00	0.004	0.001	0.005	0.005	0.005	0.004	0.004
10:00-11:00	0.002	0.001	0.003	0.003	0.002	0.004	0.003
11:00-12:00	0.005	0.005	0.003	0.004	0.002	0.003	0.002
12:00-13:00	0.001	0.005	0.001	0.002	0.005	0.002	0.004
1 hr-Minimum	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.002**	**0.001**
1 hr-Maximum	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**
Average 24 hr	**0.003**	**0.003**	**0.003**	**0.004**	**0.003**	**0.003**	**0.003**
Standard[1/] (avg. 1 hr)	**≤0.30**						
Standard[2/] (avg. 24 hr)	**≤0.12**						

Analytical Method : - UV Fluorescence Method

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

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Report No. : 2025-500005090-3 / 003-4 (Page 1 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดมาบชลูด
Coordination (UTM) : 47P 730836E, 1407438N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Station	Sampling Date	Result	
		TSP (mg/m^3)	PM-10 (mg/m^3)
วัดมาบชลูด	August 18-19, 2025	0.049	0.029
	August 19-20, 2025	0.045	0.021
	August 20-21, 2025	0.044	0.017
	August 21-22, 2025	0.038	0.014
	August 22-23, 2025	0.036	0.017
	August 23-24, 2025	0.039	0.014
	August 24-25, 2025	0.034	0.017
Standard (avg. 24 hr)[1/]		**≤0.33**	**≤0.12**

Remarks : - Sampling and analytical technique for TSP based on High Volume Air Sampler / Gravimetric Method.
- Sampling and analytical technique for PM10 based on Size Selective High Volume Air Sampler / Gravimetric Method.

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

(Thepsan Yommana)
Technical Manager

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CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดมาบชลูด
Coordination (UTM) : 47P 730836E, 1407438N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	NO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
11:00-12:00	0.008	0.009	0.010	0.006	0.011	0.010	0.012
12:00-13:00	0.008	0.007	0.007	0.008	0.014	0.009	0.012
13:00-14:00	0.009	0.012	0.007	0.013	0.013	0.008	0.012
14:00-15:00	0.010	0.012	0.007	0.012	0.014	0.006	0.010
15:00-16:00	0.007	0.008	0.005	0.011	0.011	0.005	0.008
16:00-17:00	0.007	0.009	0.005	0.008	0.011	0.013	0.012
17:00-18:00	0.009	0.009	0.006	0.008	0.010	0.012	0.010
18:00-19:00	0.011	0.010	0.007	0.010	0.009	0.012	0.012
19:00-20:00	0.006	0.010	0.008	0.013	0.008	0.010	0.011
20:00-21:00	0.007	0.009	0.008	0.013	0.006	0.013	0.012
21:00-22:00	0.008	0.009	0.005	0.006	0.006	0.012	0.009
22:00-23:00	0.012	0.008	0.007	0.006	0.009	0.011	0.012
23:00-00:00	0.012	0.008	0.007	0.010	0.012	0.012	0.008
00:00-01:00	0.008	0.011	0.009	0.010	0.009	0.012	0.006
01:00-02:00	0.007	0.010	0.007	0.010	0.010	0.012	0.006
02:00-03:00	0.007	0.010	0.008	0.012	0.010	0.009	0.008
03:00-04:00	0.007	0.008	0.012	0.009	0.008	0.009	0.007
04:00-05:00	0.009	0.009	0.010	0.009	0.008	0.008	0.009
05:00-06:00	0.009	0.010	0.012	0.008	0.008	0.006	0.006
06:00-07:00	0.012	0.006	0.009	0.012	0.007	0.006	0.010
07:00-08:00	0.007	0.006	0.009	0.012	0.012	0.010	0.008
08:00-09:00	0.007	0.006	0.008	0.010	0.013	0.008	0.008
09:00-10:00	0.007	0.006	0.006	0.012	0.011	0.006	0.008
10:00-11:00	0.009	0.007	0.006	0.012	0.011	0.011	0.009
1 hr-Minimum	**0.006**	**0.006**	**0.010**	**0.006**	**0.006**	**0.005**	**0.006**
1 hr-Maximum	**0.012**	**0.012**	**0.007**	**0.013**	**0.014**	**0.013**	**0.012**
Standard[1/] (avg. 1 hr)	**≤0.17**						

Analytical Method : - Chemiluminescence Method.

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

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CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality
SAMPLING LOCATION : วัดมาบชลูด
Coordination (UTM) : 47P 730836E, 1407438N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	SO_2 Concentration (ppm)						
	August 18-19, 2025	August 19-20, 2025	August 20-21, 2025	August 21-22, 2025	August 22-23, 2025	August 23-24, 2025	August 24-25, 2025
11:00-12:00	0.003	0.001	0.001	0.004	0.002	0.002	0.003
12:00-13:00	0.002	0.002	0.001	0.002	0.003	0.002	0.002
13:00-14:00	0.001	0.004	0.004	0.004	0.002	0.002	0.001
14:00-15:00	0.003	0.002	0.002	0.004	0.002	0.002	0.002
15:00-16:00	0.002	0.004	0.002	0.002	0.004	0.003	0.002
16:00-17:00	0.004	0.003	0.003	0.004	0.004	0.002	0.002
17:00-18:00	0.003	0.001	0.003	0.004	0.002	0.003	0.003
18:00-19:00	0.003	0.002	0.003	0.004	0.002	0.004	0.001
19:00-20:00	0.002	0.001	0.003	0.002	0.004	0.002	0.003
20:00-21:00	0.002	0.002	0.004	0.003	0.003	0.002	0.002
21:00-22:00	0.004	0.004	0.002	0.004	0.002	0.002	0.003
22:00-23:00	0.004	0.004	0.004	0.002	0.001	0.002	0.001
23:00-00:00	0.003	0.004	0.003	0.001	0.003	0.002	0.003
00:00-01:00	0.003	0.002	0.003	0.002	0.004	0.004	0.002
01:00-02:00	0.003	0.003	0.002	0.004	0.002	0.003	0.002
02:00-03:00	0.002	0.002	0.003	0.003	0.003	0.001	0.002
03:00-04:00	0.001	0.003	0.002	0.002	0.002	0.003	0.004
04:00-05:00	0.003	0.003	0.002	0.004	0.004	0.003	0.004
05:00-06:00	0.002	0.001	0.002	0.003	0.002	0.003	0.002
06:00-07:00	0.004	0.003	0.003	0.001	0.001	0.002	0.002
07:00-08:00	0.002	0.003	0.002	0.002	0.004	0.003	0.003
08:00-09:00	0.002	0.003	0.002	0.002	0.002	0.003	0.003
09:00-10:00	0.002	0.003	0.004	0.001	0.003	0.002	0.001
10:00-11:00	0.001	0.003	0.003	0.003	0.004	0.002	0.004
1 hr-Minimum	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
1 hr-Maximum	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**
Average 24 hr	**0.002**	**0.003**	**0.003**	**0.003**	**0.003**	**0.002**	**0.002**
Standard[1/] (avg. 1 hr)	**≤0.30**						
Standard[2/] (avg. 24 hr)	**≤0.12**						

Analytical Method : - UV Fluorescence Method

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

(Thepsan Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : 2025-500005090-3 / 004-1 (Page 1 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Wind Speed and Direction
SAMPLING LOCATION : วัดประชุมมิตรบำรุง
Coordination (UTM) : 47P 26450E, 1407369N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Time	August 18-19, 2025		August 19-20, 2025		August 20-21, 2025		August 21-22, 2025		August 22-23, 2025		August 23-24, 2025		August 24-25, 2025	
	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)	WD	WS (m/s)
10:00-11:00	S	2.2	WSW	1.3	-	Calm	W	0.9	-	Calm	SSW	1.8	W	1.8
11:00-12:00	W	1.8	WSW	0.9	E	1.3	ESE	0.9	-	Calm	SSW	1.8	W	1.8
12:00-13:00	W	1.8	SSW	1.8	ENE	1.3	ESE	1.8	SSW	2.2	S	1.8	W	1.8
13:00-14:00	WNW	0.9	SSW	1.8	W	0.9	E	0.9	SSW	1.8	S	2.2	S	1.8
14:00-15:00	W	0.9	S	1.8	SE	1.8	E	1.3	SSW	0.9	S	2.7	S	2.2
15:00-16:00	W	1.3	SSW	1.3	SSE	2.2	E	0.9	-	Calm	W	1.8	S	2.2
16:00-17:00	WSW	1.3	SSW	1.8	ESE	1.8	E	1.3	-	Calm	SSW	1.8	SSE	2.7
17:00-18:00	WSW	0.9	SSW	1.8	ESE	1.8	ESE	0.9	SSE	0.9	SSW	1.8	SSE	1.8
18:00-19:00	S	0.9	S	1.8	ESE	1.8	ESE	0.9	-	Calm	SSW	1.3	S	1.3
19:00-20:00	S	1.8	-	Calm	SE	0.9	-	Calm	-	Calm	S	0.9	-	Calm
20:00-21:00	S	2.2	-	Calm	-	Calm	SE	0.9	-	Calm	-	Calm	SE	0.9
21:00-22:00	S	1.3	-	Calm	-	Calm	SE	1.8	SSE	0.9	-	Calm	SSE	1.8
22:00-23:00	WSW	0.9	-	Calm	-	Calm	SE	1.8	-	Calm	-	Calm	SW	0.9
23:00-00:00	WSW	0.9	-	Calm	-	Calm	S	1.8	NNW	1.3	-	Calm	-	Calm
00:00-01:00	-	Calm	-	Calm	-	Calm	SW	0.9	-	Calm	-	Calm	-	Calm
01:00-02:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	W	0.9
02:00-03:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	SSW	0.9	-	Calm
03:00-04:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm
04:00-05:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm
05:00-06:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm
06:00-07:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	SSW	0.9
07:00-08:00	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	SSW	0.9
08:00-09:00	WSW	0.9	-	Calm	-	Calm	-	Calm	-	Calm	-	Calm	WNW	1.3
09:00-10:00	WSW	1.3	E	0.9	-	Calm	-	Calm	SSW	0.9	SSW	1.3	SSW	1.3

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

(Thepsan Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Wind Speed and Direction
SAMPLING LOCATION : วัดประชุมมิตรบำรุง
Coordination (UTM) : 47P 26450E, 1407369N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

Wind Speed / Wind Direction	Percent of Wind Speed (%)				
	0.4-1.0 m/s	1.1-2.0 m/s	2.1-3.0 m/s	3.1-4.0 m/s	>4.0 m/s
N	-	-	-	-	-
NNE	-	-	-	-	-
NE	-	-	-	-	-
ENE	-	0.60	-	-	-
E	1.79	1.79	-	-	-
ESE	1.79	2.38	-	-	-
SE	1.79	1.79	-	-	-
SSE	1.19	1.19	1.19	-	-
S	1.19	4.76	3.57	-	-
SSW	2.98	7.74	0.60	-	-
SW	1.19	0.00	-	-	-
WSW	2.98	1.79	-	-	-
W	2.38	4.17	-	-	-
WNW	0.60	0.60	-	-	-
NW	-	-	-	-	-
NNW	-	0.60	-	-	-
CALM	**49.40**				

Remark : - Measurement method by using wind speed and wind direction meter / ISO

(Thepsan Yommana)
Technical Manager

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Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

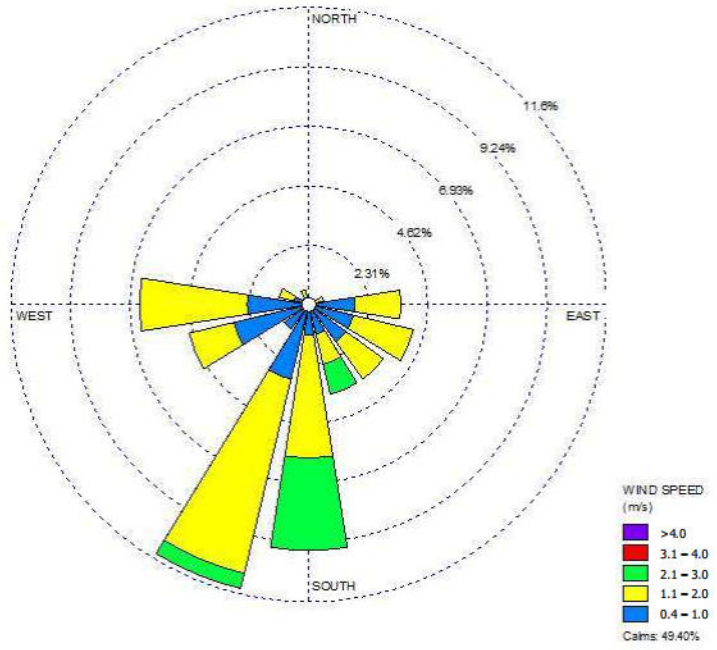
SAMPLE DESIGNATED AS : Wind Speed and Direction
SAMPLING LOCATION : วัดประชุมมิตรบำรุง
Coordination (UTM) : 47P 26450E, 1407369N

SAMPLING DATE : August 18-25, 2025
SAMPLING BY : Nopparut Jampakrum

WIND ROSE PLOT

Station Name : วัดประชุมมิตรบำรุง

Sampling Date : August 18-25, 2025



Wind Direction (Blowing from)

(Thepsan Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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คุณภาพอากาศในสถานประกอบการ (Workplace Air)

Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : 2025-500005090-3 / 001-3 (Page 1 of 1) **Issued date:** October 2, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Emission Air
Sampling Location : HRSG 1, GPSC CUP4
Sampling By : Nawat Chailoed
Korravitch Malakul Na Ayuthaya
Laboratory Name : SGS (Thailand) Limited

Sampling Date : August 18, 2025
Sampling Time : 14:20-15:20 hrs.
Received Date : August 21, 2025
Analysis Date : August 21-26, 2025

Parameter		Unit	Value	Analytical Method
Fuel Type		-	Natural Gas	-
Stack Diameter		cm.	330	-
Stack Temperature		^{O}C	140.4	-
Dry Gas Temperature		^{O}C	32.0	-
Absolute Stack Pressure		mm.Hg	756.7	-
Air Velocity		m/s	19.17	U.S.EPA Method 2
Volumetric Flow Rate at actual O_2		Nm^3/hr	385,955	U.S.EPA Method 2
Moisture		%	8.86	U.S.EPA Method 4
O_2		%	14.08	U.S.EPA Method 3A
CO_2		%	3.83	U.S.EPA Method 3A
Ammonia (NH_3)	at actual O_2	ppm	0.40	U.S.EPA Method 17
	at 7% O_2	ppm	0.81	
	Emission Rate	g/s	0.030	by Calculation

Remark : - N = Normal condition means reference condition at temperature of 25 ^{O}C, pressure of 1 atm or 760 mmHg, dry basis.

(Phatsakorn Soonthornwiphat)
Technical Specialist Section Head

(Thepsan Yommana)
Technical Specialist Manager

SGS (THAILAND) LIMITED

TY/OC/DS/DS

LABORATORY ADDRESS: 1/209, and 1/211 Moo1, Soi Sukhumvit 2, Banchang, Banchang, Rayong, 21130

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ระดับเสียง (Sound Level)

ระดับเสียงในบรรยากาศ (Ambient Noise)

Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

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Report No. : 2025-500005090-3 / 005-1 (Page 2 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **SAMPLING DATE** : August 18-25, 2025
SAMPLING LOCATION : ริมรั้วโรงงานด้านทางเข้าโรงงาน **SAMPLING BY** : Nopparut Jampakrum
CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81971
Calibration Value Reference: 93.79 dB(A), Pre Cal.: 93.8 dB(A), Post Cal.: 93.9 dB(A)
SOUND LEVEL METER NO. : Model: NL-53, RION, Serial No. 00452078
Coordination (UTM) : 47P 727960E, 1405418N

Time	Noise Level [dB(A)]									Standard[1/, 2/]
	August 18-19, 2025			August 19-20, 2025			August 20-21, 2025			
	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	
11:00-12:00	57.4	78.6	47.3	60.7	85.8	47.9	59.1	86.8	45.0	-
12:00-13:00	58.1	77.3	47.4	59.2	86.1	47.7	55.2	75.0	45.1	
13:00-14:00	61.0	84.7	48.4	59.0	83.6	47.8	57.2	83.2	45.8	
14:00-15:00	57.2	77.7	47.5	57.9	85.7	46.8	55.5	80.8	46.1	
15:00-16:00	61.0	91.0	47.2	56.7	76.6	47.0	59.9	90.9	46.2	
16:00-17:00	60.6	88.5	47.3	56.7	79.3	47.2	55.4	77.5	45.7	
17:00-18:00	58.0	83.4	46.5	60.3	88.0	47.4	60.2	85.9	45.9	
18:00-19:00	66.6	83.4	46.9	55.6	78.3	47.2	56.2	83.0	45.8	
19:00-20:00	57.1	77.7	49.2	55.5	75.8	47.2	55.9	77.1	46.7	
20:00-21:00	54.9	77.0	48.5	50.7	71.2	45.3	52.7	76.8	47.3	
21:00-22:00	56.1	78.9	47.9	50.6	77.0	46.2	50.2	71.0	47.1	
22:00-23:00	51.8	70.4	46.9	51.9	74.2	46.3	52.5	78.0	47.0	
23:00-00:00	53.3	74.9	48.5	54.5	82.8	49.0	50.8	71.9	47.1	
00:00-01:00	52.9	77.3	48.2	53.2	74.3	49.3	49.9	73.6	47.0	
01:00-02:00	50.4	59.9	47.2	52.7	73.7	48.4	50.1	69.4	46.6	
02:00-03:00	51.2	76.8	46.3	51.6	77.5	48.6	52.1	67.0	48.2	
03:00-04:00	51.7	69.2	47.8	53.2	70.4	49.2	49.9	60.3	47.2	
04:00-05:00	53.7	74.6	47.5	51.6	71.7	48.4	49.1	61.9	46.2	
05:00-06:00	53.1	77.7	47.6	51.8	73.5	48.2	51.4	79.0	45.4	
06:00-07:00	57.0	79.9	48.5	56.4	76.6	46.8	55.7	76.5	44.8	
07:00-08:00	59.3	80.0	47.3	58.3	83.7	45.1	58.3	78.9	44.9	
08:00-09:00	57.7	83.1	46.9	58.1	81.9	44.9	57.6	80.5	44.7	
09:00-10:00	56.6	86.5	47.0	56.6	84.0	45.1	56.7	80.6	45.1	
10:00-11:00	56.3	76.4	47.4	57.3	84.6	45.8	56.9	81.1	45.4	
Leq 24 hr	**58.2**	-	-	**56.5**	-	-	**55.8**	-	-	**70**
Ldn	**61.4**	-	-	**60.7**	-	-	**59.5**	-	-	-
Lmax	-	**91.0**	-	-	**88.0**	-	-	**90.9**	-	**115**
L90	-	-	**49.7**	-	-	**48.7**	-	-	**48.4**	-

Sources : 1/ Notification of the National Environment Board No.15, B.E. 2540 (1997).
2/ Notification of Ministry of Industry regarding the Standard of Nuisance Noise and Noise Level from Factory, B.E. 2548.

(Thepsan Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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Report No. : 2025-500005090-3 / 005-1 (Page 2 of 3) **Issued date :** September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayoung 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **SAMPLING DATE** : August 18-25, 2025
SAMPLING LOCATION : ริมรั้วโรงงานด้านทางเข้าโรงงาน **SAMPLING BY** : Nopparut Jampakrum
CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81971
Calibration Value Reference: 93.79 dB(A), Pre Cal.: 93.8 dB(A), Post Cal.: 93.9 dB(A)
SOUND LEVEL METER NO. : Model: NL-53, RION, Serial No. 00452078
Coordination (UTM) : 47P 727960E, 1405418N

Time	Noise Level [dB(A)]						Standard[1/, 2/]
	August 21-22, 2025			August 22-23, 2025			
	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	
11:00-12:00	68.8	84.2	48.8	57.4	78.0	51.0	-
12:00-13:00	62.1	77.9	50.7	57.9	83.7	50.2	
13:00-14:00	64.4	84.4	50.4	59.0	81.5	50.8	
14:00-15:00	58.7	87.5	48.3	57.8	83.0	50.4	
15:00-16:00	69.5	108.5	51.5	60.9	91.6	50.3	
16:00-17:00	58.2	77.2	52.4	57.2	82.2	50.3	
17:00-18:00	57.7	79.4	50.1	60.9	90.7	49.4	
18:00-19:00	56.4	79.1	49.8	58.0	79.8	50.4	
19:00-20:00	56.1	77.6	49.9	55.7	75.4	50.3	
20:00-21:00	54.5	81.7	50.6	57.5	75.7	52.0	
21:00-22:00	56.1	74.7	52.0	53.6	72.0	51.0	
22:00-23:00	54.6	72.0	53.4	52.0	70.7	51.3	
23:00-00:00	53.2	70.9	52.0	52.5	67.3	51.3	
00:00-01:00	53.2	75.0	50.6	51.5	74.1	49.1	
01:00-02:00	51.6	64.0	49.1	50.4	73.2	48.3	
02:00-03:00	52.2	74.6	50.3	50.9	71.0	48.9	
03:00-04:00	51.6	67.6	50.6	59.9	74.5	50.2	
04:00-05:00	52.9	71.9	50.4	53.5	64.1	52.0	
05:00-06:00	57.9	78.3	54.7	54.2	78.5	52.7	
06:00-07:00	60.8	79.1	57.3	57.9	83.3	53.8	
07:00-08:00	61.0	84.2	54.5	58.5	81.6	52.3	
08:00-09:00	58.7	79.4	53.6	56.7	81.2	51.0	
09:00-10:00	57.8	78.8	52.5	54.7	77.9	50.6	
10:00-11:00	60.2	87.7	51.8	57.2	79.8	51.1	
Leq 24 hr	**61.1**	**-**	**-**	**57.0**	**-**	**-**	**70**
Ldn	**64.0**	**-**	**-**	**61.9**	**-**	**-**	**-**
Lmax	**-**	**108.5**	**-**	**-**	**87.9**	**-**	**115**
L90	**-**	**-**	**50.4**	**-**	**-**	**50**	**-**

Sources : 1/ Notification of the National Environment Board No.15, B.E. 2540 (1997).
2/ Notification of Ministry of Industry regarding the Standard of Nuisance Noise and Noise Level from Factory, B.E. 2548.

(Thepsan Yommana)
Technical Manager
SGS (THAILAND) LIMITED

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Report No. : 2025-500005090-3 / 005-1 (Page 3 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **SAMPLING DATE** : August 18-25, 2025
SAMPLING LOCATION : ริมรั้วโรงงานด้านทางเข้าโรงงาน **SAMPLING BY** : Nopparut Jampakrum
CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81971
Calibration Value Reference: 93.94 dB(A), Pre Cal.: 93.8 dB(A), Post Cal.: 93.9 dB(A)
SOUND LEVEL METER NO. : Model: NL-53, RION, Serial No. 00452077
Coordination (UTM) : 47P 727960E, 1405418N

Time	Noise Level [dB(A)]						Standard[1/, 2/]
	August 23-24, 2025			August 24-25, 2025			
	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	
11:00-12:00	57.7	81.3	51.9	55.1	78.3	49.7	-
12:00-13:00	60.4	87.9	50.7	54.0	77.9	49.0	
13:00-14:00	56.4	79.1	51.0	53.8	75.9	49.8	
14:00-15:00	53.5	71.8	49.9	54.1	76.4	50.3	
15:00-16:00	57.0	80.3	49.7	57.1	83.8	51.0	
16:00-17:00	56.8	79.1	49.9	55.4	87.5	49.4	
17:00-18:00	60.2	85.6	50.4	56.6	79.0	49.7	
18:00-19:00	58.4	87.3	51.5	54.8	77.1	48.0	
19:00-20:00	55.7	75.3	51.1	56.1	78.7	50.6	
20:00-21:00	51.2	67.9	50.2	53.4	85.5	50.6	
21:00-22:00	51.2	69.0	50.1	51.3	71.9	50.0	
22:00-23:00	51.8	76.6	50.5	51.5	72.7	49.8	
23:00-00:00	52.1	72.7	51.3	50.9	64.9	49.5	
00:00-01:00	52.0	69.7	51.1	53.1	78.8	49.7	
01:00-02:00	51.6	69.2	50.7	51.8	82.6	49.4	
02:00-03:00	51.0	68.9	50.0	51.1	68.9	50.2	
03:00-04:00	50.6	62.0	50.2	50.8	63.0	49.5	
04:00-05:00	50.3	66.0	49.6	49.9	64.0	49.2	
05:00-06:00	52.7	79.8	49.9	52.0	79.5	49.3	
06:00-07:00	57.1	75.0	51.7	58.1	87.8	52.5	
07:00-08:00	56.8	78.4	50.1	57.7	76.8	51.6	
08:00-09:00	55.6	81.0	49.5	54.4	75.8	49.6	
09:00-10:00	56.6	84.2	48.8	57.3	83.9	49.7	
10:00-11:00	53.1	78.9	49.1	57.8	83.7	50.2	
Leq 24 hr	**55.7**	-	-	**54.8**	-	-	**70**
Ldn	**60.0**	-	-	**59.8**	-	-	-
Lmax	-	**87.9**	-	-	**87.8**	-	**115**
L90	-	-	**50.0**	-	-	**49.6**	-

Sources : 1/ Notification of the National Environment Board No.15, B.E. 2540 (1997).
2/ Notification of Ministry of Industry regarding the Standard of Nuisance Noise and Noise Level from Factory, B.E. 2548.

(Thepsan Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : 2025-500005090-3 / 005-2 (Page 1 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **SAMPLING DATE** : August 18-25, 2025
SAMPLING LOCATION : บ้านสำนักมะม่วง **SAMPLING BY** : Nopparut Jampakrum
CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81971
Calibration Value Reference: 93.79 dB(A), Pre Cal.: 93.8 dB(A), Post Cal.: 93.9 dB(A)
SOUND LEVEL METER NO. : Model: NL-53, RION, Serial No. 00452078
Coordination (UTM) : 47P 728251E, 1403372N

Time	Noise Level [dB(A)]									Standard[1/, 2/]
	August 18-19, 2025			August 19-20, 2025			August 20-21, 2025			
	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	
11:00-12:00	48.9	78.2	45.5	47.3	69.2	45.0	46.0	74.3	44.3	-
12:00-13:00	47.7	75.3	45.4	47.1	73.2	45.3	49.3	80.7	44.4	
13:00-14:00	47.4	65.1	46.0	47.8	65.9	45.9	46.8	68.9	44.8	
14:00-15:00	47.4	70.6	45.5	49.8	75.4	45.9	45.9	66.7	45.0	
15:00-16:00	47.4	72.4	45.9	47.0	67.6	45.1	45.9	62.5	44.4	
16:00-17:00	48.0	71.6	45.2	49.1	81.1	45.7	47.1	65.7	45.3	
17:00-18:00	54.6	81.0	47.8	48.4	70.8	45.3	51.0	78.2	44.8	
18:00-19:00	60.7	73.8	46.9	47.0	71.8	45.0	51.2	79.4	46.4	
19:00-20:00	51.7	64.8	47.0	48.5	70.5	45.8	45.7	59.9	44.8	
20:00-21:00	47.6	62.9	46.0	47.4	65.1	45.3	47.1	69.6	45.2	
21:00-22:00	50.6	67.6	46.3	49.0	62.8	48.1	46.9	56.8	44.4	
22:00-23:00	47.3	57.8	46.4	46.3	60.1	45.0	46.5	59.5	45.0	
23:00-00:00	47.7	67.5	45.9	45.5	62.8	44.3	45.8	64.6	44.7	
00:00-01:00	46.7	59.3	45.4	45.7	58.3	44.6	45.3	52.8	44.7	
01:00-02:00	46.5	60.1	45.4	45.6	60.5	44.7	45.2	50.5	44.5	
02:00-03:00	46.9	62.3	45.9	44.9	60.5	44.0	45.8	48.6	45.1	
03:00-04:00	46.8	59.4	45.9	44.9	56.3	44.3	45.1	53.2	44.6	
04:00-05:00	47.7	63.3	45.9	44.9	59.0	44.1	45.1	57.8	44.5	
05:00-06:00	48.6	63.4	46.5	47.3	73.2	44.6	45.5	58.0	44.6	
06:00-07:00	51.4	71.8	47.5	49.9	70.7	46.8	51.4	71.1	47.2	
07:00-08:00	53.6	79.0	48.1	48.2	71.7	46.3	49.0	67.4	47.6	
08:00-09:00	61.4	88.5	46.3	46.3	65.6	45.3	47.8	70.1	46.2	
09:00-10:00	50.2	73.0	45.4	46.0	68.2	44.8	48.4	78.5	43.8	
10:00-11:00	47.1	70.4	45.1	45.7	64.7	44.4	46.9	74.4	43.8	
Leq 24 hr	**52.7**	**-**	**-**	**47.3**	**-**	**-**	**47.6**	**-**	**-**	**70**
Ldn	**56.0**	**-**	**-**	**53.1**	**-**	**-**	**53.4**	**-**	**-**	**-**
Lmax	**-**	**88.5**	**-**	**-**	**81.1**	**-**	**-**	**80.7**	**-**	**115**
L90	**-**	**-**	**45.7**	**-**	**-**	**44.7**	**-**	**-**	**44.7**	**-**

Sources : 1/ Notification of the National Environment Board No.15, B.E. 2540 (1997).
2/ Notification of Ministry of Industry regarding the Standard of Nuisance Noise and Noise Level from Factory, B.E. 2548.

(Thepsan Yommana)
Technical Manager
SGS (THAILAND) LIMITED

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Report No. : 2025-500005090-3 / 005-2 (Page 2 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **SAMPLING DATE** : August 18-25, 2025
SAMPLING LOCATION : บ้านสำนักมะม่วง **SAMPLING BY** : Nopparut Jampakrum
CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81971
Calibration Value Reference: 93.79 dB(A), Pre Cal.: 93.8 dB(A), Post Cal.: 93.9 dB(A)
SOUND LEVEL METER NO. : Model: NL-53, RION, Serial No. 00452078
Coordination (UTM) : 47P 728251E, 1403372N

Time	Noise Level [dB(A)]						Standard[1/, 2/]
	August 21-22, 2025			August 22-23, 2025			
	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	
11:00-12:00	63.7	81.0	48.2	50.5	77.3	46.6	-
12:00-13:00	59.7	80.8	46.8	47.8	69.1	46.4	
13:00-14:00	57.3	76.2	46.1	51.2	67.2	47.3	
14:00-15:00	48.7	69.7	45.3	47.9	68.3	46.5	
15:00-16:00	62.5	102.0	46.6	47.1	67.4	46.2	
16:00-17:00	52.3	70.4	47.7	48.9	72.0	46.3	
17:00-18:00	48.8	68.5	46.9	48.3	70.9	46.1	
18:00-19:00	47.9	67.0	46.2	49.9	72.7	45.9	
19:00-20:00	47.4	67.5	45.8	47.2	67.8	45.5	
20:00-21:00	50.3	66.1	46.8	57.2	74.3	47.5	
21:00-22:00	50.6	70.2	46.4	64.7	85.5	48.1	
22:00-23:00	47.2	65.6	45.7	57.9	79.1	48.6	
23:00-00:00	46.3	57.2	45.5	49.3	66.3	47.9	
00:00-01:00	49.9	60.0	46.1	48.3	59.1	47.4	
01:00-02:00	51.7	60.9	50.8	48.9	73.1	47.2	
02:00-03:00	50.7	59.6	46.5	48.2	61.1	46.3	
03:00-04:00	48.2	57.6	46.0	49.9	60.5	46.9	
04:00-05:00	50.9	70.5	46.7	54.9	61.9	50.3	
05:00-06:00	59.0	76.2	55.5	58.1	66.1	56.9	
06:00-07:00	60.2	77.7	58.0	52.3	68.0	48.0	
07:00-08:00	57.8	75.6	54.3	48.6	69.8	47.4	
08:00-09:00	56.1	76.6	52.8	49.6	73.8	46.2	
09:00-10:00	59.5	80.4	53.7	47.4	69.6	45.6	
10:00-11:00	52.0	74.7	49.0	48.6	77.2	45.4	
Leq 24 hr	**56.5**	**-**	**-**	**54.4**	**-**	**-**	**70**
Ldn	**61.4**	**-**	**-**	**60.3**	**-**	**-**	**-**
Lmax	**-**	**102.0**	**-**	**-**	**85.5**	**-**	**115**
L90	**-**	**-**	**46.19**	**-**	**-**	**46.3**	**-**

Sources : [1/] Notification of the National Environment Board No.15, B.E. 2540 (1997).
[2/] Notification of Ministry of Industry regarding the Standard of Nuisance Noise and Noise Level from Factory, B.E. 2548.

(Thepsan Yommana)
Technical Manager
SGS (THAILAND) LIMITED

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Report No. : 2025-500005090-3 / 005-2 (Page 3 of 3) Issued date : September 18, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **SAMPLING DATE** : August 18-25, 2025
SAMPLING LOCATION : บ้านสำนักมะม่วง **SAMPLING BY** : Nopparut Jampakrum
CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81971
Calibration Value Reference: 93.79 dB(A), Pre Cal.: 93.8 dB(A), Post Cal.: 93.9 dB(A)
SOUND LEVEL METER NO. : Model: NL-53, RION, Serial No. 00452078
Coordination (UTM) : 47P 727960E, 1405418N

Time	Noise Level [dB(A)]						Standard[1/, 2/]
	August 23-24, 2025			August 24-25, 2025			
	Leq 1 hr	Lmax	L90	Leq 1 hr	Lmax	L90	
11:00-12:00	47.3	65.5	45.2	48.2	73.0	45.6	
12:00-13:00	47.6	64.6	46.5	47.9	66.9	45.6	
13:00-14:00	48.0	65.5	46.5	47.6	73.3	45.2	
14:00-15:00	47.6	67.2	46.1	46.7	60.8	45.5	
15:00-16:00	48.2	71.4	46.1	47.9	69.0	45.9	
16:00-17:00	48.4	69.7	46.3	48.2	69.2	46.4	
17:00-18:00	48.6	70.7	47.1	48.2	68.2	45.9	
18:00-19:00	47.2	65.7	46.2	51.3	72.2	45.7	
19:00-20:00	47.5	74.6	46.1	46.4	68.2	45.5	
20:00-21:00	46.5	61.5	45.5	47.4	63.6	46.3	
21:00-22:00	46.9	60.6	46.0	46.9	65.9	45.8	
22:00-23:00	47.3	64.6	46.1	48.8	65.3	45.4	-
23:00-00:00	46.7	56.7	45.8	46.5	55.8	45.4	
00:00-01:00	46.9	67.6	45.9	46.5	51.1	45.6	
01:00-02:00	46.6	59.2	46.0	46.7	61.8	45.8	
02:00-03:00	46.5	55.0	45.8	46.7	58.3	45.8	
03:00-04:00	47.1	53.6	46.2	46.7	61.4	46.0	
04:00-05:00	46.8	52.6	46.3	46.6	54.0	45.6	
05:00-06:00	47.8	68.8	46.2	47.3	69.5	45.9	
06:00-07:00	50.6	71.3	47.1	51.1	71.6	47.7	
07:00-08:00	48.8	74.8	46.4	50.8	70.9	47.5	
08:00-09:00	48.0	75.3	45.8	47.2	65.8	46.4	
09:00-10:00	46.5	65.1	45.1	49.6	74.1	46.2	
10:00-11:00	46.1	59.8	45.2	47.2	77.9	39.8	
Leq 24 hr	**47.6**	-	-	**48.1**	-	-	**70**
Ldn	**54.0**	-	-	**54.2**	-	-	-
Lmax	-	**75.3**	-	-	**77.9**	-	**115**
L90	-	-	**45.9**	-	-	**45.6**	-

Sources : 1/ Notification of the National Environment Board No.15, B.E. 2540 (1997).
2/ Notification of Ministry of Industry regarding the Standard of Nuisance Noise and Noise Level from Factory, B.E. 2548.

(Thepsan Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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คุณภาพน้ำ (Waste Water)

Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : **2025-500004865-1 / 001-1 (Page 1 of 2)** **Issued date:** July 24, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam (ว-197-จ-0002)
Laboratory Name : SGS (Thailand) Limited (ว-197)
Sample Condition : Clear, Odorless with sediment

Sampling Date : July 9, 2025
Sampling Time : 15:22 hr.
Received Date : July 9, 2025
Analysis Date : July 9-24, 2025

Parameter	Unit	Method	Result	Standard[1/]
pH	-	SM 4500-H^+ B	7.1	**5.5-9.0**
Temperature*	C°	SM 2550B (on site)	29.9	**≤45**
Biochemical Oxygen Demand (BOD)	mg/L	SM 4500-O G and 5210 B	11	**≤500**
Total Dissolved Solids (TDS)	mg/L	SM 2540 C	228	**≤3,000**
Oil and Grease	mg/L	SM 5520 B	<2	**≤10**

Remarks: * Under Inspection Body's accredited scope.
- SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.

Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Technical Specialist Section Head
License ID: ว-197-ค-0004

(Thepsan Yommana)
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License ID: ว-197-ค-0005

SGS (THAILAND) LIMITED

TY/RS/DS/DS

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Report No. : **2025-500004865-1 / 001-1 (Page 2 of 2)** **Issued date:** July 24, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : July 9, 2025
Sampling Time : 15:22 hr.
Received Date : July 9, 2025
Analysis Date : July 9-24, 2025

Parameter	Unit	Method	Result	Standard[1/]
Flow Rate	m^3/hr	Flow meter	44.10	-
Dissolved Oxygen (DO)	mg/L	SM 4500 O-G	5.18	-
Free Chlorine	mg/L	Photometric, DPD	0.02	≤1

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005090-1 / 001-1 (Page 1 of 2)** **Issued date:** August 19, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam (ว-197-จ-0002)
Laboratory Name : SGS (Thailand) Limited (ว-197)
Sample Condition : Clear, Odorless with sediment

Sampling Date : August 4, 2025
Sampling Time : 11:22 hr.
Received Date : August 4, 2025
Analysis Date : August 4-14, 2025

Parameter	Unit	Method	Result	Standard[1/]
pH	-	SM 4500-H^+ B	7.3	**5.5-9.0**
Temperature*	C°	SM 2550B (on site)	31.9	**≤45**
Biochemical Oxygen Demand (BOD)	mg/L	SM 4500-O G and 5210 B	<2	**≤500**
Total Dissolved Solids (TDS)	mg/L	SM 2540 C	77	**≤3,000**
Oil and Grease	mg/L	SM 5520 B	<2	**≤10**

Remarks: * Under Inspection Body's accredited scope.
- SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.

Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005090-1 / 001-1 (Page 2 of 2)** **Issued date:** August 19, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : August 4, 2025
Sampling Time : 11:22 hr.
Received Date : August 4, 2025
Analysis Date : August 4-14, 2025

Parameter	Unit	Method	Result	Standard[1/]
Flow Rate	m^3/hr	Flow meter	14.07	-
Dissolved Oxygen (DO)	mg/L	SM 4500 O-G	6.73	-
Free Chlorine	mg/L	Photometric, DPD	<0.01	**≤1**

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005345-1 / 001-1 (Page 1 of 2)** **Issued date:** September 22, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam (ว-197-จ-0002)
Laboratory Name : SGS (Thailand) Limited (ว-197)
Sample Condition : Clear, Odorless with sediment

Sampling Date : September 9, 2025
Sampling Time : 14:36 hr.
Received Date : September 9, 2025
Analysis Date : September 9-19, 2025

Parameter	Unit	Method	Result	Standard[1/]
pH	-	SM 4500-H^+ B	7.4	**5.5-9.0**
Temperature*	C°	SM 2550B (on site)	28.3	**≤45**
Biochemical Oxygen Demand (BOD)	mg/L	SM 4500-O G and 5210 B	5	**≤500**
Total Dissolved Solids (TDS)	mg/L	SM 2540 C	68	**≤3,000**
Oil and Grease	mg/L	SM 5520 B	<2	**≤10**

Remarks: * Under Inspection Body's accredited scope.
- SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.

Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005090-1 / 001-1 (Page 2 of 2)** **Issued date:** August 19, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : August 4, 2025
Sampling Time : 11:22 hr.
Received Date : August 4, 2025
Analysis Date : August 4-14, 2025

Parameter	Unit	Method	Result	Standard[1/]
Flow Rate	m^3/hr	Flow meter	14.1	-
Dissolved Oxygen (DO)	mg/L	SM 4500 O-G	6.8	-
Free Chlorine	mg/L	Photometric, DPD	<0.01	≤1

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005639 / 001-1 (Page 1 of 2)** **Issued date:** October 27, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam (ว-197-จ-0002)
Laboratory Name : SGS (Thailand) Limited (ว-197)
Sample Condition : Clear, Odorless with sediment

Sampling Date : October 7, 2025
Sampling Time : 14:55 hr.
Received Date : October 7, 2025
Analysis Date : October 7-24, 2025

Parameter	Unit	Method	Result	Standard[1/]
pH	-	SM 4500-H^+ B	7.4	**5.5-9.0**
Temperature*	C°	SM 2550B (on site)	30.4	**≤45**
Biochemical Oxygen Demand (BOD)	mg/L	SM 4500-O G and 5210 B	3	**≤500**
Total Dissolved Solids (TDS)	mg/L	SM 2540 C	<50	**≤3,000**
Oil and Grease	mg/L	SM 5520 B	<2	**≤10**

Remarks: * Under Inspection Body's accredited scope.
- SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.

Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005639 / 001-1 (Page 2 of 2)** **Issued date:** October 27, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : October 7, 2025
Sampling Time : 14:55 hr.
Received Date : October 7, 2025
Analysis Date : October 7-24, 2025

Parameter	Unit	Method	Result	Standard[1/]
Flow Rate	m^3/hr	Flow meter	14.4	-
Dissolved Oxygen (DO)	mg/L	SM 4500 O-G	7.05	-
Free Chlorine	mg/L	Photometric, DPD	<0.01	≤1

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005639-2 / 001-1 (Page 1 of 2)** **Issued date:** November 24, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam (ว-197-จ-0002)
Laboratory Name : SGS (Thailand) Limited (ว-197)
Sample Condition : Clear, Odorless with sediment

Sampling Date : November 7, 2025
Sampling Time : 10:20 hr.
Received Date : November 7, 2025
Analysis Date : November 7-21, 2025

Parameter	Unit	Method	Result	Standard[1/]
pH	-	SM 4500-H^+ B	8.0	**5.5-9.0**
Temperature*	C°	SM 2550B (on site)	28.4	**≤45**
Biochemical Oxygen Demand (BOD)	mg/L	SM 4500-O G and 5210 B	3	**≤500**
Total Dissolved Solids (TDS)	mg/L	SM 2540 C	57	**≤3,000**
Oil and Grease	mg/L	SM 5520 B	<2	**≤10**

Remarks: * Under Inspection Body's accredited scope.
- SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.

Sources: [1/] Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005639-2 / 001-1 (Page 2 of 2)** **Issued date:** November 24, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : November 7, 2025
Sampling Time : 10:20 hr.
Received Date : November 7, 2025
Analysis Date : November 7-21, 2025

Parameter	Unit	Method	Result	Standard[1/]
Flow Rate	m^3/hr	Flow meter	14.12	-
Dissolved Oxygen (DO)	mg/L	SM 4500 O-G	9.6	-
Free Chlorine	mg/L	Photometric, DPD	<0.01	≤1

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005639-4 / 001-1 (Page 1 of 2)** **Issued date:** December 16, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam (ว-197-จ-0002)
Laboratory Name : SGS (Thailand) Limited (ว-197)
Sample Condition : Yellow and turbid

Sampling Date : December 2, 2025
Sampling Time : 15:51 hr.
Received Date : December 3, 2025
Analysis Date : December 3-11, 2025

Parameter	Unit	Method	Result	Standard[1/]
pH	-	SM 4500-H^+ B	8.2	**5.5-9.0**
Temperature*	C°	SM 2550B (on site)	29.1	**≤45**
Biochemical Oxygen Demand (BOD)	mg/L	SM 4500-O G and 5210 B	<2	**≤500**
Total Dissolved Solids (TDS)	mg/L	SM 2540 C	220	**≤3,000**
Oil and Grease	mg/L	SM 5520 B	<2	**≤10**

Remarks: * Under Inspection Body's accredited scope.
- SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.

Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Report No. : **2025-500005639-4 / 001-1 (Page 2 of 2)** **Issued date:** December 16, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 320 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Yellow and turbid

Sampling Date : December 2, 2025
Sampling Time : 15:51 hr.
Received Date : December 3, 2025
Analysis Date : December 3-11, 2025

Parameter	Unit	Method	Result	Standard[1/]
Flow Rate	m^3/hr	Flow meter	0.00	-
Dissolved Oxygen (DO)	mg/L	SM 4500 O-G	7.3	-
Free Chlorine	mg/L	Photometric, DPD	<0.01	≤1

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

(Phatsakorn Soonthornwiphat)
Technical Specialist Section Head

(Thepsan Yommana)
Technical Specialist Manager

SGS (THAILAND) LIMITED

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LABORATORY ADDRESS: 1/209, and 1/211 Moo1, Soi Sukhumvit 2, Banchang, Banchang, Rayong, 21130

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Report No. : **2025-500004865 / 001-2 (Page 1 of 1)** **Issued date:** July 24, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 1,800 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : July 9, 2025
Sampling Time : 14:58 hr.
Received Date : July 9, 2025
Analysis Date : July 9-24 2025

Parameter	Unit	Method	Result	Standard[1/]
Trihalomethane (THM)				
- Dibromochloromethane	ug/L	SM 6200 B	<1	-
- Bromoform (Tribromomethane)	ug/L	SM 6200 B	<1	-
- Chloroform (Trichloromethane)	ug/L	SM 6200 B	<1	-
- Bromodichloromethane	ug/L	SM 6200 B	<1	-

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

(Phatsakorn Soonthornwiphat)
Technical Specialist Section Head

(Thepsan Yommana)
Technical Specialist Manager

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Report No. : **2025-500005090-1 / 001-2 (Page 1 of 1)** **Issued date:** August 19, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 1,800 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless and little sediment

Sampling Date : August 4, 2025
Sampling Time : 10:54 hr.
Received Date : August 4, 2025
Analysis Date : August 4-14, 2025

Parameter	Unit	Method	Result	Standard[1/]
Trihalomethane (THM)				
- Dibromochloromethane	ug/L	SM 6200 B	<1	-
- Bromoform (Tribromomethane)	ug/L	SM 6200 B	<1	-
- Chloroform (Trichloromethane)	ug/L	SM 6200 B	<1	-
- Bromodichloromethane	ug/L	SM 6200 B	<1	-

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

(Phatsakorn Soonthornwiphat)
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(Thepsan Yommana)
Technical Specialist Manager

SGS (THAILAND) LIMITED

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Report No. : **2025-500005345-1 / 001-2 (Page 1 of 1)** **Issued date:** September 22, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 1,800 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless and little sediment

Sampling Date : September 9, 2025
Sampling Time : 14:13 hr.
Received Date : September 9, 2025
Analysis Date : September 9-19, 2025

Parameter	Unit	Method	Result	Standard[1/]
Trihalomethane (THM)				
- Dibromochloromethane	ug/L	SM 6200 B	2	-
- Bromoform (Tribromomethane)	ug/L	SM 6200 B	<1	-
- Chloroform (Trichloromethane)	ug/L	SM 6200 B	7	-
- Bromodichloromethane	ug/L	SM 6200 B	<1	-

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

(Phatsakorn Soonthornwiphat)
Technical Specialist Section Head

(Thepsan Yommana)
Technical Specialist Manager

SGS (THAILAND) LIMITED

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Report No. : **2025-500005639 / 001-2 (Page 1 of 1)** **Issued date:** October 27, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 1,800 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : October 7, 2025
Sampling Time : 14:28 hr.
Received Date : October 7, 2025
Analysis Date : October 7-24, 2025

Parameter	Unit	Method	Result	Standard[1/]
Trihalomethane (THM)				
- Dibromochloromethane	ug/L	SM 6200 B	<1	-
- Bromoform (Tribromomethane)	ug/L	SM 6200 B	<1	-
- Chloroform (Trichloromethane)	ug/L	SM 6200 B	<1	-
- Bromodichloromethane	ug/L	SM 6200 B	<1	-

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

(Phatsakorn Soonthornwiphat)
Technical Specialist Section Head

(Thepsan Yommana)
Technical Specialist Manager

SGS (THAILAND) LIMITED

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Report No. : **2025-500005639-2 / 001-2 (Page 1 of 1)** **Issued date:** November 24, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 1,800 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Clear, Odorless with sediment

Sampling Date : November 7, 2025
Sampling Time : 09:55 hr.
Received Date : November 7, 2025
Analysis Date : November 7-21, 2025

Parameter	Unit	Method	Result	Standard[1/]
Trihalomethane (THM)				
- Dibromochloromethane	ug/L	SM 6200 B	<1	-
- Bromoform (Tribromomethane)	ug/L	SM 6200 B	<1	-
- Chloroform (Trichloromethane)	ug/L	SM 6200 B	<1	-
- Bromodichloromethane	ug/L	SM 6200 B	<1	-

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

(Phatsakorn Soonthornwiphat)
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(Thepsan Yommana)
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Report No. : **2025-500005639-2 / 001-2 (Page 1 of 1)** **Issued date:** December 16, 2025

Client : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
Address : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
Project Location : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

Sample Type : Wastewater
Sampling Location : บ่อตรวจวัดคุณภาพน้ำทิ้ง ขนาด 1,800 ลบ.ม. (Holding Pond)
Sampling By : Rawin Sangiemngam
Laboratory Name : SGS (Thailand) Limited
Sample Condition : Yellow and turbid

Sampling Date : December 2, 2025
Sampling Time : 15:16 hr.
Received Date : December 3, 2025
Analysis Date : December 3-15, 2025

Parameter	Unit	Method	Result	Standard[1/]
Trihalomethane (THM)				
- Dibromochloromethane	ug/L	SM 6200 B	<1	-
- Bromoform (Tribromomethane)	ug/L	SM 6200 B	<1	-
- Chloroform (Trichloromethane)	ug/L	SM 6200 B	<1	-
- Bromodichloromethane	ug/L	SM 6200 B	<1	-

Remark: - SM = Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th ed., 2023.
Sources: 1/ Notification of the Industrial Estate Authority of Thailand No.029/2567: General Standards for Wastewater drainage into central wastewater Treatment systems in Industrial Estates.

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Technical Specialist Manager

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อาชีวอนามัยและความปลอดภัย

ความร้อนในสถานที่ทำงาน (Heat Stress)

Docusign Envelope ID: 044CC218-3E34-4B11-828A-64F056B80D7D

Report No. : 2025-500005345-2 / 001-1 (page 1 of 1) Issued date : September 25, 2025

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Heat Stress **MEASUREMENT DATE:** September 13, 2025
MEASURED BY : Chayangkul Wicharuang
MEASURED LOCATION : Central Utility Plant 4 (CUP4), Rayong
HEAT STRESS MONITER NO.: GTG: Model QT-34, 3M Thailand Serial No. TEM030028
HRSG: Model QT-34, 3M Thailand Serial No. TEM030023

Station	Period	Type	T_{NWB} (°C) (Wet- bulb)	T_{DB} (°C) (Dry-bulb)	T_{GT} (°C) (Globe)	T_{WBGT} (°C)	Average Heat Stress (WBGT, °C)
GTG	10:26-12:26 hr.	Outdoor	27.5	31.7	34.7	29.3	**29.3**
HRSG	10:24-12:24 hr.	Outdoor	26.7	30.7	32.5	28.3	**28.3**
Standard[1/]			**Light Work**				**≥34**

Remarks :
- Sampling and analytical method was followed the Standard Method of National Institute for Occupational Safety and Health (NIOSH)
- Work load category is determined by averaging metabolic rates for tasks as follows;
  1) Light work : ≤200 kcal/hour
  2) Moderate work : >200-350 kcal/hour
  3) Heavy work : >350-500 kcal/hour

Source : [1/] Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016)

(Buppa Sangnil)
Environmental Monitoring and Compliance Audit Manager
SGS (THAILAND) LIMITED

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ปริมาณเสียงสะสมแบบติดตัวบุคคล (Noise Dose)

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Report No. : 2025-500005639-5 / 001-1 (page 1 of 2) Issued date : January 5, 2026

CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Noise Dose **MEASUREMENT DATE:** December 18-19, 2025
MEASUREMENT LOCATION : Glow Energy (Utility) Phase 1 **MEASURED BY** : Chayangkul Wicharuang
CALIBRATOR DATA : Model CEL-120/2 Serial No. 3864875, Casella
Pre Cal : 114.0 dB(A), Post Cal : 114.0 dB(A)
SOUND LEVEL METER NO. : FO#1: Model dBadge2, Casella, Serial No. 5037552
FO#2: Model dBadge2, Casella, Serial No. 5037602

Location	Measurement Date	Measurement Time (hrs.)	Name	Noise Dose (%)	Time Weighted Average [dB(A)]	
					8 hr.	12 hr.
FO#1	Dec 18, 2025	19:28-07:28	ศกาภัส แซ่มเชื้อ	0.6	62.5	60.8
	Dec 19, 2025	08:07-20:07	ภูมิเรศน์ ตันทา	20.0	78.0	76.2
FO#2	Dec 18, 2025	19:28-07:28	ฐานัน เฉลยถิ่น	0.5	62.4	60.6
	Dec 19, 2025	08:07-20:07	ภัทรพงศ์ แก้วสกุณี	11.0	75.4	73.7
Standard for $TWA_{(8)}$ [1/, 2/]					**≯85**	**-**
Standard of Hearing Conservation Program (working 8 hrs) [3/]					**≯85**	**-**

Remarks :
- Working hours per day approximately 12 hours
- Setting values for noise dosimeter are as follows:
  - Range = 70-140 dB
  - Criterion level = 85 dB
  - Exchange rate = 3
  - Threshold level = 80 dB
  - Response time = Slow
  - Frequency weighting = A
- $TWA_{(8)}$: Time Weighted Average for 8 working hours per day

Sources :
1/ Notification of the Department of Labour Protection and Welfare, Subject 'The allowable standard for noise exposure level in worker's daily work hours' dated January 26, B.E. 2561 (2018)
2/ Notification of the Department of Labour Protection and Welfare, Subject 'The criteria, measurement methods and analysis of working condition related to heat, light or noise including a period and a category of business to be carried out, dated March 12, B.E. 2561 (2018)
3/ Notification of the Department of Labour Protection and Welfare, Subject 'Rules and Procedures for preparation of a hearing conservation program in the workplace', dated June 12, B.E. 2561 (2018)

Approved by

(Buppa Sangnil)
Environmental Monitoring and Compliance Audit Manager

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CLIENT : **GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED**
ADDRESS : 1/2 Moo 2, Banchang, Banchang, Rayong 21130
PROJECT LOCATION : Central Utility Plant 4 (CUP4), Rayong

Analysis Report

SAMPLE DESIGNATED AS : Noise Dose **MEASUREMENT DATE:** December 18-19, 2025
MEASUREMENT LOCATION : Glow Energy (Utility) Phase 1 **MEASURED BY** : Chayangkul Wicharuang
CALIBRATOR DATA : Model CEL-120/2 Serial No. 3864875, Casella
Pre Cal : 114.0 dB(A), Post Cal : 114.0 dB(A)
SOUND LEVEL METER NO. : CO#1: Model dBadge2, Casella, Serial No. 5037620
Maintenace: Model dBadge2, Casella, Serial No. 5037563

Location	Measurement Date	Measurement Time (hrs.)	Name	Noise Dose (%)	Time Weighted Average [dB(A)]	
					8 hr.	12 hr.
CO#1	Dec 18, 2025	19:28-07:28	วิฑูลย์ แซ่อึ้ง	0.7	63.6	61.8
	Dec 19, 2025	08:07-20:07	อณุกูล มั่งศรีสุข	1.2	65.9	64.2
Maintenance	Dec 19, 2025	08:30-16:30	ปิยพัทธ์ สุขสุวรรณ	20.1	78.0	76.3
Standard for $TWA_{(8)}$ [1/, 2/]					**≯85**	**-**
Standard of Hearing Conservation Program (working 8 hrs) [3/]					**≯85**	**-**

Remarks :
- Working hours per day approximately 12 hours
- Setting values for noise dosimeter are as follows:
  - Range = 70-140 dB
  - Criterion level = 85 dB
  - Exchange rate = 3
  - Threshold level = 80 dB
  - Response time = Slow
  - Frequency weighting = A
- $TWA_{(8)}$: Time Weighted Average for 8 working hours per day

Sources :
1/ Notification of the Department of Labour Protection and Welfare, Subject 'The allowable standard for noise exposure level in worker's daily work hours' dated January 26, B.E. 2561 (2018)
2/ Notification of the Department of Labour Protection and Welfare, Subject 'The criteria, measurement methods and analysis of working condition related to heat, light or noise including a period and a category of business to be carried out, dated March 12, B.E. 2561 (2018)
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Approved by

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Environmental Monitoring and Compliance Audit Manager

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ภาคผนวก ข

หนังสือรับรองมาตรฐานบริษัท เอสจีเอส (ประเทศไทย) จำกัด

ที่ อก ๐๓๑๐(๓)/ ๙๒๓๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๓ พฤศจิกายน ๒๕๖๘

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง)

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๑ สิงหาคม ๒๕๖๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) จำนวน ๒๕ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๙๗ สถานที่ตั้งเลขที่ ๑/๒๐๙ และ ๑/๒๑๑ หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้



ค. ขอบข่ายชนิดสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๔ รายการ น้ำใต้ดิน จำนวน ๑๒๓ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๗ รายการ ดิน จำนวน ๑๒๓ รายการ และอากาศ จำนวน ๒๘ รายการ รวมทั้งสิ้น ๓๕๕ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้ ...

Green Industry "อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

หนังสือฉบับนี้จะสิ้นอายุในวันที่ ๑๒ ตุลาคม ๒๕๗๒ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๖๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[redacted]

(นางสาวปัทมวรรณ คุณประเสริฐ)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) เลขทะเบียน ว-๑๙๗
ที่ อก ๐๓๑๐(๓)/ ๙๒๓๐ ลงวันที่ ๑๓ พฤศจิกายน ๒๕๖๘

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๕ รายการ

น้ำ/น้ำเสีย จำนวน 44 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[6]
2	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
3	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
5	Arsenic	Digestion, Inductively Coupled Plasma Method[4]
6	Barium	Digestion, Inductively Coupled Plasma Method[6]
7	Biochemical Oxygen Demand	5-Day BOD Test, Membrane-Electrode Method[4]
8	Cadmium	Digestion, Inductively Coupled Plasma Method[4]
9	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method[4]
10	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
11	Chromium	Digestion, Inductively Coupled Plasma Method[4]
12	Color	ADMI Weighted-Ordinate Spectrophotometric Method[4]
13	Copper	Digestion, Inductively Coupled Plasma Method[4]
14	Cyanide	Total Cyanide after Distillation, Colorimetric Method[4]
15	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
16	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
17	Endosulfan II	Liquid-Liquid Extraction, Gas Chr[redacted] Method[4]

18 Endosulfan Sulfate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
19	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
20	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
21	Formaldehyde	Distillation, Colorimetric Method[4]
22	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
23	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
24	Hexavalent Chromium	Colorimetric Method[4]
25	Lead	Digestion, Inductively Coupled Plasma Method[4]
26	Manganese	Digestion, Inductively Coupled Plasma Method[4]
27	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]
28	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
29	Nickel	Digestion, Inductively Coupled Plasma Method[4]
30	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
31	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method[4]
32	pH	Electrometric Method[4]
33	Phenols	Distillation, Direct Photometric Method[4]
34	Selenium	Digestion, Inductively Coupled Plasma Method[4]
35	Temperature	Laboratory and Field Methods[4]
36	Total Dissolved Solids	Dried at 180 °C[4]
37	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method[4]
38	Total Suspended Solids	Dried from 103 to 105 °C[4]
39	Trivalent Chromium	Calculation[4]
40	Zinc	Digestion, Inductively Coupled Plasma Metho

41 α-BHC...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
41	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
42	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
43	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
44	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]

น้ำใต้ดิน จำนวน 123 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
2	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
3	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
4	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
5	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
6	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
7	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
8	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
9	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
10	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]

11 1,3-Dichlorobenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
12	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
13	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
14	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
15	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
16	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
17	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
18	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
19	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
20	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
21	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
22	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
23	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
24	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
25	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
26	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chr[illegible] Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
28	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
29	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
30	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
31	Antimony	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
32	Arsenic	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
33	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
34	Barium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
35	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
36	Benzo(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
37	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
38	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
39	Benzo(ghi)perylene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
40	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas [illegible] Spectrometric Method[4]

41 Benzoic acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
41	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
42	Beryllium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
43	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
44	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
45	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
46	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
47	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
48	Cadmium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
49	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
50	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
51	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
52	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
53	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
54	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
55	Chloroform	Purge and Trap, Gas Chromatog Spectrometric Method[4]

56 Chromium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	Chromium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
57	Chromium (III)	Calculation[4]
58	Chromium (VI)	Colorimetric Method[4]
59	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
60	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
61	Cyanide	Total Cyanide after Distillation, Colorimetric Method[4]
62	DDD	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
63	DDE	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
64	DDT	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
65	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
66	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
67	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
68	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
69	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
70	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
71	Endrin	Liquid-Liquid Extraction, Gas Chro Spectrometric Method[4]

72 Ethylbenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
72	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
73	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
74	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
75	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
76	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
77	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
78	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
79	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
80	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
81	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
82	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
83	Lead	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
84	Manganese	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
85	Mercury	Digestion, Cold-Vapor Atomi Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
86	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
87	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
88	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
89	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
90	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
92	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
93	Nickel	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
94	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
96	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
97	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
98	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
99	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
100	pH	Electrometric Method[4]
101	Phenanthrene	Liquid-Liquid Extraction, Gas Ch Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
102	Phenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
103	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
104	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
105	Selenium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
106	Silver	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
107	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
108	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
109	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
110	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
111	TPH (C5-C8)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
112	TPH (C>8-C16)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[4]
113	TPH (C>16-C35)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[4]
114	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
115	Trichloroethylene	Purge and Trap, Gas Chromatog Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
116	Vanadium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
117	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
118	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
119	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
120	Zinc	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
121	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
122	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
123	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
4	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
5	Carbon Monoxide	Instrumental Analyzer Method[5]
6	Chlorine	Isokinetic Sampling, Ion Chromatogra

ดับที่	สารมลพิษ	วิธีวิเคราะห์
7	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
9	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method[5]
11	Dioxins/Furans	Isokinetic Sampling[5]
12	Hydrogen Chloride	Isokinetic Sampling, Ion Chromatographic Method[5]
13	Hydrogen Fluoride	Isokinetic Sampling, Ion Chromatographic Method[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
15	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
16	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5]
18	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
19	Opacity	Ringelmann's Method[1]
20	Oxides of Nitrogen	1) Instrumental Analyzer Method[5] 2) Absorption Sampling, Alkaline Permanganate/ Colorimetric Method[5]
21	Selenium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method[5] 2) Instrumental Analyzer Method[5]
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[5]
24	Tellurium	Isokinetic Sampling, Digestion, Plasma Method[5]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
26	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method[5]
27	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
28	Xylene	Adsorption Sampling, Gas Chromatographic Method[5]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๙ รายการ

ดับที่	สารมลพิษ	วิธีวิเคราะห์
1	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method[6]
2	Aldrin	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
3	Antimony	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,10]
4	Arsenic	1) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[9,11] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,11]
5	Barium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
6	Beryllium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
7	Cadmium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
8	Chlordane	Ultrasonic Extraction, Gas Chroma... Method[7,8]]

9 Chromium...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chromium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
10	Chromium (III)	Calculation[1,9,10,12]
11	Chromium (VI)	1) Alkaline Digestion, Colorimetric Method[12] 2) Waste Extraction, Colorimetric Method[1,12]
12	Cobalt	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
13	Copper	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
14	DDD	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
15	DDE	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
16	DDT	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
17	Dieldrin	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
18	Endrin	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
19	Heptachlor	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
20	Kepone	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
21	Lead	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
22	Lindane	Ultrasonic Extraction, Gas Chromatographic Method[7,8]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[15] 2) Waste Extraction, Digestion, Thermal Decomposition Atomic Absorption Spectrometric Method[1,15]
24	Methoxychlor	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
25	Mirex	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
26	Molybdenum	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
27	Nickel	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
28	PCBs	Ultrasonic Extraction, Gas Chromatographic Method[8,16]
29	Pentachlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
30	Selenium	1) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[9,11] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,11]
31	Silver	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
32	Silvex	Ultrasonic Extraction, Gas Chromatographic Method[6]
33	Thallium	1) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[9,11] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,11]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
34	Toxaphene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
35	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
36	Vanadium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
37	Zinc	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]

ดิน จำนวน ๑๒๓ รายการ

ดับที่	สารมลพิษ	วิธีวิเคราะห์
1	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
2	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
3	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
4	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
5	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
6	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
7	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
8	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
9	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
10	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
11	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
12	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
13	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
14	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
15	2,4,5-Trichlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
16	2,4,6-Trichlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
17	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method[6]
18	2,4-Dichlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
19	2,4-Dimethylphenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
20	2,4-Dinitrophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
21	2,4-Dinitrotoluene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
22	2,6-Dinitrotoluene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
23	2-Chlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
24	2-Methylnaphthalene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
25	2-Methylphenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
26	3,3'-Dichlorobenzidine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
27	Acenaphthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
28	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
29	Aldrin	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
30	Anthracene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
31	Antimony	Digestion, Inductively Coupled Plasma Method[10,19]
32	Arsenic	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[11,19]
33	Atrazine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
34	Barium	Digestion, Inductively Coupled Plasma Method[10,19]
35	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
36	Benzo(a)anthracene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
37	Benzo(a)pyrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
38	Benzo(b)fluoranthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
39	Benzo(ghi)perylene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
40	Benzo(k)fluoranthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
41	Benzoic acid	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
42	Beryllium	Digestion, Inductively Coupled Plasma Method[10,19]
43	Bis(2-chloroethyl)ether	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
44	Bis(2-ethylhexyl)phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
45	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
46	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
47	Butyl benzyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
48	Cadmium	Digestion, Inductively Coupled Plasma Method[10,19]
49	Carbazole	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
50	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
51	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
52	Chlordane	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
53	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
54	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
55	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
56	Chromium	Digestion, Inductively Coupled Plasma Method[10,19]
57	Chromium (III)	Calculation[9,10,12]
58	Chromium (VI)	Alkaline Digestion, Colorimetric Method[12]
59	Chrysene	Microwave Extraction, Gas Chrom Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
60	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
61	Cyanide	Extraction, Distillation, Colorimetric Method[20,21,22]
62	DDD	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
63	DDE	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
64	DDT	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
65	Dibenz(a,h)anthracene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
66	Dieldrin	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
67	Diethyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
68	Di-n-butyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
69	Di-n-Octyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
70	Endosulfan	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
71	Endrin	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
72	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
73	Fluoranthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
74	Fluorene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
75	Heptachlor	Microwave Extraction, Gas Chroma Spectrometric Method[13,14]

76 Hep

ดับที่	สารมลพิษ	วิธีวิเคราะห์
76	Heptachlor Epoxide	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
77	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
78	Hexachlorobenzene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
79	Hexachlorocyclopentadiene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
80	Hexachloroethane	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
81	Indeno(1,2,3-cd)pyrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
82	Isophorone	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
83	Lead	Digestion, Inductively Coupled Plasma Method[10,19]
84	Manganese	Digestion, Inductively Coupled Plasma Method[10,19]
85	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[15]
86	Methoxychlor	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
87	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
88	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
89	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
90	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
91	Naphthalene	Microwave Extraction, Gas Chroma Spectrometric Method[13,14]

92 n-Hexane...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
92	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
93	Nickel	Digestion, Inductively Coupled Plasma Method[10,19]
94	Nitrobenzene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
95	N-Nitrosodi-n-propylamine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
96	N-Nitrosodiphenylamine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
97	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
98	PCBs	Ultrasonic Extraction, Gas Chromatographic Method[8,16]
99	p-Chloroaniline	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
100	Pentachlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
101	Phenanthrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
102	Phenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
103	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
104	Pyrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
105	Selenium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[11,19]
106	Silver	Digestion, Inductively Coupled Plasma Method[10,19]
107	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
108	Tetrachloroethylene	Purge and Trap, Gas Chromato Spectrometric Method[17,18]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
109	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
110	Toxaphene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
111	TPH (C5-C8)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17]
112	TPH (C>8-C16)	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[8]
113	TPH (C>16-C35)	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[8]
114	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
116	Vanadium	Digestion, Inductively Coupled Plasma Method[10,19]
117	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
118	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
119	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
120	Zinc	Digestion, Inductively Coupled Plasma Method[10,19]
121	α-HCH	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
122	β-HCH	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
123	γ-HCH	Microwave Extraction, Gas C ass Spectrometric Method[13,14]

เอกสารอ้างอิง...

เอกสารอ้างอิง

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ABS Quality Evaluations Certification

ABS Quality Evaluations
An ABS Group Company

Certificate Of Conformance

This is to certify that the Quality Management System of:

SGS (Thailand) Limited

238 TRR Tower, 19th-21st Floor Naradhiwas Rajanagarindra Road,Chong Nonsi
Yannawa Bangkok 10120
Thailand
(WITH ADDITIONAL FACILITIES LISTED ON ATTACHED ANNEX)

has been assessed by ABS Quality Evaluations, Inc. and found to be in conformance with the requirements set forth by:

ISO 9001:2015

The Quality Management System is applicable to:

Provision of Physical Inspection, Fumigation, and Laboratory Testing and Calibration

Certificate No:	**52229**
Certification Date:	**30 JUL 2015**
Effective Date:	**06 AUG 2025**
Expiration Date:	**24 JUL 2026**
Revision Date:	**06 AUG 2025**

Dominic Townsend, President

This certificate's validity is subject to the organization maintaining their system in accordance with ABS Quality Evaluations, Inc. 1701 City Plaza Dr Spring, TX 77389 USA requirements fo certification. It is contingent upon prompt, written notification to ABS Quality Evaluations, Inc. of significant changes to the management system or components thereof. Validity may be confi website (www.abs-qe.com) or scanning the code to the right with a smartphone. For certificates issued in the People's Republic of China information may also be verified on the Certifica Administration of the People's Republic of China's website (www.cnca.gov.cn).
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ABS Quality Evaluations Certification

ABS Quality Evaluations
An ABS Group Company

ISO 9001:2015

Certificate Of Conformance
ANNEX

Certificate No: 52229

SGS (Thailand) Limited

At the below facilities

FACILITY NAME	FACILITY ACTIVITY	ADDRESS
SGS (Thailand) Limited	Management of QMS and Inspection Service	238 TRR Tower, 19th-21st Floor Naradhiwas Rajanagarindra Road,Chong Nonsi Yannawa Bangkok 10120, Thailand
Rayong Branch	Inspection and Testing Service	1/209 and 1/211 Moo 1, T. Ban Chang, A. Ban Chang Rayong 21130, Thailand
Sriracha Office	Inspection and Fumigation Service	165/61-62 Moo 10 Surasak, Sriracha Chonburi 20110, Thailand
Nakornratchasima Office	Inspection and Fumigation Service	1340/46 Suranarai Road., T. Nai-Muang, A. Muang Nakornratchasima 30000, Thailand
Hat Yai Branch	Inspection and Testing Service	57, 59 and 61 Soi 10 Phetkasem Road, T. Hat Yai, A. Hat Yai Songkhla 90110, Thailand
Rama III Branch, Laboratory Services	Testing Service	10,10/1-4, 12 Rama III Road, Soi 59 Chongnonsee, Yannawa Bangkok 10120, Thailand
SGS (Cambodia) Limited	Inspection Service	No.1076 A-D, Street 371, Phum Trea II,Sangkat Steung Meanchey, , Khan Meanchey, Phnom Penh, Cambodia
Rama III Branch - Soft Line & Hard goods Laboratory Services	Testing Service	1025/1 Soi Rama III 61, Rama III Road Chongnonsee, Yannawa Bangkok 10120, Thailand

This certificate's validity is subject to the organization maintaining their system in accordance with ABS Quality Evaluations, Inc. 1701 City Plaza Dr Spring, TX 77389 USA requirements fo certification. It is contingent upon prompt, written notification to ABS Quality Evaluations, Inc. of significant changes to the management system or components thereof. Validity may be confi website (www.abs-qe.com) or scanning the code to the right with a smartphone. For certificates issued in the People's Republic of China information may also be verified on the Certifica Administration of the People's Republic of China's website (www.cnca.gov.cn).
The certificate remains the property of ABS Quality Evaluations, Inc. to whom it must be returned upon request.

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แบบ กมช./สมอ.๒
Form NSC/TISI 2

ใบรับรองเลขที่ 25-IB0009
(Certificate No.)

ใบรับรองระบบงาน
(Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท เอสจีเอส (ประเทศไทย) จำกัด
(SGS (Thailand) Limited)

ตั้งอยู่เลขที่
(Address)

๒๓๘ อาคารไทยรุ่งเรือง ชั้น ๑๙ - ๒๑ ถนนนราธิวาสราชนครินทร์ แขวงช่องนนทรี เขตยานนาวา กรุงเทพมหานคร
(238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsee, Yannawa, Bangkok)

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๑๗๐๒๐ - ๒๕๕๖
(Standard No. ISO/IEC 17020 : 2012)

การตรวจสอบและรับรอง-ข้อกำหนดสำหรับหน่วยตรวจ
(Conformity assessment — Requirements for the operation of various types of bodies performing inspection)

หมายเลขการรับรองที่ หน่วยตรวจ ๐๐๓๔
(Accreditation No. Inspection 0034)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้ใบรับรอง 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 ๒๔ เมษายน พ.ศ. ๒๕๖๘
(Issue date : 24 April B.E. 2568 (2025))

(นายวีระศักดิ์ เพ็งหลัง)
ผู้อำนวยการสำนักงานคณะกรรมการการมาตรฐานแห่งชาติ
ปฏิบัติราชการแทน
เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

96f655de

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 25-IB0009

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด

ที่ตั้งสถานประกอบการของหน่วยตรวจและข้อมูลติดต่อ

ที่ตั้งสำนักงานใหญ่
238 อาคารไทยรุ่งเรือง ชั้น 19-21 ถนนนราธิวาสราชนครินทร์ แขวงช่องนนทรี เขตยานนาวา กรุงเทพมหานคร

ที่ตั้งสำนักงานสาขา (กรณีแตกต่างจากที่ตั้งสำนักงานใหญ่)

1) **สำนักงานศรีราชา**
165/61-62 หมู่ 10 ตำบลสุรศักดิ์ อำเภอศรีราชา จังหวัดชลบุรี
2) **สำนักงานนครราชสีมา**
1340/46 ถนนสุรนารายณ์ ตำบลในเมือง อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
3) **สาขาหาดใหญ่**
57, 59, 61 ซอย 10 ถนนเพชรเกษม ตำบลหาดใหญ่ อำเภอหาดใหญ่ จังหวัดสงขลา

หมายเลขการรับรอง : หน่วยตรวจ 0034

ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
1. เครื่องแต่งกาย : เสื้อผ้าสำเร็จรูป (เฉพาะสำนักงานใหญ่)	การตรวจสายการผลิตและการตรวจก่อนการส่งมอบ ในรายการต่อไปนี้ – ลักษณะทั่วไป – รูปแบบและขนาด – ปริมาณและการบรรจุ (เฉพาะการตรวจก่อนการส่งมอบ)	– วิธีปฏิบัติงานของบริษัทหมายเลข P-INSP-WI-SL-001 – ข้อกำหนดของลูกค้า
2. ผลิตภัณฑ์อาหาร : การตรวจผลิตภัณฑ์อาหาร (เฉพาะสำนักงานใหญ่และสาขาหาดใหญ่)	การตรวจระหว่างการผลิตและการตรวจก่อนการส่งมอบ สำหรับกลุ่มผลิตภัณฑ์อาหารแช่แข็งและกลุ่มผลิตภัณฑ์อาหารกระป๋อง	– ขั้นตอนการดำเนินงานของบริษัทหมายเลข P-CORP-I-09 – ข้อกำหนดของลูกค้า
3. ยานยนต์ : รถยนต์ (เฉพาะสำนักงานใหญ่และสำนักงานศรีราชา)	การตรวจสภาพทั่วไปก่อนการส่งมอบ ในรายการต่อไปนี้ – จำนวน – สภาพความสมบูรณ์ภายนอกของรถยนต์ เช่น สภาพของกระจก สภาพทั่วไปของตัวถัง สภาพยางและล้อ ความสะอาด และอื่น ๆ ที่อยู่ภายนอก	– ขั้นตอนการดำเนินงานของบริษัทหมายเลข PR-TH-NR-OGC-IN-001 และ PR-TH-NR-OGC-IN-002 – เอกสาร New Vehicle Receiving and Inspection Procedures Issued May 1, 1989 ของ Federal Chamber of Automotive Industries

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
4. เครื่องจักรกล : ถังก๊าซปิโตรเลียมเหลว (เฉพาะสำนักงานใหญ่)	การตรวจกระบวนการผลิตและการควบคุมคุณภาพ ในรายการต่อไปนี้ – การตรวจชิ้นส่วนประกอบการผลิตถัง – การตรวจระหว่างการประกอบ – การทำกระบวนการทางความร้อน – การทดสอบทั้งทางกล การรั่ว การขยายตัวและการระเบิด และการตรวจสอบปริมาตร – การตรวจสอบก่อนการส่งมอบ	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-071 – ข้อกำหนดของลูกค้า
5. สินค้าเกษตร : ข้าวหอมมะลิไทย (เฉพาะสำนักงานใหญ่และสำนักงานนครราชสีมา)	การตรวจในขั้นตรวจปล่อย ในรายการต่อไปนี้ – ปริมาณ – คุณภาพทางกายภาพและลักษณะทั่วไป ดังต่อไปนี้ • ประเภท ชนิด • ความบริสุทธิ์ • ความชื้น • ขนาดของเมล็ดข้าว • ส่วนผสม (ข้าวเต็มเมล็ด ข้าวหักต้นข้าว) • ข้าวและสิ่งที่อาจมีปนได้ (เมล็ดเสีย เมล็ดเหลือง เมล็ดท้องไข่ เมล็ดแดง ฯลฯ) • ไม่มีแมลงที่ยังมีชีวิต • ระดับการขัดสี ไม่ครอบคลุมการตรวจความบริสุทธิ์ด้วยวิธีวิเคราะห์ในห้องปฏิบัติการในรายการปริมาณอมิโลส (Amylose content) และค่าการสลายเมล็ดข้าวในด่าง (Alkali spreading value)	– ประกาศกระทรวงพาณิชย์ เรื่อง หลักเกณฑ์และวิธีการการจัดให้มีการตรวจสอบมาตรฐานสินค้าและการตรวจสอบมาตรฐานสินค้าข้าวหอมมะลิไทย – ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-AGR-IN-004 และ PR-TH-NR-AGR-IN-005 – ข้อกำหนดของลูกค้า

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 25-IB0009

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
6. สินค้าเกษตร : น้ำตาลทรายขาวและน้ำตาลทรายดิบ (เฉพาะสำนักงานใหญ่ สำนักงานศรีราชา และสำนักงานนครราชสีมา)	การตรวจลักษณะทั่วไปและปริมาณ ทั้งนี้ไม่รวมผลวิเคราะห์ในห้องปฏิบัติการ	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-AGR-IN-002 และ PR-TH-NR-AGR-IN-003 – ข้อกำหนดของลูกค้า
7. สินค้าเทกอง : ถ่านหิน ซีเมนต์ ยิปซัม ปูนเม็ด หินปูน และหินตะกอน (เฉพาะสำนักงานใหญ่ สำนักงานศรีราชา และสาขาหาดใหญ่)	การตรวจสภาพทั่วไปและการสุ่มตัวอย่าง	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-MIN-IN-001 และ PR-TH-NR-MIN-IN-002
8. การตรวจโรงงานเพื่อการรับรองคุณภาพผลิตภัณฑ์ (เฉพาะสำนักงานใหญ่)	การตรวจกระบวนการผลิต ระบบคุณภาพ และการตรวจประเมินผลิตภัณฑ์ สำหรับกลุ่มผลิตภัณฑ์ ดังต่อไปนี้ – วัสดุก่อสร้าง คอนกรีต สุขภัณฑ์ เซรามิก และเครื่องเรือน – บริภัณฑ์ส่องสว่าง – ไฟฟ้ากำลัง – เครื่องใช้ไฟฟ้า – เครื่องใช้อิเล็กทรอนิกส์ – โภคภัณฑ์ และของเล่น – ยาง เคมี สิ่งทอ ปิโตรเลียม และอาหาร – ยานยนต์ ชิ้นส่วนยานยนต์ และเครื่องกล	– หลักเกณฑ์การตรวจสอบเพื่อการอนุญาตของสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม – หลักเกณฑ์เฉพาะในการตรวจสอบเพื่อการอนุญาตผลิตภัณฑ์ที่เกี่ยวข้อง และมาตรฐานผลิตภัณฑ์อุตสาหกรรมที่เกี่ยวข้อง – เอกสารขั้นตอนการดำเนินงานของบริษัทหมายเลข THLPP.01

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
9. สิ่งแวดล้อม (เฉพาะสำนักงานใหญ่)	การตรวจคุณภาพสิ่งแวดล้อมภายในอาคาร ในรายการต่อไปนี้ – ระดับเสียง – ความร้อนสะสม – ปริมาณ CO, CO_2, PM-10, Ozone, Total VOCs – อุณหภูมิ – ความชื้นสัมพันธ์ – ความเร็วลม – ระดับความเข้มแสง	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-035, PR-TH-I&E-IN-036, PR-TH-I&E-IN-038, PR-TH-I&E-IN-050, PR-TH-I&E-IN-051, PR-TH-I&E-IN-052, PR-TH-I&E-IN-054 และ PR-TH-I&E-IN-055 – ข้อกำหนดของลูกค้า – กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง
	การตรวจคุณภาพสิ่งแวดล้อมภายนอกอาคาร ในรายการต่อไปนี้ – ระบบการตรวจสอบคุณภาพอากาศจากปล่องแบบอัตโนมัติอย่างต่อเนื่อง (Continuous Emission Monitoring Systems : CEMs) ด้วยเครื่องมือหรือเครื่องอุปกรณ์พิเศษ (ปริมาณ CO, SO_2, NO_2, O_2, CO_2, NO และ NO_x)	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-015 และ PR-TH-I&E-IN-032 – ข้อกำหนดของลูกค้า – กฎหมาย กฎและระเบียบต่างๆ ที่เกี่ยวข้อง
	การตรวจคุณภาพน้ำ ในรายการ – การเก็บตัวอย่างน้ำ – ลักษณะทางกายภาพ (สี สีตะกอน) – ความเป็นกรด-ด่าง – อุณหภูมิ – ปริมาณออกซิเจนที่ละลายน้ำ (Dissolved Oxygen : DO) – ค่าการนำไฟฟ้า – ค่าความเค็ม – ค่าความขุ่น ทั้งนี้ไม่รวมผลวิเคราะห์ในห้องปฏิบัติการ	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-043 – ข้อกำหนดของลูกค้า – กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 25-IB0009

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
10. สินค้าเกษตร : ข้าวสาลีและกากถั่วเหลือง (เฉพาะสำนักงานใหญ่และสำนักงานศรีราชา)	การตรวจสอบสภาพทั่วไป การสุ่มตัวอย่าง และการสังเกตการณ์การชั่งน้ำหนัก	– GAFTA Weighing Rules No. 123 – GAFTA Sampling Rules No.124 – วิธีปฏิบัติงานของบริษัทหมายเลข PR-TH-NR-AGR-IN-006 – ข้อกำหนดของลูกค้า
11. การตรวจสถานประกอบการผลิตวัตถุอันตราย (ที่สำนักงานคณะกรรมการอาหารและยารับผิดชอบ) (เฉพาะสำนักงานใหญ่)	การตรวจสถานที่ และกระบวนการผลิตด้านการจัดการระบบคุณภาพ การสุขาภิบาล และความปลอดภัย	- หลักเกณฑ์วิธีการที่ดีในการผลิตวัตถุอันตราย ที่สำนักงานคณะกรรมการอาหารและยารับผิดชอบ (GMP) - ขั้นตอนการดำเนินงานของบริษัท หมายเลข THLPP.3100

ตั้งแต่ วันที่ 26 กุมภาพันธ์ พ.ศ. 2568
ถึง วันที่ 10 กันยายน พ.ศ. 2569
ออกให้ ณ วันที่ 24 เมษายน พ.ศ. 2568

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

Scope of Accreditation for Inspection Body
Certificate No. 25-IB0009

Name of Inspection Body : SGS (Thailand) Limited

Addresses and contact details

Head office or primary location
238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsee, Yannawa, Bangkok

Additional Locations (If different from Head Office)

1) **Sriracha Office**
165/61-62 Moo 10, Surasak, Sriracha, Chonburi
2) **Nakhon Ratchasima Office**
1340/46 Suranarai Road, Nai-Muang, Muang Nakhonratchasima, Nakhonratchasima
3) **Hat Yai Branch**
57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai, Songkhla

Accreditation No. : INSPECTION 0034

Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
1. Apparel : Readymade Garment (Head office)	In-line process and Pre-shipment inspection of readymade garment with the items as follows : – General appearance – Style, Size and Weight of unit – Quantity and Packing (Pre-shipment inspection)	– Work instruction of SGS (Thailand) Limited : P-INSP-WI-SL-001 – Customer's requirements
2. Food Products : Food Inspection (Head Office and Hat Yai Branch)	During process inspection and Pre-shipment inspection of food products covering frozen food products and canned food products	– Operating procedure of SGS (Thailand) Limited : P-CORP-I-09 – Customer's requirements
3. Motor Vehicle : Automotive (Head Office and Sriracha Office)	Pre-shipment inspection of general condition of vehicle with the items as follows : – Quantity – Visual inspection of external condition e.g. glass, body, tires, wheels, cleanliness etc.	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-OGC-IN-001 and PR-TH-NR-OGC-IN-002 – New Vehicle Receiving and Inspection Procedures Issued May 1, 1989 of Federal Chamber of Automotive Industries

Scope of Accreditation for Inspection Body
Certificate No. 25-IB0009

Name of Inspection Body : SGS (Thailand) Limited

Accreditation No. : INSPECTION 0034

Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
4. Machinery : LPG Cylinder (Head Office)	Production process and quality control inspection with the items as follows : – Component parts – During assembly – Heat treatment – Mechanical, Hydraulic pressure leak, Volumetric expansion, Burst test and Capacity check – Pre-delivery inspection	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-071 – Customer's requirements
5. Agricultural Products : Thai Hom Mali Rice (Head Office and Nakhon Ratchasima Office)	Pre-shipment inspection with the items as follows : – Quantity – Physical quality and general feature as follows : • Type, Grade • Purity • Moisture • Kernel size • Composition (whole kernel, broken, head rice) • Rice and matters that may be present (damaged kernel, yellow kernel, chalky kernel, red kernel, etc.) • No live insects • Milling degree Not covering the purity check by laboratory analysis for determination of Amylose content and Alkali spreading value	– Notification of Ministry of Commerce on Criteria and procedures of organizing the inspection of commodity standards and the inspection of the standards of Thai Hom Mali Rice – Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-004 and PR-TH-NR-AGR-IN-005 – Customer's requirements

Scope of Accreditation for Inspection Body
Certificate No. 25-IB0009

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
6. Agricultural Products : White sugar and raw sugar (Head Office, Sriracha Office and Nakhon Ratchasima Office)	General appearance and quantity inspection Excluding analysis by laboratory testing	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-002 and PR-TH-NR-AGR-IN-003 – Customer's requirements
7. Bulk Solids : Coal, cement, gypsum, clinker, limestone and sedimentary rock (Head Office, Sriracha Office and Hat Yai Branch)	General appearance inspection and sampling	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-MIN-IN-001 and PR-TH-NR-MIN-IN-002
8. Manufacturing inspection for product certification (Head Office)	Production process and quality control system inspection including the evaluation of the following group of products : – Construction materials, concretes, sanitary wares, ceramics, and furniture – Electrical lighting and similar equipment – Electrical power devices – Electrical appliances – Electronic apparatus, parts, and components – Consumer goods and toys – Rubbers, chemicals, textiles, petroleum, and food products – Automotive products, parts, and mechanical products	– Criteria for product certification of Thai Industrial Standards Institute – Criteria for the relevant particular requirements and Thai Industrial Standards for product certification – Operating procedure of SGS (Thailand) Limited : THLPP.01

Scope of Accreditation for Inspection Body
Certificate No. 25-IB0009

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
9. Environmental (Head Office)	Indoor Environment Inspection with the items as follows : – Sound level – Heat stress – CO, CO_2, PM-10, Ozone, Total VOCs – Temperature – Relative humidity – Air velocity – Light intensity	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-035, PR-TH-I&E-IN-036, PR-TH-I&E-IN-038, PR-TH-I&E-IN-050, PR-TH-I&E-IN-051, PR-TH-I&E-IN-052, PR-TH-I&E-IN-054, and PR-TH-I&E-IN-055 – Customer's requirement – Related laws and regulations
	Outdoor Environment Inspection, the items as follows : – Continuous Emission Monitoring System : CEMS (CO, SO_2, NO_2, O_2, CO_2, NO, and NO_x)	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-015 and PR-TH-I&E-IN-032 – Customer's requirement – Related laws and regulations
	Water Inspection, the items as follows : – Water sampling – Physical appearance (Color, Suspended Solids) – pH – Temperature – Dissolved Oxygen : DO – Conductivity – Salinity – Turbidity Excludes laboratory analysis result	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-043 – Customer's requirement – Related laws and regulations

Scope of Accreditation for Inspection Body
Certificate No. 25-IB0009

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
10. Agricultural Products : Wheat and soybean meal (Head Office and Sriracha Office	General appearance inspection, Sampling, and weighing observation	– GAFTA Weighing Rules No. 123 – GAFTA Sampling Rules No.124 – Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-006 – Customer's requirement
11. Factory inspection of hazardous substance manufacturer (under the responsibility of the Food and Drug Administration) (Head office)	Inspection of physical location and production processes regarding the management of quality, sanitation and safety	– Criteria for Good Manufacturing Practice for Hazardous Substances under the Responsibility of the Food and Drug Administration – Procedure of SGS (Thailand) Limited : THLPP.3100

Valid from : 26 February B.E. 2568 (2025)
Until : 10 September B.E. 2569 (2026)
Issue Date : 24 April B.E. 2568 (2025)

Date of Initial Issue : 11 September BE. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

แบบ กมช./สมอ.๒
Form NSC/TISI 2

ใบรับรองเลขที่ 23-LB0119
(Certificate No.)

ใบรับรองระบบงาน
(Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท เอสจีเอส (ประเทศไทย) จำกัด ห้องปฏิบัติการทดสอบสิ่งแวดล้อม (สาขาระยอง)
(SGS (Thailand) Limited, Environmental Laboratory (Rayong Branch))

ตั้งอยู่เลขที่
(Address)

๑/๒๐๙ และ ๑/๒๑๑ หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง
1/209 and 1/211 Moo 1, Ban Chang, Ban Chang, Rayong

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 ๐๔๗๐
(Accreditation No. Testing 0470)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้รับรอง 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 ๒๐ กุมภาพันธ์ พ.ศ. ๒๕๖๖
(Issue date : 20 February B.E. 2566 (2023))

รองเลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
ปฏิบัติราชการแทน
เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

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กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)

ภาคผนวก ค

สำเนาใบรับรองการสอบเทียบเครื่องมือการตรวจวัด

Meter Console Verification

Dry Gas Meter ID.	: ENSS 071	**Date of Calibration**	: 12-Aug-2025
Instrument Brand	: Apex / Model 572	**Calibrated By**	: SY

Wet gas meter Information

Wet gas Brand	: Shinagawa	**Wet gas S/N**	: 544122
Wet gas Model	: W-NK-2.5A	**Expire Date**	: 10-Jun-2027

Orifice Setting ΔH@ (mm H_2O)	Wet gas		Metering System		Time (min)	Yi	ΔH@
	V_w (L)	T_w (°C)	V_d (L)	T_m (°C)			
13	139.52	25.2	140.0	21.5	12.28	0.9830	49.805
13	139.28	25.2	140.0	22.0	12.26	0.9829	49.626
26	138.42	25.0	140.0	22.0	8.49	0.9763	50.526
26	138.32	24.9	140.0	22.5	8.50	0.9776	50.671
40	277.34	24.9	280.0	23.0	14.31	0.9805	52.334
40	277.68	24.6	280.0	23.0	14.32	0.9826	52.238
50	275.34	24.3	280.0	23.5	12.54	0.9760	52.180
50	275.48	24.1	280.0	24.0	12.53	0.9788	51.835
70	273.06	23.9	280.0	24.0	10.45	0.9689	51.456
70	273.56	23.8	280.0	24.0	10.45	0.9712	51.216
90	270.90	23.6	280.0	24.0	9.26	0.9604	51.755
90	272.32	22.8	280.0	24.0	9.26	0.9563	52.202
Average						**0.9745**	**51.320**

Remark : Yi ≤ ± 0.02 from average
Yi = 1.00 ± 0.05
ΔH@ ≤ ± 5.08 mm.H_2O from average
ΔH@ = 46.7 ± 6.4 mm.H_2O

Temperature Display Verification

Dry Gas Meter ID.	: ENSS 071	**Date of Calibration**	: 12-Aug-2025
Instrument Brand	: Apex / Model 572	**Calibrated By**	: PK

Temperature Simulator Information

Simulator Brand	: Handy Cal	**Simulator S/N**	: T1L1015
Simulator Model	: CA11E	**Expire Date**	: 24-Jul-2026

Standard Value	Instrument Display				
	Stack	Probe	Filter	Aux	Exit
300	300	300	300	301	-
200	200	201	200	201	-
150	150	151	151	152	-
100	101	101	101	102	-
50	50	50	50	51	51
0	0	0	0	1	1
Difference	**0.3%**	**1.0**	**1.0**	**2.0**	**1.0**

Remark : Stack ≤ ± 1.5 % Absolute
Probe ≤ ± 3.0 °C
Filter ≤ ± 3.0 °C
Aux ≤ ± 3.0 °C
Exit ≤ ± 3.0 °C

SGS (Thailand) Limited | 238 TRR Tower, 19th -21st Floor, Narachiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120 t +66 (0)2 678 18 13 www.sgs.co.th
Member of the SGS Group

Prob Nozzle Diameter Calibration Data Sheet

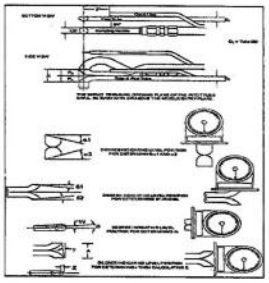
Date	05/01/2026	Personal	CS
Vernier (Digital)	Dial Caliper	Reference	MINV08
Nozzle ID	ENSS 092 Stainless Steel	Expire Date	05/01/2027

Nozzle No.	Nozzle Diameter (mm)			HI-Lo	D_{avg}
	D1	D2	D3	ΔD	
1	3.02	3.00	3.00	0.02	3.01
2	4.48	4.42	4.42	0.06	4.44
3	5.80	5.84	5.82	0.04	5.82
4	6.22	6.32	6.24	0.10	6.26
5	7.60	7.50	7.50	0.10	7.53
6	9.04	9.02	9.08	0.06	9.05
7	10.90	10.98	10.92	0.08	10.93

Remark : ΔD = Maximum distance between any two diameters, must be ≤ 0.100 mm
D_{avg} = (D1+D2+D3)/3

Certificate of Calibration

S-Type Geometric Pitot Tube Calibration
See the Code of Federal Regulations, Title 40, Part 60, Appendix A, Method 2, Item 4



Pitot tube/Probe No. No.56/A10401

Parameter	Value	Allowable Range	Check
Assembly Level?	Y	Yes or y	PASS
Ports Damaged?	N	No or n	PASS
$\alpha 1$	2	$-10° < \alpha 1 < +10°$	PASS
$\alpha 2$	0.4	$-10° < \alpha 1 < +10°$	PASS
$\beta 1$	-0.4	$-5° < \alpha 1 < +5°$	PASS
$\beta 2$	-1.1	$-5° < \alpha 1 < +5°$	PASS
γ	0.6	N/A	-
θ	0.6	N/A	-
D_t	0.375	0.188" to 0.375"	PASS
A	0.953543	$2.1D_t \leq A \leq 3.00_t$	PASS
$A/2D_t$	1.271391	$1.05 \leq P_A/D_t \leq 1.5$	PASS
$Z = A \tan \gamma$	0.009986	$Z \leq 0.125"$	PASS
$W = A \tan \theta$	0.009986	$W \leq 0.031"$	PASS

I certify that pitot tube/probe No.56/A10401 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification factor of 0.84. See 40 CFR Pt. 60, App A, EPA Method 2

Standard Device

Device Name	Digital Inclinometer	**Expiration data**	14-Nov-26
Manufacturer	BASELINE	**ENSS No.**	ENSS 22159
Model	12-1057		
ID No.	QC-1824		

KINETICS
บริษัท ไคเนติคส์ คอร์ปอเรชัน จำกัด
KINETICS CORPORATION LTD.

A-AQM 17005

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand)Co., Ltd. วันที่ : 26 กุมภาพันธ์ 2568
รายชื่ออุปกรณ์ / เครื่องมือ : SO_2 Analyzer บริษัทผู้ผลิต : Teledyne API
รุ่นของอุปกรณ์ / เครื่องมือ : T100 หมายเลขอุปกรณ์ / เครื่องมือ : 1771

TEST VALUES				
	API MODEL T100		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	SO2 STABILITY	≤ 1 PPB	0.10	0.10
3	PRESSURE	25 - 35 in - Hg-A	27.7	27.5
4	SAMPLE FLOW	700 ± 10% cc/min	660.0	655
5	PMT	mV	51.5	77.6
6	NORM PMT	mV	63.4	93.2
7	UV LAMP	1000 - 4800 mV	3541.3	3646.5
8	LAMP RATIO	30 To 120 %	86.3	86.3
9	STRAY LIGHT	≤ 100 PPB	66.8	66.2
10	DARK PMT	-50 ± 200 % mV	20.9	36.0
11	DARK LAMP	-50 ± 200 % mV	5.0	4.1
12	SO2 SLOPE	1.0 ± 0.3	1.850	1.026
13	SO2 OFFSET	< 250 mV	61.5	90.1
14	HVPS	400 - 900 V	577	546
15	RX CELL TEMP	50 ± 1 °C	50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C	31.5	31.5
17	PMT TEMP	7 ± 2 °C	8.5	8.5
18	SO2 SAMPLE READING	PPB	1.8	1.4
19	OPTIC TEST	2000 ± 1000 mV	1483.0	1480.1
20	ELECTRICAL TEST	2000 ± 1000 mV	1004.0	1104.2
21	VOLTAGE TEST	+5 V +12 V -15 V -15 V	5.19/ 11.66/-16.43/-15.48	5.19/ 11.66/-16.43/-15.48
22	ZERO GAS	0.00 PPB	4.7	0.1
23	SPAN GAS	400.00 PPB	475.4	399.8

หมายเหตุ
- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น,Rebuild Kit Pump 1 set.
- ทำการ Calibrate Multi-Point

KINETICS
บริษัท ไคเนติคส์ คอร์ปอเรชัน จำกัด
KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand)Co., Ltd. วันที่ : 19 มีนาคม 2568
รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer บริษัทผู้ผลิต : Teledyne API
รุ่นของอุปกรณ์ / เครื่องมือ : T200 หมายเลขอุปกรณ์ / เครื่องมือ : 2199

TEST VALUES				
	API MODEL T200		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	STABILITY	≤ 1 PPB	0.1	0.1
3	SAMPLE FLOW	500 ± 10% cc/min	508	510
4	OZONE FLOW	80 ± 10% cc/min	87	87
5	PMT	mV	111.4	73.6
6	NORM PMT	mV	-5.4	1.9
7	A ZERO	-50 To 150 MV	12.3	74.7
8	HVPS	400 - 900 V	669	661
9	RX CELL TEMP	50 ± 1 °C	50.0	50.0
10	BOX TEMP	AMBIENT ± 5 °C	29.8	30.2
11	PMT TEMP	7 ± 2 °C	7.0	7.0
12	MOLY TEMP	315 ± 5 °C	314.0	316.0
13	RX CELL PRESSURE	<10 in - Hg-A	11.9	11.6
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	28.9	29.3
15	NOX SLOPE	1.0 ± 0.3	0.993	1.004
16	NOX OFFSET	-50 To 150	25.3	-0.6
17	NO SLOPE	1.0 ± 0.3	0.934	0.995
18	NO OFFSET	-50 To 150	-2.7	-2.5
19	NO SAMPLE READING	PPB	-1.0	2.5
20	NOX SAMPLE READING	PPB	-6.2	8.3
21	NOX SAMPLE READING	PPB	-7.3	8.8
22	OPTIC TEST	2000 ± 1000 mV	1982.4	1981.2
23	ELECTRICAL TEST	2000 ± 1000 mV	2340.1	2236.3
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.28/ 12.32/15.86/-15.07	5.28/ 12.32/15.86/-15.07
25	ZERO GAS NO/NOx	0.00/0.00 PPB	0.2/ -13.2	0.0 / 0.1
26	SPAN GAS NO/NOx	400.00/400.00 PPB	412.8 / 408.6	400.1 / 402.0

หมายเหตุ
- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 3 ชิ้น, O-ring 8 ชิ้น
- ทำการCalibrate Multi-point

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KINETICS CORPORATION LTD.

AQM 17002

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน :SGS (Thailand) Co., Ltd. วันที่ : 26 กุมภาพันธ์ 2568
รายชื่ออุปกรณ์ / เครื่องมือ : SO_2 Analyzer บริษัทผู้ผลิต : Teledyne API
รุ่นของอุปกรณ์ / เครื่องมือ : T100 หมายเลขอุปกรณ์ / เครื่องมือ : 1385

TEST VALUES				
	API MODEL T100		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	SO2 STABILITY	≤ 1 PPB	0.1	0.2
3	PRESSURE	25 - 35 in - Hg-A	27.7	27.5
4	SAMPLE FLOW	700 ± 10% cc/min	660.0	655
5	PMT	mV	65.0	34.0
6	NORM PMT	mV	70.5	39.0
7	UV LAMP	1000 - 4800 mV	3589.0	3490.7
8	LAMP RATIO	30 To 120 %	99.4	94.4
9	STRAY LIGHT	≤ 100 PPB	108.7	18.5
10	DARK PMT	-50 ± 200 % mV	68.0	80.8
11	DARK LAMP	-50 ± 200 % mV	1.1	1.1
12	SO2 SLOPE	1.0 ± 0.3	3.551	1.035
13	SO2 OFFSET	< 250 mV	61.2	36.3
14	HVPS	400 - 900 V	614	591
15	RX CELL TEMP	50 ± 1 °C	50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C	32.4	31.8
17	PMT TEMP	7 ± 2 °C	8.8	8.7
18	SO2 SAMPLE READING	PPB	16.2	1.1
19	OPTIC TEST	2000 ± 1000 mV	3335.9	2296.8
20	ELECTRICAL TEST	2000 ± 1000 mV	1871.2	1970.4
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.19/ 12.11/-16.31/-16.31	5.19/ 12.11/-16.31/-16.31
22	ZERO GAS	0.00 PPB	8.3	0.1
23	SPAN GAS	400.00 PPB	451.9	400.2

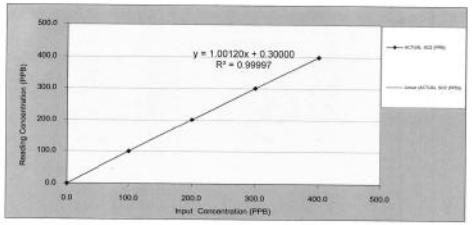
หมายเหตุ
- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น
- ทำการ Calibrate Multi-Point

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.
EQUIPMENT NAME : SO_2 Analyzer
MANUFACTURER : Teledyne - API | MODEL : T100 | SERIAL NUMBER : 1771
STANDARD GAS CONCENTRATION (PPM) : 53.79 | CYLINDER NO : EB0169291
CYLINDER PRESSURE (PSIG) : 1550 | CERTIFIED DATE : Nov 08, 2023
CERTIFIED BY : AIRGAS SPECIALTY GASES | EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO_2 (PPB)	ERROR SO_2 (PPB)	% ERROR SO_2
ZERO	0.0	0.1	0.1	-
1	100.0	99.8	-0.2	-0.2
2	200.0	201.4	1.4	0.7
3	300.0	301.6	1.6	0.5
4	400.0	399.8	-0.2	0.0
AVERAGE (%)				0.4



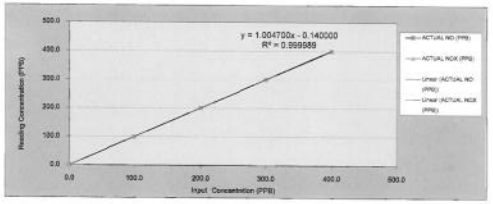
CALIBRATED BY : คุณธนาคม มหาอาจ | DATE 26 กุมภาพันธ์ 2568
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์ : 02-515-8987
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.
EQUIPMENT NAME : NO_x Analyzer
MANUFACTURER : Teledyne - AP | MODEL : T200 | SERIAL NO : 2199
STANDARD GAS CONCENTRATION (PPM) : 53.16 | CYLINDER NO : EB0169291
CYLINDER PRESSURE (psig) : 1550 | CERTIFIED DATE : Nov 08, 2023
CERTIFIED BY : AIRGAS SPECIALTY GASES | EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO_x (PPB)	ERROR NO_x (PPB)	% ERROR NO_x
ZERO	0.0	0.0	0.0	-	0.1	0.1	-
1	100.0	98.8	-1.2	-1.2	98.8	-0.2	-0.2
2	200.0	201.0	1.0	0.5	201.4	1.4	0.7
3	300.0	300.2	0.2	0.1	300.7	0.7	0.2
4	400.0	400.1	0.1	0.0	402.0	2.0	0.5
AVERAGE (%)				0.5			0.4



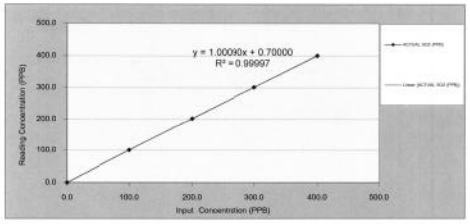
CALIBRATED BY : คุณธนาคม มหาอาจ | DATE : 19 มีนาคม 2568
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์ : 02-515-8987
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.
EQUIPMENT NAME : SO_2 Analyzer
MANUFACTURER : Teledyne - API | MODEL : T100 | SERIAL NUMBER : 1385
STANDARD GAS CONCENTRATION (PPM) : 53.56 | CYLINDER NO : EB0169291
CYLINDER PRESSURE (PSIG) : 2000 | CERTIFIED DATE :Nov 08, 2023
CERTIFIED BY : AIRGAS SPECIALTY GASES | EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO_2 (PPB)	ERROR SO_2 (PPB)	% ERROR SO_2
ZERO	0.0	0.1	0.1	-
1	100.0	100.7	0.7	0.7
2	200.0	202.0	2.0	1.0
3	300.0	301.4	1.4	0.5
4	400.0	400.2	0.2	0.0
AVERAGE (%)				0.6



CALIBRATED BY : คุณธนาคม มหาอาจ | DATE 26 กุมภาพันธ์ 2568
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์ : 02-515-8987
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

AAGM 2200.2

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KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน :SGS (Thailand) Co., Ltd.
รายชื่ออุปกรณ์ / เครื่องมือ : SO_2 Analyzer
รุ่นของอุปกรณ์ / เครื่องมือ : T100
วันที่ : 26 กุมภาพันธ์ 2568
บริษัทผู้ผลิต : Teledyne API
หมายเลขอุปกรณ์ / เครื่องมือ : 6200

TEST VALUES				
	API MODEL T100		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	SO2 STABILITY	≤ 1 PPB	0.18	0.09
3	PRESSURE	25 - 35 in - Hg-A	29.6	29.5
4	SAMPLE FLOW	700 ± 10% cc/min	660.9	661
5	PMT	mV	90.4	90.6
6	NORM PMT	mV	39.7	125.6
7	UV LAMP	1000 - 4800 mV	2405.0	2429.5
8	LAMP RATIO	30 To 120 %	79.7	79.5
9	STRAY LIGHT	≤ 100 PPB	66.3	69.5
10	DARK PMT	-50 ± 200 % mV	176.0	132.4
11	DARK LAMP	-50 ± 200 % mV	1.7	1.4
12	SO2 SLOPE	1.0 ± 0.3	3.313	1.069
13	SO2 OFFSET	< 250 mV	40.0	130.1
14	HVPS	400 - 900 V	653	645
15	RX CELL TEMP	50 ± 1 °C	50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C	32.1	31.4
17	PMT TEMP	7 ± 2°C	8.2	8.3
18	SO2 SAMPLE READING	PPB	-1.744	0.524
19	OPTIC TEST	2000 ± 1000 mV	2395.0	2391.8
20	ELECTRICAL TEST	2000 ± 1000 mV	2775.0	2774.8
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.19/ 12.08 /15.85 /-15.18	5.19/ 12.08 /15.85 /-15.18
22	ZERO GAS	0.00 PPB	-1.940	0.126
23	SPAN GAS	400.00 PPB	421.700	398.086

หมายเหตุ
- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น
- ทำการ Calibrate Multi-Point

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KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน :SGS (Thailand) Co., Ltd.
รายชื่ออุปกรณ์ / เครื่องมือ : SO_2 Analyzer
รุ่นของอุปกรณ์ / เครื่องมือ : T100
วันที่ : 13 พฤศจิกายน 2567
บริษัทผู้ผลิต : Teledyne API
หมายเลขอุปกรณ์ / เครื่องมือ : 2512

TEST VALUES				
	API MODEL T100		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	SO2 STABILITY	≤ 1 PPB	0.52	0.06
3	PRESSURE	25 - 35 in - Hg-A	28.1	28.1
4	SAMPLE FLOW	700 ± 10% cc/min	665.0	663
5	PMT	mV	93.8	126.2
6	NORM PMT	mV	60.5	116.1
7	UV LAMP	1000 - 4800 mV	3204.0	3212.0
8	LAMP RATIO	30 To 120 %	90.8	91.0
9	STRAY LIGHT	≤ 100 PPB	27.1	62.7
10	DARK PMT	-50 ± 200 % mV	39.6	25.0
11	DARK LAMP	-50 ± 200 % mV	1.8	1.8
12	SO2 SLOPE	1.0 ± 0.3	1.033	1.098
13	SO2 OFFSET	< 250 mV	52.4	113.3
14	HVPS	400 - 900 V	566	613
15	RX CELL TEMP	50 ± 1 °C	50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C	30.7	30.0
17	PMT TEMP	7 ± 2 °C	8.6	8.6
18	SO2 SAMPLE READING	PPB	4.1	1.1
19	OPTIC TEST	2000 ± 1000 mV	1600.0	1600.0
20	ELECTRICAL TEST	2000 ± 1000 mV	1850.0	1850.0
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.06/ 12.19 /15.93 /-15.76	5.06/ 12.19 /15.93 /-15.76
22	ZERO GAS	0.00 PPB	5.1	0.8
23	SPAN GAS	400.00 PPB	260.4	400.2

หมายเหตุ
- ทำการเปลี่ยน Filter as 1ea.Spring 1ea.O-ring 2ea.Filter47mm. 1ea.
- ทำการ Calibrate Multi-Point

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ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.
รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer
รุ่นของอุปกรณ์ / เครื่องมือ : T200
วันที่ : 16 กรกฎาคม 2568
บริษัทผู้ผลิต : Teledyne API
หมายเลขอุปกรณ์ / เครื่องมือ : 2975

TEST VALUES				
	API MODEL T200		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	STABILITY	≤ 1 PPB	0.0	0.3
3	SAMPLE FLOW	500 ± 10% cc/min	501	500
4	OZONE FLOW	80 ± 10% cc/min	82	82
5	PMT	mV	58.6	98.1
6	NORM PMT	mV	29.8	32.8
7	A ZERO	-20 To 150 MV	91.2	39.9
8	HPVS	400 - 900 V	775	775
9	RX CELL TEMP	50 ± 1 °C	50.0	50.0
10	BOX TEMP	AMBIENT ± 5 °C	28.4	28.1
11	PMT TEMP	7 ± 3 °C	7.4	7.5
12	MOLY TEMP	315 ± 5 °C	315.0	314.0
13	RX CELL PRESSURE	<10 in - Hg-A	4.3	4.9
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	29.0	29.0
15	NOX SLOPE	1.0 ± 0.3	1.031	0.998
16	NOX OFFSET	-50 To 150	24.0	1.8
17	NO SLOPE	1.0 ± 0.3	0.936	0.944
18	NO OFFSET	-50 To 150	-1.8	-1.1
19	NO SAMPLE READING	PPB	2.3	0.0
20	NO2 SAMPLE READING	PPB	9.1	2.5
21	NOX SAMPLE READING	PPB	11.9	3.1
22	OPTIC TEST	2000 ± 1000 mV	1131.2	1142.5
23	ELECTRICAL TEST	2000 ± 1000 mV	1258.0	1258.1
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.26 / 12.44 /15.86 /-15.28	5.26 / 12.44 /15.86 /-15.28
25	ZERO GAS NO/NOx	0.00/0.00 PPB	0.5 / -0.4	0.0 / 0.1
26	SPAN GAS NO/NOx	400.00/400.00 PPB	410.8 / 412.6	399.8 / 400.2

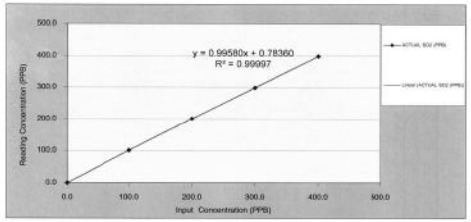
หมายเหตุ
- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 3 ชิ้น, O-ring 6 ชิ้น
- ทำการCalibrate Multi-point

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.			
EQUIPMENT NAME : SO_2 Analyzer			
MANUFACTURER : Teledyne - API	MODEL : T100	SERIAL NUMBER : 6200	
STANDARD GAS CONCENTRATION (PPM) : 53	53.56	CYLINDER NO : EB0169291	
CYLINDER PRESSURE (PSIG) : 2000		CERTIFIED DATE : Nov 08, 2023	
CERTIFIED BY : AIRGAS SPECIALTY GASES		EXPIRED DATE : Nov 08, 2031	

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO_2 (PPB)	ERROR SO_2 (PPB)	% ERROR SO_2
ZERO	0.000	0.128	0.13	-
1	100.000	100.786	0.79	0.79
2	200.000	201.046	1.05	0.52
3	300.000	298.669	-1.33	-0.44
4	400.000	399.086	-0.91	-0.23
AVERAGE (%)				0.49



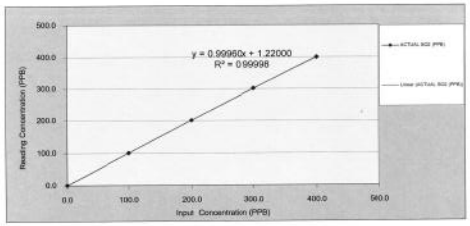
CALIBRATED BY : ศูนย์บางนา มหาชน | DATE : 26 กุมภาพันธ์ 2568
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : ศูนย์บางนา มหาชน โทรศัพท์ : 02-515-8987
เลขที่ 388 ถนนบริดจ์เวิลด์ แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.			
EQUIPMENT NAME : SO_2 Analyzer			
MANUFACTURER : Teledyne - API	MODEL : T100	SERIAL NUMBER : 2512	
STANDARD GAS CONCENTRATION (PPM) : 53.79		CYLINDER NO : CC745169	
CYLINDER PRESSURE (PSIG) : 1550		CERTIFIED DATE : Mar 10, 2021	
CERTIFIED BY : AIRGAS SPECIALTY GASES		EXPIRED DATE : Mar 10, 2029	

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO_2 (PPB)	ERROR SO_2 (PPB)	% ERROR SO_2
ZERO	0.0	0.8	0.8	-
1	100.0	101.2	1.2	1.2
2	200.0	201.5	1.5	0.8
3	300.0	302.0	2.0	0.7
4	400.0	400.2	0.2	0.0
AVERAGE (%)				0.7



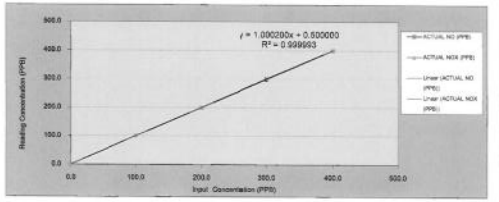
CALIBRATED BY : ศูนย์บางนา มหาชน | DATE : 13 /11 /2567
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : ศูนย์บางนา มหาชน โทรศัพท์ : 02-515-8987
เลขที่ 388 ถนนบริดจ์เวิลด์ แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.			
EQUIPMENT NAME : NO_x Analyzer			
MANUFACTURER : Teledyne - API	MODEL : T200		SERIAL NO : 2975
STANDARD GAS CONCENTRATION (PPM) :	53.16		CYLINDER NO : EB0169291
CYLINDER PRESSURE (psig) : 1550			CERTIFIED DATE : Nov 08, 2023
CERTIFIED BY : AIRGAS SPECIALTY GASES			EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO_x (PPB)	ERROR NO_x (PPB)	% ERROR NO_x
ZERO	0.0	0.0	0.0	-	0.1	0.1	-
1	100.0	100.2	0.2	0.2	101.0	1.0	1.0
2	200.0	199.7	-0.3	-0.2	200.4	0.4	0.2
3	300.0	298.9	-1.1	-0.4	301.0	1.0	0.3
4	400.0	399.8	-0.2	0.0	400.2	0.2	0.0
AVERAGE (%)				0.2			0.4



CALIBRATED BY : ศูนย์บางนา มหาชน | DATE : 16 กรกฎาคม 2568
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : ศูนย์บางนา มหาชน โทรศัพท์ : 02-515-8987
เลขที่ 388 ถนนบริดจ์เวิลด์ แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 26 June, 2025 Certification No. 315/25

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 ID No. : ENAB085

Mfg Code : Display AK130626046 Transmitter AM149127096

Customer : SGS (Thailand) Limited. (Head Office)
238 TRR Tower, 19th-21st Floor, Narradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1008.9 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Tes: Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02849057

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MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand Co., Ltd.

EQUIPMENT NAME : NO_x Analyzer

MANUFACTURER : Teledyne - API | MODEL : T200 | SERIAL NO : 7534

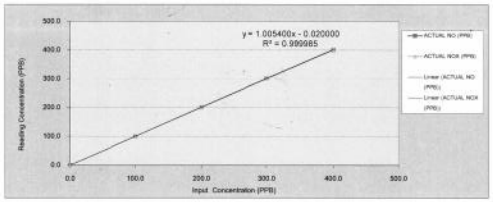
STANDARD GAS CONCENTRATION(PPM) : 53.16 | CYLINDER NO : EB0160291

CYLINDER PRESSURE (psig) : 2000 | CERTIFIED DATE : Nov 08,2023

CERTIFIED BY : AIRGAS SPECIALTY GASES | EXPIRED DATE : Nov 08,2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO_x (PPB)	ERROR NO_x (PPB)	% ERROR NO_x
ZERO	0.0	0.1	0.1	-	0.1	0.1	-
1	100.0	99.7	-0.3	-0.3	99.8	-0.2	-0.2
2	200.0	201.4	1.4	0.7	202.0	2.0	1.0
3	300.0	300.8	0.8	0.3	301.4	1.4	0.5
4	400.0	401.0	1.0	0.3	402.0	2.0	0.5
AVERAGE (%)				0.4			0.6



CALIBRATED BY : คุณสมาน มหาชาติ | DATE : 6/02/2568

ต้องการข้อมูลหรือคำแนะนำเพิ่มเติม: คุณสมาน มหาชาติ โทรศัพท์: 02-015-6967

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

KINETICS

Customer service report

บริษัท เอส จี เอส (ประเทศไทย) จำกัด

Manufacturer	Equipment	Model
Teledyne API	NOx Analyzer	T200

S/N 7534

Quotation

● Checking Date ●

6/02/2568

● Problem

- 03 Flow Warning



B2

contact us

● Correlation working / Remark

1 ทำการเปลี่ยน Flow Meter 1 ชิ้น,Sintered Filter 3 ชิ้น , Spring 3 ชิ้น O-ring 6 ชิ้น

2 ทำการ Calibrate Multi-point

● Repair parts ●

Flow Meter 1 ชิ้น,Sintered Filter 3 ชิ้น , Spring 3 ชิ้น , O-ring 6 ชิ้น

[redacted]

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 315/25

26 June, 2025 Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.9	0.10
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.9	0.11
13.01	-	-	-	13.0	0.31
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.32
20.02	-	-	-	19.3	0.72

Vane Angel Bench Stand Model 18112 Young Meteorological Instruments	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180

[redacted]

Airgas

An Air Liquide company

Airgas Specialty Gases
Airgas USA LLC
6141 Easton Road
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL GAS CO LTD

Part Number: E04NI99E80ACP0C
Cylinder Number: LL164665
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402557716-1
Cylinder Volume: 83.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Oct 21, 2022

Expiration Date: Oct 21, 2025

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA-600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 150 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.01 PPM	G1	+/- 1.3% NIST Traceable	10/13/2022, 10/21/2022
NITRIC OXIDE	45.00 PPM	45.01 PPM	G1	+/- 1.2% NIST Traceable	10/13/2022, 10/21/2022
SULFUR DIOXIDE	45.00 PPM	45.11 PPM	G1	+/- 0.9% NIST Traceable	10/13/2022, 10/21/2022
CARBON MONOXIDE	4500 PPM	4511 PPM	G1	+/- 0.8% NIST Traceable	10/14/2022
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	210607-21	CC708065	48.41 PPM NITRIC OXIDE/NITROGEN	+/- 1.2%	Sep 21, 2029
PRM	12386	D887660	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 22, 2022
GMIS	12420999B110	CC322574	4.470 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 25, 2025
NTRM	160102-32	KAL004082	97.59 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
NTRM	08012355	KAL004734	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

The SRM, PRM or RGM noted above is only in reference to the GMIS used in this assay, and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1KD579	NDIR	Sep 22, 2022
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Oct 20, 2022
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Oct 06, 2022
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Sep 29, 2022

Triad Data Available Upon Request

NOTES:PO# 5222004798
Gross Weight: 17.2 Kg
Net Weight: 2.7 Kg
Cylinder: 80A

Page 1 of 1

[redacted]

KINETICS

บริษัท โคเนติคส์ คอร์ปอเรชัน จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd. วันที่ : 6 กุมภาพันธ์ 2568

รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T200 หมายเลขอุปกรณ์ / เครื่องมือ : 7534

	TEST VALUES			
	AP MODEL T200		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	STABILITY	≤ 1 PPB	0.12	0.09
3	SAMPLE FLOW	500 ± 10% cc/min	469	481
4	OZONE FLOW	80 ± 10% cc/min	0	80
5	PMT	mV	114.5	72.9
6	NORM PMT	mV	-5.9	99.8
7	A-ZERO	-20 To 150 MV	xxx	71.8
8	HVPS	600 - 900 V	650	642
9	RX CELL TEMP	50 ± 1°C	50.0	50.0
10	BOX TEMP	AMBIENT ± 5°C	31.0	30.0
11	PMT TEMP	7 ± 2°C	7.0	7.1
12	MOLY TEMP	315 ± 5°C	315.2	315.1
13	RX CELL PRESSURE	<10 in - Hg-A	4.1	4.1
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	28.5	28.8
15	NOX SLOPE	1.0 ± 0.3	0.891	1.000
16	NOX OFFSET	-50 To 150	-31.4	-4.2
17	NO SLOPE	1.0 ± 0.3	0.877	0.990
18	NO OFFSET	-50 To 150	-31.00	-5.60
19	NO SAMPLE READING	PPB	11.0	7.7
20	NO2 SAMPLE READING	PPB	0.5	22.5
21	NOX SAMPLE READING	PPB	11.5	30.2
22	OPTIC TEST	2000 ± 1000 mV	2068.2	2071.3
23	ELECTRICAL TEST	2000 ± 1000 mV	2405.6	2455.6
24	VOLTAGE TEST	+5 V +12 V -15 V -15 V	5.17 /12.00 /15.38 /-15.18	5.17 /12.00 /15.38 /-15.18
25	ZERO GAS NO/NOx	0.00/0.00 PPB	9.2 / 10.6	0.1 / 0.1
26	SPAN GAS NO/NOx	400.00/400.00 PPB	480.1 / 482.0	401.0 / 402.0

หมายเหตุ

- 03 Flow Warning
- ทำการเปลี่ยน Flow Meter 1 ชิ้น,Sintered Filter 3 ชิ้น, Spring 3 ชิ้น, O-ring 6ชิ้น
- ทำการ Calibrate Multi-Point

[redacted]

ต้องการข้อมูลหรือคำแนะนำเพิ่มเติม: คุณสมาน มหาชาติ โทรศัพท์: 02-015-6967
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 315/25

26 June, 2025

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
87.24	92	-4.76
65.15	68	-2.85
45.23	47	-1.77

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 315/25

26 June, 2025

Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction (mmHg)
755.52	755.4	0.12
755.12	755.0	0.12
755.30	755.2	0.10
755.49	755.3	0.19
755.79	755.6	0.19
755.93	755.8	0.13
756.07	755.9	0.17
756.27	756.1	0.17
756.57	756.4	0.17
756.76	756.6	0.16
754.13	754.0	0.13
754.44	754.3	0.14
754.80	754.7	0.10
755.21	755.1	0.11
755.80	755.7	0.10
756.02	755.9	0.12
756.44	756.3	0.14
756.75	756.6	0.15
756.98	756.8	0.18

Date of Issue 26 June, 2025

Certification No. 315/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152C Mfg. Code. AMI40127096 ทำการสอบเทียบกับแก้ววัดฝนแบบแก้ววาง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in./TIP)

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 315/25

26 June, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.6	45.4	0.2
30.2	30.1	0.1
15.6	15.7	-0.1

SITHIPORN associates

SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : ACL25207
Job No. : VC68AC0104
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KM	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Electrical Anc Electronics Institute (EEI).

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7 SOI MOO 13, SOI SUNTINAKORN 13 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0668-2116-5860-1 FAX: 0668-2116-7140

Certificate No 24-ACT-134
Request No Req-2024-2000

Decision Rule for Statement of Conformity

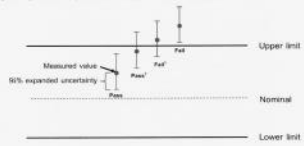
The standard decision rule employed for the statements of conformity in each calibration result will be applied using ILAC-G8:09/2019: Guidelines on the Reporting of Compliance with Specification a following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass' = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail' = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Calibration

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7 SOI MOO 13, SOI SUNTINAKORN 13 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0668-2116-5860-1 FAX: 0668-2116-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok 10120

Certificate No 24-ACT-134
Request No Req-2024-2000

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : CIRRUS
Model : CR:515
Serial Number : 81971
ID : ENSL 17153

Class : 1
Range : 94 dB / 1000 Hz
Instrument Status : Used

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 27 August 2024
Calibration Date : 23 September 2024
Location of Calibration : LAB 1 Acoustic
Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Seria Number	Traceable	Duc Calibration
Sound Calibrator	SV 35A	38079	EEI	12 June 2025
THD Multimeter	2015	1047765	NIMT	16 January 2025

Traceability : This certificate providoes traceability of measurement to recognized national standard, and to the realization of the international System ofUnits (SI).

Note

SITHIPORN associates

SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : ACL25207
Job No. : VC68AC0104
Pages : 3 of 8

Summary of Measurement Result :

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

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-453 Srinthorn Road, Bangbumru, Bangplad, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN associates

Cert. No. : ACL25207
Pages : 1 of 8

Calibration Certificate

ENSL 17116

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-53 / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00452077 / 26812 / 55057
ID No.: -

Condition As Found : GOOD

Customer : SGS (THAILAND) LIMITED.
238 TRR TOWER, 19th-21st FLOOR,
NARADHIWAS RAJANAGARINDRA ROAD,
CHONG NONSI, YANNAWA, BANGKOK 10120
THAILAND.

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

Received Date : 22 MAY 2025
Calibration Date : 27 MAY 2025
Date of Issue : 29 MAY 2025

Calibrated by : Nathakorn Pisutpaisan

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7 SOI MOO 13, SOI SUNTINAKORN 13 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0668-2116-5860-1 FAX: 0668-2116-7140

Certificate No 24-ACT-134
Request No Req-2024-2000

Sound pressure level **Calibration Results :** Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)	Acceptance limit Class 1 (± dB)	Result
	Measured	Deviated value	Measured	Deviated value			
94 dB / 1000 Hz	93.79	-0.21	-	-	0.13	0.25	Pass

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
	Measured (Hz)	Deviated	Measured (Hz)	Deviated			
94 dB / 1000 Hz	1000.00	0.00	-	-	0.01	0.70	Pass

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment Measured (%)	Adjustment Measured (%)	Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
94 dB / 1000 Hz	0.15	-	0.40	2.5	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
Sound pressure level	0.15 dB
Frequency	0.20%
Total distortion+noise	0.50%

- Acceptance limit was IEC60942:2017 Class 1
- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

Cert. No. : ACL25207
Job No. : VC68AC0104
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	30.0	0.0	±2.0
One	133.4	33.4	0.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	33.0	0.0	±1.0
Positive half cycle	135.4	35.1	-0.3	±1.0
Negative half cycle	135.4	35.1	-0.3	±1.0

11. Overload indication

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

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weigh	137.0	37.0	0.0	±0.1

The reportal uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$

or any value f

Cert. No. : ACL25207
Job No. : VC68AC0104
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	33.9	-0.1	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8

Cert. No. : ACL25207
Job No. : VC68AC0104
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Weighting (dB)
A - weight	11.9
C - weight	15.8
Flat	21.2

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level o' 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.4	0.4	± 1.0
1000	0.2	0.3	0.2	± 0.7
8000	-1.0	-1.0	-1.0	+ 1.5, - 2.5

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bongburinu, Bongplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com

Cert. No. : ACL25208
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER ENSL 25449
Manufacturer : RION
Model : NL-53 / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00452078 / 26813 / 55058
ID No.: -

Condition As Found : GOOD

Customer : SGS (THAILAND) LIMITED.
238 TRR TOWER, 19th-21st FLOOR,
NARADHIWAS RAJANAGARINDRA ROAD,
CHONG NONSI, YANNAWA, BANGKOK 10120
THAILAND.

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

Received Date : 22 MAY 2025
Calibration Date : 27 MAY 2025
Date of Issue : 29 MAY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by : Nichroa B.

This certificate is
other than in full

Cert. No. : ACL25207
Job No. : VC68AC0104
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL25207
Job No. : VC68AC0104
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.1	0.1	±1.0
125	0.1	0.1	0.1	±1.0
250	0.1	0.0	0.0	±1.0
500	0.0	0.1	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	+ 1.5, - 2.5
16000	0.0	-0.7	-0.7	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

Cert. No. : ACL25208
Job No. : VC68AC0104
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	38.9	-0.1	±0.8
34.0	34.0	0.0	±0.8
30.0	29.9	-0.1	±0.8

Cert. No. : ACL25208
Job No. : VC68AC0104
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.7

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

Frequency Weighting	Weighting (IB)
A - weight	13.8
C - weight	16.9
Flat	23.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	-0.5	-0.4	-0.4	+ 1.5, - 2.5

Cert. No. : ACL25208
Job No. : VC68AC0104
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0111-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0112-25	11-FEB-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1030	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Electrical And Electronics Institute (EEI).

Cert. No. : ACL25208
Job No. : VC68AC0104
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL25208
Job No. : VC68AC0104
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 cHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.1	0.1	±1.0
125	0.1	0.1	0.1	±1.0
250	0.1	0.0	0.0	±1.0
500	0.0	0.1	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	+ 1.5, - 2.5
16000	0.0	-0.7	-0.7	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

Cert. No. : ACL25208
Job No. : VC68AC0104
Pages : 3 of 8

Summary of Measurement Result :

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.4	0.0	±2.0

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

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.6	0.1	±1.5

12. High level stability

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

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$

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7 139 MOO 13, SOI SUNTINAKORN II TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 66(0)-2116-7860-1 FAX: 66(0)-2106-7140

Certificate No : 25-NDM-141
Request No : Req-2025-1382

1. Absolute acoustical sensitivity

UUC Setting	Time		Exposur Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 114 dB	120	120	3.53	3.55	+0.6	3.1

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand CASELLA, Model CEL-120/2, SN. 3865036

2. Frequency weightings

UUC Setting	Deviation from various Frequency Weighting		UNCERTAINTY
FAST / 54-140	A	C	
STD Setting	(dB)	(dB)	(± dB)
*63 Hz	-0.4	-0.2	0.40
125 Hz	-0.2	-0.3	0.40
250 Hz	-0.3	-0.5	0.40
500 Hz	-0.2	-0.3	0.40
1000 Hz	0.0	0.0	0.40
2000 Hz	0.7	0.6	0.40
4000 Hz	2.2	2.2	0.40
8000 Hz	0.7	0.7	0.40

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd

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TEL : 66(0)-2116-7860-1 FAX: 66(0)-2106-7140

Certificate No : 25-ACT-035
Request No : Req-2025-0559

Decision Rule for Statements of Conformity

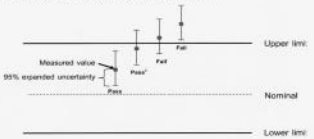
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019. Guideline on the Reporting of Compliance with Specification as following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass[1] = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail[1] = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Calibration

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

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TEL : 66(0)-2116-7860-1 FAX: 66(0)-2106-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 THR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-ACT-035
Request No : Req-2025-0559

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : CASELLA
Model : CEL-120/2
Serial Number : 3864875
ID : ENSL 17150

Class : 2
Range : 114 dB / 1000 Hz
Instrument Status : Used

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 27 February 2025
Calibration Date : 7 March 2025
Location of Calibration : LAB 1 Acoustic
Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEI	12 June 2025
THD Multimeter	2015	1047765	NIMT	4 February 2026

Traceability : This certificate provideus traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor *k*=2, providing a level of confidence

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TEL : 66(0)-2116-7860-1 FAX: 66(0)-2106-7140

Certificate No : 25-NDM-141
Request No : Req-2025-1382

3. Linearity of response to steady signals

a. Sound exposure meter, linearity of response for changes of input sinusoidal signal level

UUC Setting			FAST / A / High								
1000 Hz	Ref	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Leve A	(dB)	54.3	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Error	(dB)	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000 Hz	Ref	(dB)			88.9	98.9	108.9	112.9	118.9	128.9	138.9
	Leve A	(dB)			89.0	99.0	109.0	112.9	118.9	128.8	138.8
	Error	(dB)			0.1	0.1	0.1	0.0	0.0	-0.1	-0.1
63 Hz	Ref	(dB)						87.8	93.8	103.8	113.8
	Leve A	(dB)						87.8	93.8	103.8	113.8
	Error	(dB)						0.0	0.0	0.0	0.0
UNCERTAINTY		(±dB)	0.3								

b. Sound exposure meter linearity of error

UUC Setting	Time		Exposur Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 110 dB	27	27	0.30	0.30	0.00	5.6
1000 Hz 110 dB	45	45	0.50	0.50	0.00	
1000 Hz 110 dB	90	90	1.00	0.99	-1.00	
1000 Hz 110 dB	180	180	2.00	1.98	-1.00	
1000 Hz 120 dB	36	36	4.00	3.98	-0.50	
1000 Hz 120 dB	72	72	8.00	7.97	-0.38	5.6
1000 Hz 120 dB	90	90	10.00	9.95	-0.50	
1000 Hz 120 dB	180	180	20.00	19.92	-0.40	
1000 Hz 120 dB	360	360	40.00	39.82	-0.45	
1000 Hz 120 dB	720	720	80.00	79.49	-0.64	

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TEL : 66(0)-2116-7860-1 FAX: 66(0)-2106-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 THR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-NDM-141
Request No : Req-2025-1382

Unit Under Calibration Details

Measurement item : Noise Dosimeter
Manufacturer : CASELLA
Model : dBadge2
Serial Number : 503752
ID : ENSL 14217
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : -
Microphone S/N : 105928
Preamplifier Model : -
Preamplifier S/N : -
Instrument Status : Used

Calibration Environment and Detail

Temperature : 23 °C ± 2 °C
Humidity : 50 %R.H ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 17 June 2025
Calibrated Date : 19 June 2025
Calibration Procedure : In-house method CP-NDM-01 based on IEC 61252 :2017
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Brüel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Ivantek	SVAN 401	131	9 October 2025	WK Electric
Timer	EXTECH	-	05-ACT	11 March 2026	TPA

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor *k* = 2, providing a level of confidence approximately 95 %.

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7 139 MOO 13, SOI SUNTINAKORN II TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 66(0)-2116-7860-1 FAX: 66(0)-2106-7140

Certificate No : 25-ACT-035
Request No : Req-2025-0559

Sound pressure level **Calibration Results :** Without Adjustment

Calibration Range	Without Adjustment (dB)		Adjustment (dB)		Uncertainty	Acceptance limit	Result
(dB)	Measured	Deviated value	Measured	Deviated value	(± dB)	Class 2 (± dB)	
114 dB / 1000 Hz	114.10	0.10	-	-	0.13	0.40	Pass

Frequency of Sound pressure level

Calibration Range	Without Adjustment		Adjustment		Uncertainty	Acceptance limit	Result
(Hz)	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	(± %)	Class 2 (± %)	
114 dB / 1000 Hz	1000.00	0.00	-	-	0.01	1.7	Pass

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range	Without Adjustment	Adjustment	Uncertainty	Acceptance limit	Result
(Hz)	Measured (%)	Measured (%)	(± %)	Class 2 (± %)	
114 dB / 1000 Hz	0.58	-	0.40	5.0	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
Sound pressure level	0.35 dB
Frequency	0.20%
Total distortion+noise	1.00%

- Acceptance limit was IEC60942:2017 Class 1
- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

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TEL : 0669-2116-5860-1 FAX: 0669-21 6-7140

Certificate No : 25-NDM-142
Request No : Req-2025-1383

4. Response to short duration

a. Response for sinusoidal signals - reference level

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(Pa^2h)	(Pa^2h)
4000 Hz 95 dB	2846	2846	1.00	1.00	0.00	0.052

b. Sound exposure meter response for series of toneburst imulses

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
Burst 1 ms, 95 dB	2856	2846	1.00	1.00	0.00	5.6
Burst 1 ms, 100 dB	900	900	1.00	1.00	0.00	
Burst 1 ms, 108 dB	1-3	143	1.00	1.01	+1.00	

5. Response to unipolar pulse

UUC Setting	Time	Exposure Measurement		UNCERTAINTY
FAST / A / 54-140	UUC	UUC	Different	
Calibrator Setting	(s)	(Pa^2h)	(%)	(%)
Continuous Rectangle +	28	10.13	+2.47	3.7
Continuous Rectangle -		10.38		

End of Certificate

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TEL : 0669-2116-5860-1 FAX: 0669-21 6-7140

Certificate No : 25-NDM-142
Request No : Req-2025-1383

1. Absolute acoustical sensitivity

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
1000 Hz 114 dB	120	120	3.55	3.55	+0.6	3.1

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand CASELLA, Model CEL-120/2, SN. 3865016

2. Frequency weightings

UUC Setting	Deviation from various Frequency Weighting		UNCERTAINTY
FAST / 54-140	A	C	
STD Setting	(dB)	(dB)	(± dB)
*63 Hz	0.0	0.2	0.40
125 Hz	0.0	-0.1	0.40
250 Hz	-0.2	-0.4	0.40
500 Hz	-0.1	-0.2	0.40
1000 Hz	0.0	0.0	0.40
2000 Hz	0.5	0.4	0.40
4000 Hz	1.3	1.3	0.40
8000 Hz	0.2	0.2	0.40

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 25-NDM-141
Request No : Req-2025-1382

4. Response to short duration

a. Response for sinusoidal signals - reference level

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(Pa^2h)	(Pa^2h)
4000 Hz 95 dB	2846	2846	1.00	1.00	0.00	0.052

b. Sound exposure meter response for series of toneburst imulses

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
Burst 1 ms, 95 dB	2846	2846	1.00	1.00	0.00	5.6
Burst 1 ms, 100 dB	900	900	1.00	1.00	0.00	
Burst 1 ms, 108 dB	143	143	1.00	1.01	+1.00	

5. Response to unipolar pulse

UUC Setting	Time	Exposure Measurement		UNCERTAINTY
FAST / A / 54-140	UUC	UUC	Different	
Calibrator Setting	(s)	(Pa^2h)	(%)	(%)
Continuous Rectangle +	28	10.13	+0.40	3.7
Continuous Rectangle -		10.15		

End of Certificate

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FM-708-NDM-01 Rev.06 Issue date 17/2/25

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Namdhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-NDM-143
Request No : Req-2025-1384

Unit Under Calibration Details

Measurement item	: Noise Dosimeter	Microphone Class	: 2
Manufacturer	: CASELLA	Microphone Model	: -
Model	: dBadge2	Microphone S/N	: 105084
Serial Number	: 5037602	Preamplifier Model	: -
ID	: ENSL 24219	Preamplifier S/N	: -
Resolution	: 0.1 dB	Instrument Status	: Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 17 June 2025
Calibrated Date : 19 June 2025
Calibration Procedure : In-house method CP-NDM-01 based on IEC 61252 : 2017
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Brüel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	SVAN 401	131	9 October 2025	WK Electric
Timer	EXTECH	-	05-ACT	11 March 2026	TPA

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Facor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : Mr Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 19 June 2025

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd
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TEL : 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 25-NDM-142
Request No : Req-2025-1383

3. Linearity of response to rteady signals

a. Sound exposure meter, linearity of response for changes of input sinusoidal signal level

UUC Setting			FAST / A / High							
1000 Hz	Ref	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Leve A	(dB)	54.2	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Error	(dB)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000 Hz	Ref	(dB)			88.9	98.9	108.9	112.9	118.9	128.9	138.9
	Leve A	(dB)			89.0	99.0	109.0	113.0	119.0	129.0	139.0
	Error	(dB)			0.1	0.1	0.0	0.0	0.0	0.1	0.1
63 Hz	Ref	(dB)						87.8	93.8	103.8	113.8
	Leve A	(dB)						87.8	93.8	103.8	113.8
	Error	(dB)						0.0	0.0	0.0	0.0
UNCERTAINTY		(±dB)	0.3								

b. Sound exposure meter linearity of error

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
1000 Hz 110 dB	27	27	0.30	0.30	0.00	5.6
1000 Hz 110 dB	45	45	0.50	0.50	0.00	
1000 Hz 110 dB	90	90	1.00	0.99	-1.00	
1000 Hz 110 dB	180	180	2.00	1.98	-1.00	
1000 Hz 120 dB	36	36	4.00	3.96	-1.00	
1000 Hz 120 dB	72	72	8.00	7.92	-1.00	5.6
1000 Hz 120 dB	90	90	10.00	9.90	-1.00	
1000 Hz 120 dB	180	180	20.00	19.80	-1.00	
1000 Hz 120 dB	360	360	40.00	39.60	-1.00	
1000 Hz 120 dB	720	720	80.00	79.20	-1.00	

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FM-708-NDM-01 Rev.06 Issue date 17/2/25

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Namdhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-NDM-142
Request No : Req-2025-1383

Unit Under Calibration Details

Measurement item	: Noise Dosimeter	Microphone Class	: 2
Manufacturer	: CASELLA	Microphone Model	: -
Model	: dBadge2	Microphone S/N	: 105183
Serial Number	: 5037563	Preamplifier Model	: -
ID	: ENSL 24218	Preamplifier S/N	: -
Resolution	: 0.1 dB	Instrument Status	: Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 17 June 2025
Calibrated Date : 19 June 2025
Calibration Procedure : In-house method CP-NDM-01 based on IEC 61252 : 2017
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Brüel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	SVAN 401	131	9 October 2025	WK Electric
Timer	EXTECH	-	05-ACT	11 March 2026	TPA

Note

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06 69-2116-5960-1 FAX: 06 69-2116-7140

Certificate No : 25-NDM-173
Request No : Req-2025-1538

1. Absolute acoustical sensitivity

UUC Setting	Time		Exposur- Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 114 dB	120	120	3.53	3.56	+0.8	3.1

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand CASELLA, Model CEL-120/2, SN. 3865016

2. Frequency weightings

UUC Setting	Deviation from various Frequency Weighting		UNCERTAINTY
FAST / 54-140	A	C	
STD Setting	(dB)	(dB)	(± dB)
*63 Hz	-0.3	-0.1	0.40
125 Hz	-0.1	-0.2	0.40
250 Hz	-0.2	-0.4	0.40
500 Hz	-0.1	-0.2	0.40
1000 Hz	0.0	0.0	0.40
2000 Hz	0.2	0.1	0.40
4000 Hz	0.4	0.4	0.40
8000 Hz	-0.2	0.0	0.40

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TEL: 06 69-2116-5960-1 FAX: 06 69-21 6-7140

Certificate No : 25-NDM-173
Request No : Req-2025-1538

3. Linearity of response to steady signals
a. Sound exposure meter, linearity of response for changes of input sinusoidal signal level

UUC Setting		FAST / A / High								
1000 Hz	Ref	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Level A	(dB)	54.0	80.1	90.1	100.0	110.0	114.0	120.0	130.0	140.0
	Error	(dB)	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
8000 Hz	Ref	(dB)			88.9	98.9	108.9	112.9	118.9	128.9	138.9
	Level A	(dB)			89.0	99.0	108.9	112.9	118.9	128.8	138.8
	Error	(dB)			0.1	0.1	0.0	0.0	0.0	-0.1	-0.1
63 Hz	Ref	(dB)						87.8	93.8	103.8	113.8
	Level A	(dB)						87.8	93.8	103.8	113.8
	Error	(dB)						0.0	0.0	0.0	0.0
UNCERTAINTY		(±dB)	0.3								

b. Sound exposure meter linearity of error

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 110 dB	27	27	0.30	0.30	0.00	5.6
1000 Hz 110 dB	45	45	0.50	0.50	0.00	
1000 Hz 110 dB	90	90	1.00	1.01	+1.00	
1000 Hz 110 dB	180	180	2.00	1.02	+1.00	
1000 Hz 120 dB	36	36	4.00	4.01	+0.25	
1000 Hz 120 dB	72	72	8.00	8.03	+0.37	5.6
1000 Hz 120 dB	90	90	10.00	10.03	+0.30	
1000 Hz 120 dB	180	180	20.00	20.06	+0.30	
1000 Hz 120 dB	360	360	40.00	40.13	+0.33	
1000 Hz 120 dB	720	720	80.00	80.26	+0.33	

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TEL: 06 69-2116-5960-1 FAX: 06 69-21 6-7140

Certificate No : 25-NDM-143
Request No : Req-2025-1384

4. Response to short duration
a. Response for sinusoidal signals - reference level

UUC Setting	Time		Exposur- Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(Pa^2 h)	(Pa^2 h)
4000 Hz 95 dB	2886	2846	1.00	1.00	0.00	0.052

b. Sound exposure meter response for series of toneburst impulses

UUC Setting	Time		Exposur- Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
Burst 1 ms, 95 dB	2886	2846	1.00	1.00	0.00	5.6
Burst 1 ms, 100 dB	900	900	1.00	1.00	0.00	
Burst 1 ms, 105 dB	1-3	143	1.00	1.01	+1.00	

5. Response to unipolar pube

UUC Setting	Time	Exposur- Measurement		UNCERTAINTY
FAST / A / 54-140	UUC	UUC	Different	
Calibrator Setting	(s)	(Pa^2 h)	(%)	(%)
Continuous Rectangle +	28	10.15	+0.79	3.7
Continuous Rectangle -		10.23		

End of Certificate

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TEL: 06 69-2116-5960-1 FAX: 06 69-2116-7140

Certificate No : 25-NDM-143
Request No : Req-2025-1384

1. Absolute acoustical sensitivity

UUC Setting	Time		Exposur- Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 114 dB	120	120	3.53	3.55	+0.6	3.1

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand CASELLA, Model CEL-120/2, SN. 3865016

2. Frequency weightings

UUC Setting	Deviation from various Frequency Weighting		UNCERTAINTY
FAST / 54-140	A	C	
STD Setting	(dB)	(dB)	(± dB)
*63 Hz	0.1	0.3	0.40
125 Hz	0.0	-0.1	0.40
250 Hz	-0.2	-0.4	0.40
500 Hz	-0.1	-0.2	0.40
1000 Hz	0.0	0.0	0.40
2000 Hz	0.5	0.4	0.40
4000 Hz	1.5	1.5	0.40
8000 Hz	1.1	1.1	0.40

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TEL: 06 69-2116-5960-1 FAX: 06 69-21 6-7140

Certificate No : 25-NDM-143
Request No : Req-2025-1384

3. Linearity of response to steady signals
a. Sound exposure meter, linearity of response for changes of input sinusoidal signal level

UUC Setting		FAST / A / High								
1000 Hz	Ref	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Level A	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Error	(dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000 Hz	Ref	(dB)			88.9	98.9	108.9	112.9	118.9	128.9	138.9
	Level A	(dB)			89.0	99.0	108.9	112.9	118.9	128.8	138.8
	Error	(dB)			0.1	0.1	0.0	0.0	0.0	-0.1	-0.1
63 Hz	Ref	(dB)						87.8	93.8	103.8	113.8
	Level A	(dB)						87.8	93.8	103.8	113.8
	Error	(dB)						0.0	0.0	0.0	0.0
UNCERTAINTY		(±dB)	0.3								

b. Sound exposure meter linearity of error

UUC Setting	Time		Exposur- Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 110 dB	27	27	0.30	0.30	0.00	5.6
1000 Hz 110 dB	45	45	0.50	0.50	0.00	
1000 Hz 110 dB	90	90	1.00	0.99	-1.00	
1000 Hz 110 dB	180	180	2.00	1.98	-1.00	
1000 Hz 120 dB	36	36	4.00	3.98	-0.50	
1000 Hz 120 dB	72	72	8.00	7.94	-0.50	5.6
1000 Hz 120 dB	90	90	10.00	9.94	-0.60	
1000 Hz 120 dB	180	180	20.00	19.90	-0.50	
1000 Hz 120 dB	360	360	40.00	39.80	-0.50	
1000 Hz 120 dB	720	720	80.00	79.48	-0.65	

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06 69-2116-5960-1 FAX: 06 69-2116-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 23/6 TBR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-NDM-173
Request No : Req-2025-1538

Unit Under Calibration Details

Measurement item : Noise Dosimeter
Manufacturer : CASELLA
Model : dBadge2
Serial Number : 503762
ID : ENSL /4220
Resolution : 0.1 DB

Microphone Class : 2
Microphone Model : -
Microphone S/N : 105748
Preamplifier Model : -
Preamplifier S/N : -
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 7 July 2025
Calibrated Date : 15 July 2025
Calibration Procedure : In-house method CP-NDM-01 based on IEC 61252 :2017
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Multifunction Acoustic Calibrator	Bruel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	Svantek	SVAN 401	131	9 October 2025	WK Electric
Timer	EXTECH	-	05-ACT	11 March 2026	TPA

Note

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06 69-2116-5960-1 FAX: 06 69-2116-7140

Certificate No : 25-NDM-143
Request No : Req-2025-1384

3. Linearity of response to steady signals
a. Sound exposure meter, linearity of response for changes of input sinusoidal signal level

UUC Setting		FAST / A / High								
1000 Hz	Ref	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Level A	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Error	(dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000 Hz	Ref	(dB)			88.9	98.9	108.9	112.9	118.9	128.9	138.9
	Level A	(dB)			89.0	99.0	108.9	112.9	118.9	128.8	138.8
	Error	(dB)			0.1	0.1	0.0	0.0	0.0	-0.1	-0.1
63 Hz	Ref	(dB)						87.8	93.8	103.8	113.8
	Level A	(dB)						87.8	93.8	103.8	113.8
	Error	(dB)						0.0	0.0	0.0	0.0
UNCERTAINTY		(±dB)	0.3								

b. Sound exposure meter linearity of error

UUC Setting	Time		Exposur- Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2 h)	(Pa^2 h)	(%)	(%)
1000 Hz 110 dB	27	27	0.30	0.30	0.00	5.6
1000 Hz 110 dB	45	45	0.50	0.50	0.00	
1000 Hz 110 dB	90	90	1.00	0.99	-1.00	
1000 Hz 110 dB	180	180	2.00	1.98	-1.00	
1000 Hz 120 dB	36	36	4.00	3.98	-0.50	
1000 Hz 120 dB	72	72	8.00	7.94	-0.50	5.6
1000 Hz 120 dB	90	90	10.00	9.94	-0.60	
1000 Hz 120 dB	180	180	20.00	19.90	-0.50	
1000 Hz 120 dB	360	360	40.00	39.80	-0.50	
1000 Hz 120 dB	720	720	80.00	79.48	-0.65	

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Certificate No : 25-NDM-173

Request No : Req-2025-1538

4. Response to short duration

a. Response for sinusoidal signals - reference level

UUC Setting	Time		Exposur: Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(Pa^2h)	(Pa^2h)
4000 Hz 95 dB	2846	2846	1.00	0.99	-0.01	0.052

b. Sound exposure meter response for series of toneburst impulses

UUC Setting	Time		Exposurr Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
Burst 1 ms, 95 dB	2846	2846	1.00	0.99	-1.00	5.6
Burst 1 ms, 100 dB	900	900	1.00	0.99	-1.00	
Burst 1 ms, 108 dB	143	143	1.00	1.00	0.00	

5. Response to unipolar pulse

UUC Setting	Time	Exposurx Measurement		UNCERTAINTY
FAST / A / 54-140	UUC	UUC	Different	
Calibrator Setting	(s)	(Pa^2h)	(%)	(%)
Continuous Rectangle +	28	10.11	+1.38	3.7
Continuous Rectangle -		10.25		

End of Certificate

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TEL: 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

Certificate of Calibration

Customer

Certificate No : 25-TPM-074

Name : SGS (Thailand) Limited.

Request No : Req-2025-0133

Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Page : 1/2

Unit Under Calibration Details

Calibration Parameter	: Temperature		
Instrument Name	: Area Heat Stress Monitor	Range Calibration :	25 °C to 45 °C
Manufacturer	: 3M	Type of Sensor :	RTD
Model	: QT-34	Sensor Diameter (mm) :	4.5
Serial Number	: TEM030023	Calibration Position (mm) :	67.5
Resolution	: 0.1 °C	Instrument Status :	Used
ID Number	: ENWP 087		

Calibration Environment and Details

Temperature	: 23 °C ± 3 °C
Humidity	: 55 %RH ± 15 %RH
Received Date	: 16 January 2025
Calibrated Date	: 6 February 2025
Calibration Procedure	: In-house method CP-TPM-01 by Comparison with Standard Thermometer.

Reference Standard : Digital Thermometer with Sensor, Manufacturer: GINGO/GINGO, Model: GT11/ RTD100, SN: 08000057, ID: 02-TPM Which was calibrated on 1 March 2024, Calibration Certificate No. : QR24-0478

Traceability : This Certificate is traceable to SI Unit through Quality Reborn Co., Ltd., NSC-ONSC Accreditation No.: Calibration 0292

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k=2, providing a level of confidence approximately 95 %.

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TEL: 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 25-TPM-074

Request No : Req-2025-0133

Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.033	25.0	0.0	0.13
	35.037	35.0	0.0	0.13
	45.039	45.0	0.0	0.13
DRY	25.032	24.9	+ 0.1	0.13
	35.035	34.9	+ 0.1	0.13
	45.041	45.0	0.0	0.13
GLOBE	25.033	25.0	0.0	0.13
	35.035	35.0	0.0	0.13
	45.038	45.0	0.0	0.13

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

Certificate of Calibration

Customer

Certificate No : 25-TPM-075

Name : SGS (Thailand) Limited.

Request No : Req-2025-0132

Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120

Page : 1/2

Unit Under Calibration Details

Calibration Parameter	: Temperature		
Instrument Name	: Area Heat Stress Monitor	Range Calibration :	25 °C to 45 °C
Manufacturer	: 3M	Type of Sensor :	RTD
Model	: QT-34	Sensor Diameter (mm) :	4.5
Serial Number	: TEM030028	Calibration Position (mm) :	67.5
Resolution	: 0.1 °C	Instrument Status :	Used
ID Number	: ENWP 092		

Calibration Environment and Details

Temperature	: 23 °C ± 3 °C
Humidity	: 55 %RH ± 15 %RH
Received Date	: 16 January 2025
Calibrated Date	: 6 February 2025
Calibration Procedure	: In-house method CP-TPM-01 by Comparison with Standard Thermometer.

Reference Standard : Digital Thermometer with Sensor, Manufacturer: GINGO/GINGO, Model: GT11/ RTD100, SN: 08000057, ID: 02-TPM Which was calibrated on 1 March 2024, Calibration Certificate No. : QR24-0478

Traceability : This Certificate is traceable to SI Unit through Quality Reborn Co., Ltd., NSC-ONSC Accreditation No.: Calibration 0292

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k=2, providing a level of confidence approximately 95 %.

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 25-TPM-075

Request No : Req-2025-0132

Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.053	25.1	- 0.1	0.13
	35.037	35.1	- 0.1	0.13
	45.039	45.1	- 0.1	0.13
DRY	25.032	24.9	+ 0.1	0.13
	35.035	34.9	+ 0.1	0.13
	45.041	44.9	+ 0.1	0.13
GLOBE	25.033	24.9	+ 0.1	0.13
	35.035	34.9	+ 0.1	0.13
	45.038	44.9	+ 0.1	0.13

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

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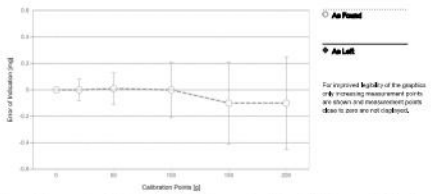
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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0,05000 g	0,05000 g	0,00000 g	0,015 mg	2
2	0,01000 g	0,01000 g	0,00000 g	0,017 mg	2
3	0,10000 g	0,10000 g	0,00000 g	0,021 mg	2
4	0,99999 g	0,99999 g	0,00000 g	0,031 mg	2
5	5,00000 g	5,00000 g	-0,00001 g	0,047 mg	2
6	10,00000 g	9,99999 g	-0,00001 g	0,060 mg	2
7	20,00001 g	20,00001 g	0,00000 g	0,081 mg	2
8	49,99995 g	49,99995 g	0,00001 g	0,12 mg	2
9	100,00000 g	100,00000 g	0,00000 g	0,21 mg	2
10 *	150,00000 g	149,99999 g	-0,00001 g	0,31 mg	2
11 *	200,00000 g	199,99999 g	-0,00001 g	0,35 mg	2

* The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capabilities) value because the calculated uncertainty was smaller than the CMC value.



For improved legibility of the graphics, only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated. The results of this calibration certificate relate only to the calibrated item.

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Report Version: 2.16.21
Form Number: F1000
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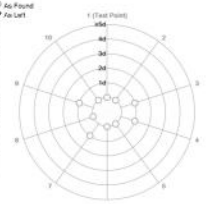
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Measurement Results

Repeatability

Test Load: 70 g

	As Found	As Left
1	69,99998 g	N/A
2	69,99998 g	N/A
3	69,99995 g	N/A
4	69,99995 g	N/A
5	69,99998 g	N/A
6	69,99998 g	N/A
7	69,99997 g	N/A
8	69,99998 g	N/A
9	69,99997 g	N/A
10	69,99998 g	N/A
Standard Deviation	**0,000007 g**	**N/A**



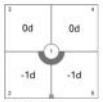
The "d" in the graph represents the readability of the ranges/decade in which the test was performed.

The results of the graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100,0000 g	N/A
2	99,9999 g	N/A
3	100,0000 g	N/A
4	100,0000 g	N/A
5	99,9999 g	N/A
Maximum Deviation	**0,0001 g**	**N/A**



As Found

The "d" in the graph represents the readability of the range/interval in which the test was performed.

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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	54030949	130RC116	25E2743	25 Aug 2026
2) Ref. Standard Thermometer	4982054	110RC044	25I708	03 July 2026

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

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-PRÜ-15184-01-00
: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 1.678	CPA chem	940101	02 Nov 2025
pH 4.007	CPA chem	1135353	16 Aug 2027
pH 6.999	Hach Lange GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1135355	16 Aug 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	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	1.680	314.73	314.9	1.680	0.058	2.00
S/N.: 1231235141	4.000	177.48	177.7	4.000	0.058	2.00
	7.000	0.00	0.2	7.000	0.058	2.00
	10.000	-177.48	-177.2	10.000	0.058	2.00

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.: 25CH1236
Page.: 1 of 3

Equipment :	pH Meter
Manufacturer :	Mettler Toledo
Model :	Seven Easy S20
Serial No. :	1231235141
ID No. :	P2010024
Condition As-Received:	Used Item
Received Date :	28 October 2025
Calibration Date :	29 October 2025
Reference :	2510-0797WSC-1
Submitted by :	SGS (Thailand) Limited 1/209, 1/211 Moo 1, Ban Chang, Ban Chang, Rayong 21130
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 :	Warakorn Lerngagtrakul
Approved by :	Approved Signatory

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

Issue Date : 29 October 2025

The Uncertainties are for a confidence probability of approximately 95%

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METTLER TOLEDO Service

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: 1x10⁻⁶/K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

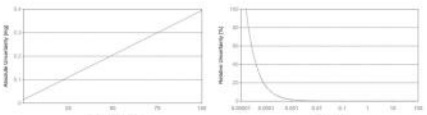
Linearization of Uncertainty Equation

	Range d	Range Max	As Found	As Left
1	0,00001 g	81 g	U_c = 0,016 mg + 0,00489 mg/g • R	N/A
2	0,0001 g	220 g	U_c = 0,26 mg + 0,00491 mg/g • R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0,06220 g	0,016 mg	0,75%	N/A	N/A
0,03500 g	0,016 mg	0,073%	N/A	N/A
0,22000 g	0,017 mg	0,0077%	N/A	N/A
0,20000 g	0,020 mg	0,0012%	N/A	N/A
220,0000 g	1,1 mg	0,00049%	N/A	N/A



As Found As Left

The weighing range shown in the absolute uncertainty graph refers to the first interval/range of the device.

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METTLER TOLEDO Service

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: CH5, E2

Weight Set No.:	WS32	Date of Issue:	07-Aug-2024
Certificate Number:	183673	Calibration Due Date:	30-Jun-2026

Weight Set 2: CH8, E2

Weight Set No.:	WS32-1	Date of Issue:	06-Sep-2024
Certificate Number:	C435717337	Calibration Due Date:	26-Jun-2026

Thermo Hygrometer

Equipment No.:	E001	Date of Issue:	25-Sep-2024
Certificate Number:	SCH-0060697	Calibration Due Date:	25-Sep-2025

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
84/4 - 84/5 Lasalle Rd, Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
IVT-THServiceSupport@mt.com

Accuracy Calibration Certificate

Customer

Company:	SGS (Thailand) Co., Ltd.		
Address:	1/209, 1/211 Moo 1, Ban Chang		
City:	Ban Chang	Contact:	Phannipha Sorachit
Zip / Postal:	21130		
State / Province:	Rayong		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	Instrument Type:	Weighing Instrument
Model:	XS205DU	Asset Number:	N/A
Serial No.:	B036005880	Terminal Model:	SAT
Building:	LABORATORY	Terminal Serial No.:	B036005880
Floor:	1	Terminal Asset No.:	N/A
Room:	Balance		

Range	Max. Capacity	Readability (d)
1	81 g	0,00001 g
2	220 g	0,0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction:	CRW002200

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity-span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 20,3 °C	End: 20,0 °C	Start: 49,0 %	End: 48,8 %

As Found Calibration Date:	11-Mar-2025	Calibrator:	
As Left Calibration Date:	N/A		Theraphong Sallanot
Issue Date:	14-Mar-2025	Approved Signatory:	

Technical Manager / Head of Calibration Center

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Cert.No.: 25CH1236
Page.: 3 of 3

Calibration Results

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	1.678	1.723	321.2	0.0053	2.06
S/N.: 5370358	4.007	4.010	186.5	0.0044	2.00
	6.999	7.004	10.3	0.0064	2.00
	10.010	10.014	-164.5	0.0068	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab®Expert Pro-ISM
- Serial No. : 5370358

Dimension of probe

- Length : 120 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.004	25.1	0.096	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

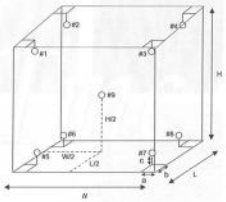
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Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025 **Cert No.** 25/1243
Order No. 25030172

Results (without adjustment)



Position of reference thermometers were placed

Note.

1). Dimension (W x L x H) is 40 x 33 x 40 cm

2). Stability - greatest one half of difference between max peak and min peak of each reference probe measured temperature obtained during the calibration interval.

3). Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025 **Cert No.** 25/1243
Order No. 25030172

Customer SGS (Thailand) Limited,
1/209, 1/211 Moo 1, T. Ban Chang, A. Ban Chang Rayong 21130 Thailand.

Place of Calibration Hot Lab

Description Oven
Model UFE400
Serial No. G410.0833
ID.No. O2010002
Date of Receipt Mar 24, 2025
Date of Calibration Mar 24, 2025
Environment
Temperature (Min) 28.4 °C (Max) 29.6 °C
Relative Humidity (Min) 37.3 %rh (Max) 44.9 %rh

Calibration Method

WI-17: The reference thermometer was placed into the chamber and measurement was performed based on AS-2853. The temperature scale in use at this laboratory is the International Temperature Scale of 1990.

Standard Equipment	Serial No.	Certificate No.	Due Date
1) Data Acquisition Switch Unit with Sensor	MY59003190	QR24-1215	07 Jun 2025

This certificate is traceable to SI unit.

This certificate is issued in accordance with the conditions of accreditation granted by Thermology Laboratory Room. The traceability to recognised national standard and the unit of measurement realised at corresponding national standard Laboratory Room. This certificate may not be reproduced other than in full except with the prior written approval of Laboratory Room.

METTLER TOLEDO Service

Minimum Weight

As Found Minimum Weight Table

Range 1

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	5	8	10
0.1%	0,015708 g	0,031565 g	0,078573 g	0,250039 g	0,164036 g
0.2%	0,007836 g	0,015708 g	0,039318 g	0,062559 g	0,080090 g
0.5%	0,003130 g	0,006288 g	0,015708 g	0,025008 g	0,031565 g
1%	0,001564 g	0,003130 g	0,007837 g	0,012479 g	0,015708 g
2%	0,000782 g	0,001564 g	0,003913 g	0,006230 g	0,007836 g
5%	0,000313 g	0,000626 g	0,001568 g	0,002496 g	0,003130 g

The minimum weight table applies to the fine range of the weighing device.

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Range 1

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	5	8	10
0.1%	0,015708 g	0,031565 g	0,078573 g	0,250039 g	0,164036 g
0.2%	0,007836 g	0,015708 g	0,039318 g	0,062559 g	0,080090 g
0.5%	0,003130 g	0,006288 g	0,015708 g	0,025008 g	0,031565 g
1%	0,001564 g	0,003130 g	0,007837 g	0,012479 g	0,015708 g
2%	0,000782 g	0,001564 g	0,003913 g	0,006230 g	0,007836 g
5%	0,000313 g	0,000626 g	0,001568 g	0,002496 g	0,003130 g

The minimum weight table applies to the fine range of the weighing device.

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At those net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/5, 1/8, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until last occurred. For the pass, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:
1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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METTLER TOLEDO Service

GWP® Certificate

As Found ✓ **As Left** ✓

The weighing device meets the given process requirements.

The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.01000 g** | Safety Factor: **2**

Safe Weighing Range



With the values in this graph select the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025 **Cert No.** 25/1243
Order No. 25030172

Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
150.0	150.0	150.0	Position 1	150.554	0.124	0.782	0.47
			Position 2	150.313			
			Position 3	149.593			
			Position 4	150.020			
			Position 5	150.151			
			Position 6	150.616			
			Position 7	149.207			
			Position 8	149.770			
			Position 9	149.864			

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
180.0	180.0	180.0	Position 1	180.745	0.073	1.010	0.48
			Position 2	180.419			
			Position 3	179.498			
			Position 4	180.001			
			Position 5	180.213			
			Position 6	180.826			
			Position 7	179.040			
			Position 8	179.784			
			Position 9	179.847			

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CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025 **Cert No.** 25/1243
Order No. 25030172

Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
85.0	85.0	85.0	Position 1	85.191	0.050	0.353	0.31
			Position 2	85.077			
			Position 3	84.808			
			Position 4	84.979			
			Position 5	85.009			
			Position 6	85.183			
			Position 7	84.815			
			Position 8	84.798			
			Position 9	84.871			

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
104.0	104.0	104.0	Position 1	104.353	0.125	0.447	0.44
			Position 2	104.196			
			Position 3	103.636			
			Position 4	104.066			
			Position 5	104.094			
			Position 6	104.349			
			Position 7	103.575			
			Position 8	103.834			
			Position 9	103.934			

METTLER TOLEDO Service

Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0,00000 g	0,00000 g	N/A	N/A	N/A	N/A	N/A	N/A
20,20001 g	0,00000 g	0,21000 g	0,02000 g	0,05000 g	0,10000 g	0,20000 g	0,50000 g
49,99995 g	0,00001 g	0,32500 g	0,05000 g	0,12500 g	0,25000 g	0,50000 g	1,25000 g
100,00000 g	0,00000 g	0,42500 g	0,10000 g	0,25000 g	0,50000 g	1,00000 g	2,50000 g
150,00000 g	-0,00001 g	0,47500 g	0,15000 g	0,37500 g	0,75000 g	1,50000 g	3,75000 g
200,00000 g	-0,00001 g	0,51000 g	0,20000 g	0,50000 g	1,00000 g	2,00000 g	5,00000 g
Result:		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0,00000 g	0,00000 g	N/A	N/A	N/A	N/A	N/A	N/A
20,20001 g	0,00000 g	0,21000 g	0,02000 g	0,05000 g	0,10000 g	0,20000 g	0,50000 g
49,99995 g	0,00001 g	0,32500 g	0,05000 g	0,12500 g	0,25000 g	0,50000 g	1,25000 g
100,00000 g	0,00000 g	0,42500 g	0,10000 g	0,25000 g	0,50000 g	1,00000 g	2,50000 g
150,00000 g	-0,00001 g	0,47500 g	0,15000 g	0,37500 g	0,75000 g	1,50000 g	3,75000 g
200,00000 g	-0,00001 g	0,51000 g	0,20000 g	0,50000 g	1,00000 g	2,00000 g	5,00000 g
Result:		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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METTLER TOLEDO Service

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 70 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	0,000095 g	0,000007 g	✗	0,000007 g	✗
0.2%	0,000010 g		✓		⚠
0.5%	0,000025 g		✓		✓
1%	0,000050 g		✓		✓
2%	0,000100 g		✓		✓
5%	0,000250 g		✓		✓

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0,2500 g	0,0001 g	✓	0,0001 g	✓
0.2%	0,1000 g		✓		✓
0.5%	0,2500 g		✓		✓
1%	0,5000 g		✓		✓
2%	1,0000 g		✓		✓
5%	2,5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Calibration Report

Certificate No: 252233/ME

1. Input I (DC Voltage)

Range (mV)	[1]STD Setting (mV)	[2]Tolerance (mV)	[3]UUC Reading (mV)	Uncertainty (± mV)
2 V	0.00	-2.0 to 2.0	0.0	0.13
	300.00	298.0 to 302.0	299.9	0.194
	600.00	598.0 to 602.0	599.9	0.261
	900.00	898.0 to 902.0	899.8	0.329
	1200.00	1198.0 to 1202.0	1199.9	0.4
	-1200.00	-1202.0 to -1198.0	-1200.0	0.4

2. Input I (pH)*

[1]STD Setting (mV)	Nominal Value (pH)	[2]Tolerance (pH)	[3]UUC Reading (pH)	Uncertainty (± pH)
414.12	0	-0.034 to 0.034	0.002	0.0037
354.96	1	0.966 to 1.034	1.002	0.0034
295.80	2	1.966 to 2.034	2.002	0.0032
236.64	3	2.966 to 3.034	3.002	0.0030
177.48	4	3.966 to 4.034	4.001	0.0028
118.32	5	4.966 to 5.034	5.001	0.0025
59.16	6	5.966 to 6.034	6.001	0.0023
0.00	7	6.966 to 7.034	7.001	0.0021
-59.16	8	7.966 to 8.034	8.001	0.0023
-118.32	9	8.966 to 9.034	9.001	0.0025
-177.48	10	9.966 to 10.034	10.001	0.0028
-236.64	11	10.966 to 11.034	11.001	0.0030
-295.80	12	11.966 to 12.034	12.001	0.0032
-354.96	13	12.966 to 13.034	13.001	0.0034
-414.12	14	13.966 to 14.034	14.001	0.0038

Reference Temperature : 25° C

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Calibration Report

Certificate No: 252233/ME

1. Reference Standards

Item	Description/Model	Serial No.	Manufacturing	Certificate No.	Due Date
1	Multifunction Calibrator MC2	22541	Beamex	CAL0252-25P0001	2 Jan 2026
2	Digital Dial Gauge	19129518	Sylvac	D6U2506772	13 Jul 2026
3	Temperature and Humidity Logger	62218704	Ebro	L202507370-0001	24 Jul 2026

2. The measurement standards are traceable to International system of units (SI) by mean of an unbroken chain of calibration via accredited calibration laboratory, National or International metrology institute.

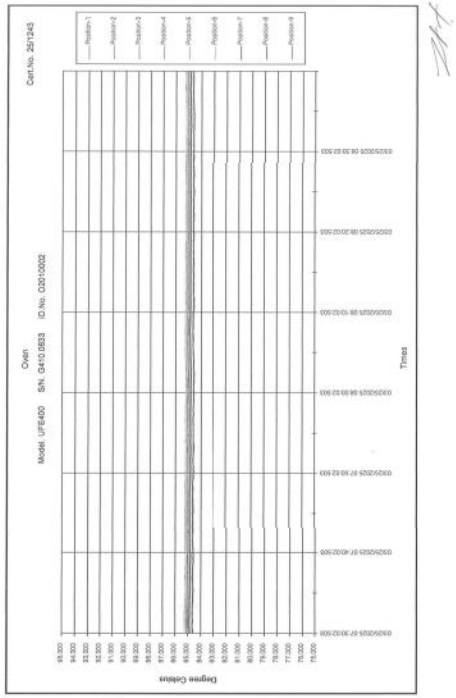
3. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

4. The results of test were found accurate as shown on date and place of test only.

5. Procedure Used :

On-Site method WI-08 by substitute measurement with digital multimeter (DC Voltage) (Direct)
On-Site method WI-08 based on BS 3145 : 1978 (pH)
On-Site method WI-08 based on CEI IEC 60751 : 2008 (Temperature)
Method WI-14 by direct measurement with digital indicator (Dimension)

6. The calibration results apply accuracy of display unit titrator only. User shall be validation of the titrator included electrode test , Volume and specific titration method, user certified primary standard for the validation of titrator.



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Date of Issue Mar 26, 2025

Cert No. 25/1243
Order No. 25030172

The stability and uniformity were taken into account in the measurement uncertainty stated.
The above results are valid exclusively for calibration samples as mentioned in this report.
This reported expanded uncertainty was based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with ONAC requirements.

Thermology Co., Ltd.
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CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025

Cert No. 25/1242
Order No. 25030172

Customer SGS (Thailand) Limited.
1/209, 1/211 Moo 1, T. Ban Chang, A. Ban Chang Rayong 21130 Thailand.

Place of Calibration Sample Area

Description BOD Incubator
Model ICP450
Serial No. F721.0023
ID.No. 02022007
Date of Receipt Mar 24, 2025
Date of Calibration Mar 24, 2025
Environment
Temperature (Min) 24.2 °C (Max) 27.7 °C
Relative Humidity (Min) 40.8 %rh (Max) 46.5 %rh

Calibration Method

WI-17: The reference thermometer was placed into the chamber and measurement was performed based on AS-2853.
The temperature scale in use at this laboratory is the International Temperature Scale of 1990.

Standard Equipment	Serial No.	Certificate No.	Due Date
1) Data Acquisition Switch Unit with Sensor	MY49010059	QR24-0874	24 Apr 2025

This certificate is traceable to SI unit.

This certificate is issued in accordance with the conditions of accreditation granted by Thermology Laboratory [illegible] recognised national standard and the unit of measurement realised at corresponding national standard Laboratory Room. This certificate may not be reproduced other than in full except with the prior written approval of Laboratory Room.

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Calibration Report

Certificate No: 252233/ME

3. Temperature

3.1 Input I PT-1000 (385)

[1]STD Setting (Ω)	Nominal Value (°C)	[2]Tolerance (°C)	[3]UUC Reading (°C)	Uncertainty (± °C)
1000.0	0	-1.0 to 1.0	0.1	0.15
1077.9	20	19.0 to 21.0	20.1	0.15
1097.3	25	24.0 to 26.0	25.1	0.15
1116.7	30	29.0 to 31.0	30.1	0.15
1194.0	50	49.0 to 51.0	50.1	0.16
1385.1	100	99.0 to 101.0	100.2	0.19

4. Dimension

4.1 Spindle Stroke

[3]UUC Setting (ml)	Nominal Value (mm)	[2]Tolerance (mm)	[1]STD Reading (mm)	Uncertainty (± mm)
1.3	10.400	10.330 to 10.470	10.419	0.010
5.6	44.800	44.730 to 44.870	44.832	0.010
10.0	80.000	79.930 to 80.070	79.993	0.011

Remark:

1. [1]STD = Standard Equipment.
2. [2]Tolerance according to manufacturer specification and service manual.
3. [3]UUC = Unit Under Calibration.
4. The result as per (*) marked are not TISI Accreditation Scope.

End of data

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[illegible]

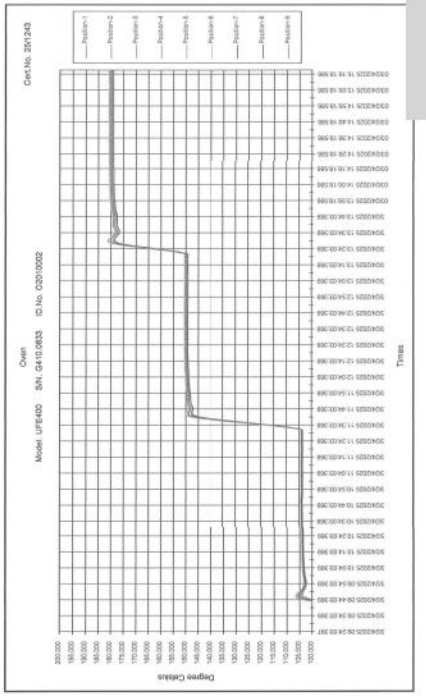
Certificate of Calibration

Date of Issue	:	19 August 2025
Certificate No.	:	252233/ME
Customer Company	:	SGS (Thailand) Limited 1/209, 1/211 Moo 1, T.Ban Chang, A.Ban Chang, Rayong 21130
Instrument Manufacturer	:	Metrohm
Instrument Type	:	Titrator
Model	:	848
Instrument Serial Number	:	1848001021332
Calibration Place	:	Laboratory, SGS (Thailand) Limited 1/209, 1/211 Moo 1, T.Ban Chang, A.Ban Chang, Rayong 21130
Environment Status	:	Temperature : 25.00° C ± 1.60° C Humidity : 41.10% ± 2.20%
Date of Receipt	:	15 August 2025
Date of Calibration	:	15 August 2025
Job Number	:	CAL250712/ME
Condition of Calibration Item	:	Used Item
Result of Calibration	:	[X] Without Adjustment [ ] Adjustment
Calibrated By	:	
Approved By	:	

[ ] Mr. Teerayut Cheepdamrong
[ ] Mr. Jarunsak Samara

The uncertainties are for a confidence probability of approximately 95%

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Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	00827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	25/1248
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2025
Calibration Date	10/04/2025	Next Cal. Date	10/04/2026

Right

Hole 1			Hole 2			Hole 3		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.2	-0.18 / 148.0	1	148.2	-0.18 / 148.0	1	148.2	-0.18 / 148.0
2	148.3	-0.18 / 148.1	2	148.3	-0.18 / 148.1	2	148.3	-0.18 / 148.1
3	148.2	-0.18 / 148.0	3	148.2	-0.18 / 148.0	3	148.2	-0.18 / 148.0
	Mean	148.05		Mean	148.05		Mean	148.05
	SD	0.058		SD	0.058		SD	0.058
	%RSD	0.039		%RSD	0.039		%RSD	0.039

Hole 4			Hole 5			Hole 6		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.5	-0.18 / 148.3	1	148.8	0.18 / 148.4	1	148.3	-0.18 / 148.1
2	148.4	-0.18 / 148.2	2	148.9	-0.18 / 148.7	2	148.5	-0.18 / 148.3
3	148.2	-0.18 / 148.0	3	148.2	0.18 / 148.0	3	148.2	-0.18 / 148.0
	Mean	148.19		Mean	148.39		Mean	148.15
	SD	0.153		SD	0.351		SD	0.153
	%RSD	0.103		%RSD	0.237		%RSD	0.103

Hole 7			Hole 8			Hole 9		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.4	-0.18 / 148.2	1	148.3	0.18 / 148.1	1	148.2	-0.18 / 148.0
2	148.3	-0.18 / 148.1	2	148.5	0.18 / 148.3	2	148.4	-0.18 / 148.2
3	148.2	-0.18 / 148.0	3	148.2	0.18 / 148.0	3	148.2	-0.18 / 148.0
	Mean	148.12		Mean	148.15		Mean	148.09
	SD	0.100		SD	0.153		SD	0.115
	%RSD	0.068		%RSD	0.103		%RSD	0.078

Hole 10			Hole 11			Hole 12		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.3	-0.18 / 148.1	1	148.4	0.18 / 148.2	1	148.2	-0.18 / 148.0
2	148.3	-0.18 / 148.1	2	148.3	0.18 / 148.1	2	148.4	-0.18 / 148.2
3	148.2	-0.18 / 148.0	3	148.2	-0.18 / 148.0	3	148.2	-0.18 / 148.0
	Mean	148.09		Mean	148.12		Mean	148.09
	SD	0.058		SD	0.100		SD	0.115
	%RSD	0.039		%RSD	0.068		%RSD	0.078

Verified By Sukanda K. Approved By Phanuphan S.

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Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	00827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	25/1248
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2025
Calibration Date	10/04/2025	Next Cal. Date	10/04/2026

Middle

Hole 1			Hole 2			Hole 3		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	150.2	-0.18 / 150.0	1	150.6	-0.18 / 150.4	1	150.2	-0.18 / 150.0
2	150.4	-0.16 / 150.2	2	150.7	-0.18 / 150.5	2	150.7	-0.18 / 150.5
3	150.6	-0.18 / 150.4	3	150.8	-0.18 / 150.6	3	150.3	-0.18 / 150.1
	Mean	150.22		Mean	150.52		Mean	150.22
	SD	0.200		SD	0.100		SD	0.265
	%RSD	0.133		%RSD	0.066		%RSD	0.176

Hole 4			Hole 5			Hole 6		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	149.6	-0.18 / 149.4	1	149.5	-0.18 / 149.3	1	149.6	-0.18 / 149.4
2	149.5	-0.18 / 149.3	2	149.5	-0.18 / 149.3	2	149.5	-0.18 / 149.3
3	149.5	-0.18 / 149.3	3	149.2	-0.18 / 149.0	3	149.4	-0.18 / 149.2
	Mean	149.35		Mean	149.22		Mean	149.32
	SD	0.058		SD	0.173		SD	0.100
	%RSD	0.039		%RSD	0.116		%RSD	0.067

Hole 7			Hole 8			Hole 9		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	150.2	-0.18 / 150.0	1	150.2	-0.18 / 150.0	1	150.2	-0.18 / 150.0
2	150.3	-0.18 / 150.1	2	150.4	-0.18 / 150.2	2	150.4	-0.18 / 150.2
3	150.4	-0.18 / 150.2	3	150.8	-0.18 / 150.4	3	150.4	-0.18 / 150.2
	Mean	150.12		Mean	150.22		Mean	150.15
	SD	0.100		SD	0.200		SD	0.115
	%RSD	0.067		%RSD	0.133		%RSD	0.077

Hole 10			Hole 11			Hole 12		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	150.1	-0.18 / 149.9	1	150.8	-0.18 / 150.6	1	150.9	-0.18 / 150.7
2	150.6	-0.18 / 150.4	2	150.2	-0.18 / 150.0	2	151.0	-0.18 / 150.8
3	151.5	-0.18 / 151.3	3	150.6	-0.18 / 150.4	3	150.9	-0.18 / 150.7
	Mean	150.55		Mean	155.55		Mean	150.75
	SD	0.709		SD	0.306		SD	0.058
	%RSD	0.471		%RSD	0.203		%RSD	0.038

Verified By Sukanda K. Approved By Phanuphan S.

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Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025 **Cert No.** 25/1242
Order No. 25030172

Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer	(°C)	Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
			Position 1	20.064			
			Position 2	20.085			
			Position 3	20.235			
			Position 4	20.231			
20.0	20.0	20.0	Position 5	20.077	0.397	0.428	0.57
			Position 6	20.083			
			Position 7	19.899			
			Position 8	19.990			
			Position 9	20.168			

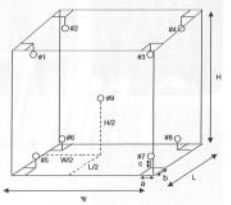
The stability and uniformity were taken into account in the measurement uncertainty stated.
The above results are valid exclusively for calibration samples as mentioned in this report.
This reported expanded uncertainty was based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evalustion has been carried out in accordance with ONAC requirements.

Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2025 **Cert No.** 25/1242
Order No. 25030172

Results (without adjustment)



Position of reference thermometers were placed

Note

1). Dimension (W x L x H) is 104 x 60 x 72 cm

2). Stability - greatest one half of difference between max peak and min peak of each reference probe measured temperature obtained during the calibration interval.

3). Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

Maintenance Protocol

analytikjena
An Endress+Hauser Company

PlasmaQuant® MS (Elite)
ICP-MS



Analytik Jena AG
Konrad-Zuse-Strasse 1
07745 Jena - Germany

Phone +49 3641 77 70
Fax +49 3641 77 9279
info@analytikjena.com
www.analytikjena.com

Version 01.20
Ref.

Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	00827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	25/1248
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2025
Calibration Date	10/04/2025	Next Cal. Date	10/04/2026

สรุปผลการ **Verify COD Reactor**

Set Temp. ที่ 159.5 องศาเซลเซียส ทำให้ Temp. อยู่ในช่วง 148 - 152 องศาเซลเซียส

Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	00827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	25/1248
Temperature Verify	159 ± 2 °C	Due Date Ref. std.	24/03/2025
Calibration Date	10/04/2025	Next Cal. Date	10/04/2026

Left

Hole 1			Hole 2			Hole 3		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.6	-0.18 / 148.4	1	148.6	-0.18 / 148.4	1	148.4	-0.18 / 148.2
2	148.4	-0.18 / 148.2	2	148.7	-0.18 / 148.5	2	148.6	-0.18 / 148.4
3	148.6	-0.18 / 148.4	3	148.6	-0.18 / 148.4	3	148.5	-0.18 / 148.3
	Mean	148.35		Mean	148.45		Mean	148.32
	SD	0.115		SD	0.058		SD	0.100
	%RSD	0.078		%RSD	0.039		%RSD	0.067

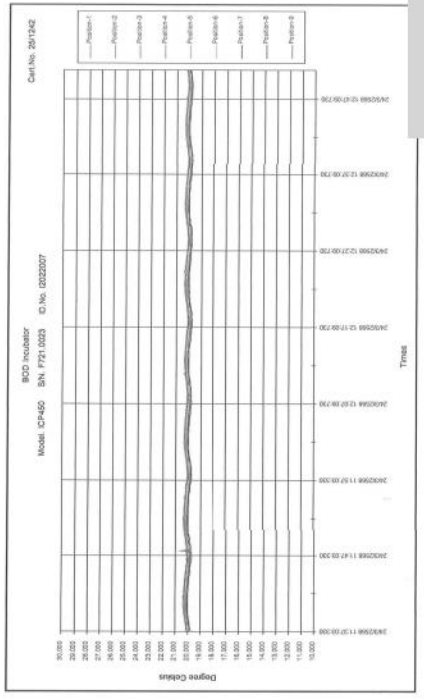
Hole 4			Hole 5			Hole 6		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.3	-0.18 / 148.1	1	148.4	-0.18 / 148.2	1	148.4	-0.18 / 148.2
2	148.4	-0.18 / 148.2	2	148.6	-0.18 / 148.4	2	148.4	-0.18 / 148.2
3	148.3	-0.18 / 148.1	3	148.5	-0.18 / 148.3	3	148.3	-0.18 / 148.1
	Mean	148.15		Mean	148.32		Mean	148.19
	SD	0.058		SD	0.100		SD	0.058
	%RSD	0.039		%RSD	0.067		%RSD	0.039

Hole 7			Hole 8			Hole 9		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.4	-0.18 / 148.2	1	148.6	-0.18 / 148.4	1	148.5	-0.18 / 148.3
2	148.4	-0.18 / 148.2	2	148.4	-0.18 / 148.2	2	148.6	-0.18 / 148.4
3	148.4	-0.18 / 148.2	3	148.6	-0.18 / 148.4	3	148.6	-0.18 / 148.4
	Mean	148.29		Mean	148.35		Mean	148.39
	SD	0.115		SD	0.115		SD	0.058
	%RSD	0.078		%RSD	0.078		%RSD	0.039

Hole 10			Hole 11			Hole 12		
NO.	Result		NO.	Result		NO.	Result	
	Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.		Temp. °C	Corr. / Temp+Corr.
1	148.4	-0.18 / 148.2	1	148.5	-0.18 / 148.3	1	148.5	-0.18 / 148.3
2	148.3	-0.18 / 148.1	2	148.4	-0.18 / 148.2	2	148.4	-0.18 / 148.2
3	148.5	-0.18 / 148.3	3	148.5	-0.18 / 148.3	3	148.5	-0.18 / 148.3
	Mean	148.33		Mean	148.39		Mean	148.39
	SD	0.100		SD	0.058		SD	0.058
	%RSD	0.067		%RSD	0.039		%RSD	0.039

Verified By Sukanda K. Approved By Phanuphan S.

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Service Report

Customer's address :	Customer's Ref. No.
SGS Rayong Sukhumvit 2 Rd, Ban Chang, Ban Chang District, Rayong 21150	DISTRIBUTOR
E-mail :	Phone : Fax :
Job No. 250626PB	User : system Service Engineer : Somchai N Date : 24-26/06/2025 Page : 1/1
Instrument model :	Serial No. 10-5000-030-26-AR109 Software Version No. 4.3.3

☐ Repair (RE) ☑ Maintenance (PM) ☐ Installation (IN) ☐ Warranty ☐ Application (AP) ☐ Site Prep.(SP) ☐ Visit(VI)

Fault / Claim : ☐ ☐ ☐ Error Code

PM1/2025

Clean cooling system , replaces DI water, adjust conductivity to 101 uS/cm, Clean water filter

Action taken : Clean extraction lenses #1 and #2.
Clean sample introduction system, torch,spray chamber,nebulizer, replace quick lock and clamp.
Clean water manifold, water valve assembly
Check spray chamber and replace all O-rings and water tubing.
Clean sampler/skimmer cones/replace O-rings.
Inspect/clean/adjust RF coil/ igniter/replace ignitor cable.
Clean all external covers and fans. Interlock Tests all passed.
Replace Activated Alumina (vacuum oil trap)
Tune up instrument ,ion and trim, mass calibration and run performance test with 1 ppb tuning standard.
Instrument working properly.

Action Pending / Recommendation : สายยางการเชื่อมต่อ AutoSample
418-10-405-336 Sample Probe (demountable) complete 1 ea. ที่เข้าไม่ได้ ต้องเปลี่ยน
418-13-410-541 Set pump tubing autosampler (grey/grey) 1 set
10-405-102 Z-Axis drive belt 1 ea.
10-405-316 Nipple, polypropylene, 2,5mm nipple 2,5 mm
fixed wash reservior ทำงาน 2 ชิ้น

☐ Spare Part ☐ Instrument Configuration

Item No.	Name	Quantity	Unit Price
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Maintenance Protocol

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Comments and recommendations:

.

Maintenance Protocol

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2 Maintenance Checklist

Tick each checkbox as the steps are completed.

Parts required

- ☑ 10-5000-220-20 Kit preventative maintenance ICP-MS
- ☑ 13-410-540 Cooling Water Additives

Choose one of the following oil types as it is important for rotary pump type:

- ☐ 418-68089-0 Vacuum Pump Oil (Esther Oil LVO 200) N/A
- ☑ 418-10-406-251 Vacuum Pump Oil (PFPE Oil LVO 420)

Initial performance tests

- ☑ Printout Details, Plasma Align (Time Scan mode), Res & Trim, Mass Cali, Detector Setup, Mass Scan (after new scan with tuning solution), Vacuum (Gate Valve opened and closed), iCRC, Ion Optics and Stepper pages from the instrument setup
- ☑ Verify performance (sensitivity/oxides/double charges) of system before starting maintenance

Vacuum system

- ☑ Drain and replace oil in rotary pump. Inspected
- ☑ Clean exterior of pump.
- ☑ Test vacuum interlock by attempting to start vacuum with Turbo pump #1 dismounted. Verify that appropriate error message is displayed.

Mass spectrometer system

- ☑ Check/adjust gate valve.
- ☑ Clean sampler/skimmer cones/replace O-rings.
- ☑ Check quadrupole resolution and check Quad Controller resonance.
  Resonance peak voltage is 2.75 v.
- ☑ Clean entrance lens and entrance plate
  Detector voltage is: 3210 v.

Maintenance Protocol

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1 Customer and service data

Customer data

Company	SGS
Department	Environmental Laboratory 1
Name	
Address (Street, Number, ZIP code, City)	Sukhumvit 2 Rd, Ban Chang, Ban Chang District, Rayong 21150
Telephone	
E-Mail	
Customer no.	
Order no.	

Device data

Device Type	PQMS Elite
Serial number	10-5000-030-26-AR109

Data of the authorized person for the Maintenance

Name, Company	Analytik Jena Instruments Thailand Ltd.
Date of the Maintenance	25 June 2025

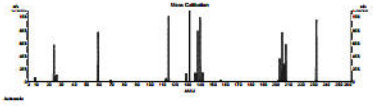
	yes	no
Maintenance with following Operational Qualification OQ (requires a separate OQ protocol)	☐	☑

analytikjena ASpect MS Instrument Setup Status Page 2 of 3
Report Date 2025-06-25 15:12:44 GMT+07:00
Title PM1_2025 Jun 25

Mass Calibration

Last calibration: 2025-06-25 14:43:26
[Worksheet: C:\Program Data\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.asmwx]

Isotope	Exact Mass	Current Mass	Theory - Cure	Resolution	Height (cts)	Status
In 9	9.012	9.009	0.003	0.77	56237.33	Pass
Mg25	24.986	24.984	0.002	0.75	73121.00	Pass
Co59	58.933	58.944	-0.011	0.70	765304.69	Pass
In115	114.904	114.904	0.000	0.70	1051608.38	Pass
Ce140	139.905	139.91	-0.006	0.70	1001149.00	Pass
Pb206	205.975	205.954	0.021	0.77	279282.00	Pass
Th232	232.038	232.040	-0.002	0.75	969168.00	Pass



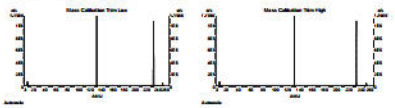
	Squared Term	Scale Factor	Offset
RF	-2.6113E-6	46.4585-6	25.4485-3

Resolution and Trim

Last modified: 2025-06-25 14:43:26
[Worksheet: C:\Program Data\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.asmwx]

	Offset	Scale Factor
RF	-132.436	226.259
DC	-102.696	252.539

	Isotope	Observed AMU	Width
LOW Mass	In 9	8.996	0.80
HIGH Mass	Th232	232.039	0.78

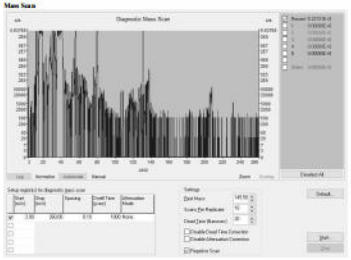


analytikjena ASpect MS Instrument Setup Status Page 1 of 3
Report Date 2025-06-25 15:12:44 GMT+07:00
Title PM1_2025 Jun 25

Details



Mass Scan



Maintenance Protocol

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Interlock Tests

- ☑ Turn off argon supply and ignite plasma. Verify if low argon error message is displayed.
- ☑ Ignite plasma and press emergency stop button. Verify that plasma goes out and appropriate error message is displayed.
- ☑ Ignite plasma and unlatch plasma compartment/main RF door. Verify that plasma goes out and appropriate error message is displayed.
- ☑ Ignite plasma and turn off argon supply. Check if plasma is turned off and appropriate low argon flow message is displayed.
- ☑ Turn off water cooler and light plasma. Verify if appropriate error message is displayed.

Accessories

- ☑ Verify initialization and operation of auto sampler. Check bells and whistles.
- ☑ Check all other accessories

Performance tests

- ☑ Update entries in Details page of Instrument Setup window as required.
- ☑ Printout every section of the Instrument Setup (service mode) and put it into the logbook.
- ☑ Tune up instrument and run performance test. Perform any corrective action necessary if results do not meet specifications. Add performance test results to logbook.

Instrument condition

- ☑ Assess and comment on condition of ICP-MS system
- ☑ Discuss condition, preventative maintenance results and instrument performance with the customer.
- ☑ Sign and date this checklist after obtaining customer's signature.

Instrument and environmental conditions

- ☑ Good ☐ Fair ☐ Poor

Maintenance Protocol

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Sample introduction system

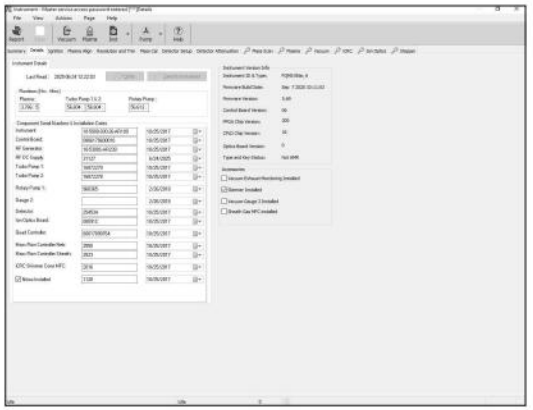
- ☑ Inspect torch.
- ☑ Inspect/replace torch gas tubing.
- ☑ Inspect/clean/adjust RF coil.
- ☑ Inspect ignitor/replace ignitor cable.
- ☑ Clean sampler/skimmer cones/replace O-rings.
- ☑ Clean extraction lenses #1 and #2.
- ☑ Remove nebulizer from spray chamber. Turn on the peristaltic pump (1.5 rpm) and nebulizer gas flow (1.0 L/min) and aspirate de-ionized water. Check that the aerosol produced by the nebulizer is normal and uniform.
- ☑ Check spray chamber and replace all O-rings and water tubing.
- ☑ Inspect sample introduction system electrical connections.

Water cooling system

- ☑ Drain water reservoir.
- ☑ Clean air intake filters & heat exchange fins as needed.
- ☑ Inspect all water hoses for cracks/leaks.
- ☑ Disassemble inline water filter & clean cartridge.
- ☑ Fill water reservoir with additives and check the water conductivity according to instruction. Conductivity = 100 uS/cm.
- ☑ Inspect mains cable and plug.
- ☑ Turn on and re-check water level.
- ☑ Check pressure (640±40 kPa) and temperature set point (20°C); adjust if necessary.
- ☑ Verify operation of the water solenoid.

Basic instrument

- ☑ Inspect condition of argon supply hose.
- ☑ Inspect mains power cable and plug.
- ☑ Check operation of exhaust system and inspect airflow sensor; if necessary clean according to instruction.
- ☑ Inspect USB and serial cables/connections.
- ☑ Clean all external covers and fans.
- ☑ Check argon inlet pressure if it is at recommended pressure of 700 kPa (100 psi) (allowed range is 600 to 830 kPa, 90 to 120 psi) Actual setting is 102 kPa/psi.
- ☑ Check iCRC for leakage and blockage according to service info. Check gas pressures:
  He ~150 kPa (22 psi), H2 ~100 kPa (16 psi)



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Report Date 2025-06-25 15:11:24 GMT+07:00
Worksheet System Test 25 Jun 2025.msws
Analyst

Worksheet Summary
Worksheet: System Test 25 Jun 2025.msws
Created: 2020-06-05 07:56:54
Analyst:
Computer: APPLICATIONICP
Last Saved: 2025-06-25 15:10:23 GMT+07:00
Software Ver.: 4.3 r10995
Firmware Ver.: 5.69
Samples: 1
Comment:

Chemistry
Matrix:
Acids Used:
Keywords:
CRM:

Measurement Parameters
Analysis Modes: Analysis Type: Quantitative, Acquisition Mode: Steady State, Scan Mode: Peak Hopping
Spacing: Centre, Points/Peak: 1, Scans/Replicate: 50, Replicates/Sample: 10

Plasma
Plasma flow: 9.00 L/min Auxiliary flow: 1.35 L/min Sheath Gas Flow: 0.00 L/min Nebuliser flow: 0.99 L/min
Sampling depth: 6.00 mm
Power: 1,200 kW Pump rate: 10 rpm Stabilization delay: 30 sec Nitrox Flow: 0.00 mL/min

Ion Optics (Volts)
Skimmer Bias: 0.00
First Extraction Lens: -53.00 Second Extraction Lens: -493.00 Third Extraction Lens: -496.00
Left Mirror Lens: 0.00 Right Mirror Lens: 53.00 Bottom Mirror Lens: 54.00
Center Lens: -446.00 Entrance Lens: 6.00
Fringe Bias: -3.00 Entrance Plate: -70.00
Detector Focus: True Pole Bias: 0.00

ICRC
Skimmer Cone: OFF ICRC Skimmer Gas Flow: 0 mL/min

Nitrox
0 mL/min

Sampling
Aerosol generation: Nebuliser, Source: Manual
Fast pump during sample delay/Rinse: On, Enable device control: OFF
Spray Chamber Cooling: On Spray Chamber Temp: 3.00 °C
Sample uptake delay: 30 sec, Smart Rinse: Yes, Switch Delay: OFF
Scan time: 1407 msec, Replicate time: 70.35 sec

Analytes (6)
Be9, Co59, In115, Ce140, Pb208, Th232

Semiquant Analytes (0)

Internal Standards (0)

No. of isotope ratio standards: 0

Isotope Ratios (2)
Ce140Ce/Ce140O16Ce140, Ba++/Ba(Ba138++Ba138)

Default exclusions (7)
Ar40, Ar40Ar40, N14, N14H1, O16, O16H1, Ar40H1

User-specified exclusions (0)

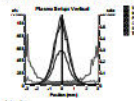
Scan Segments (11)

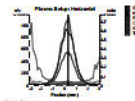
Start (mfr)	Stop (mfr)	Dwell (µs/ea)	Attenuation mode	Norm-Med	Med-High
5	5	60000		None	
8	10	60000		None	
58	60	60000		None	
69	69	60000		None	
114	116	60000		None	
138	140	60000		None	
156	158	60000		None	
207	209	60000		None	
220	220	60000		None	
228	228	60000		None	

analytikjena **ASpect MS Instrument Setup Status** Page 3 of 3
Report Date 2025-06-25 15:12:44 GMT+07:00
Title PM1_2025 Jun 25

Plasma Setup
Last modified: 2025-06-25 10:48:19
[Worksheet: C:\Program\Data\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.msws]

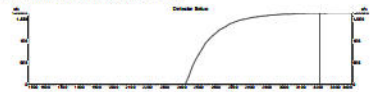
Horizontal (x) alignment: 0.30 mm, Vertical (y) alignment: 0.00 mm

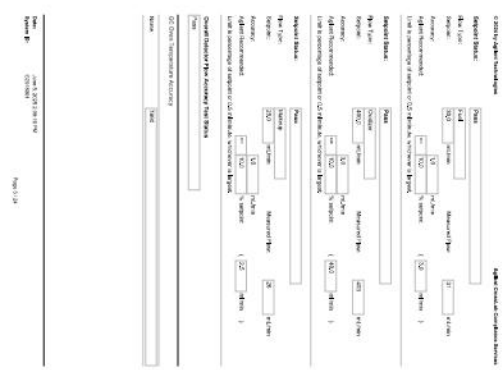


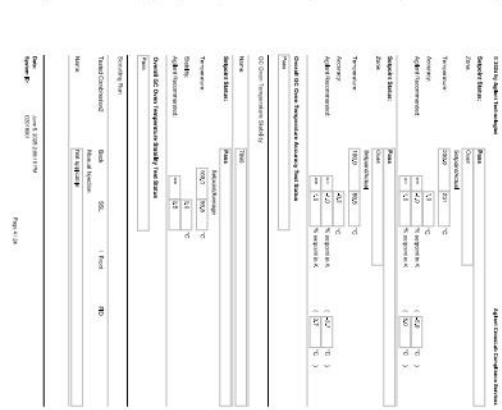


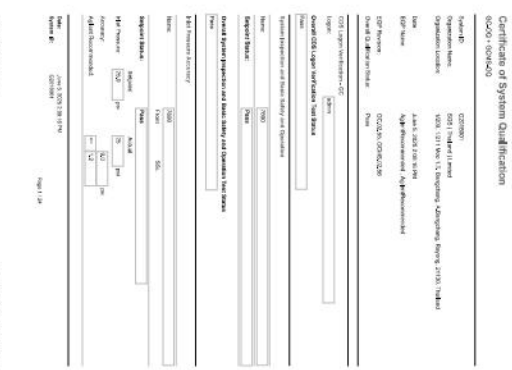
Detector Setup
Last modified: 2025-06-25 10:50:44
[Worksheet: C:\Program\Data\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.msws]

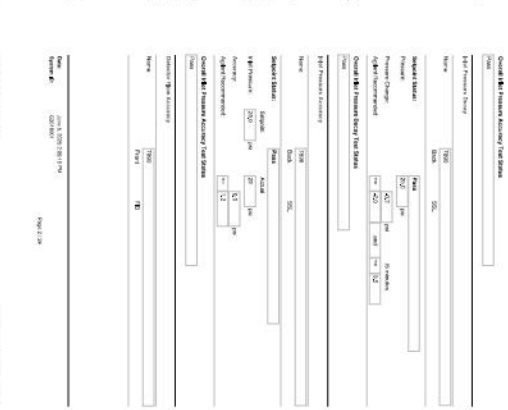
Detector Voltage 3200 volt, Scan Range From: 1500 - 3400 volt



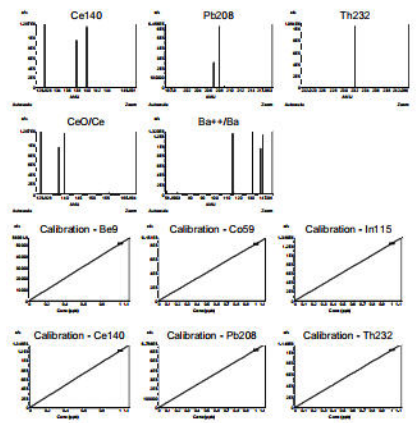








analytikjena **ASpect MS Worksheet Report** Page 3 of 3
Report Date 2025-06-25 15:11:24 GMT+07:00
Worksheet System Test 25 Jun 2025.msws
Analyst



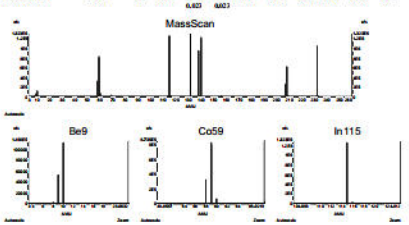
analytikjena **ASpect MS Worksheet Report** Page 2 of 3
Report Date 2025-06-25 15:11:24 GMT+07:00
Worksheet System Test 25 Jun 2025.msws
Analyst

Start (mfr)	Stop (mfr)	Dwell (µs/ea)	Attenuation mode	Norm-Med	Med-High
231	231	60000		None	

1 ppb Tuning solution [1 ppb Tuning solution]
Tune 2, Replicate 30, Auto Dilution factor: -(CalSlot 1, Time measured: 2025-06-25 10:10:23
Actual weight: 1.0000 g, Actual volume: 1.00 mL, Dilution Factor: 1.00
Position Horizontal: 0.30 mm Position Vertical: 0.00 mm Detector Voltage: 3210.00 volt

Analyte	Soln Conc	Unit	QC	Mean ab	%RSD	SD	Replicates (ab)				
Be9	1.0000	ppb	-	51301.60	0.72	371.8	51707	51042	51366	51270	51436
							51436	51450	50842	51171	51346
							51346	50856			
Co59	1.0000	ppb	-	820025.1	1.18	9673.2	831885	796040	826472	817928	819266
							819266	823205	823859	824786	825083
							825083	813067			
In115	1.0000	ppb	-	1240130	0.64	8001.3	1239767	1243571	1237494	1253068	1243334
							1243334	1257360	1248353	1240675	1250458
							1250458	1241489			
Ce140	1.0000	ppb	-	1209218	0.77	9256.5	1225137	1192868	1208656	1211723	1211688
							1211688	1215015	1213598	1211068	1197430
							1197430	1203004			
Pb208	1.0000	ppb	-	616015.1	0.96	5936.7	618351	615015	610190	609081	620719
							620719	616661	615095	625686	623426
							623426	622297			
Th232	1.0000	ppb	-	1042654	0.70	7316.2	1040777	1041703	1045408	1042580	1044542
							1044542	1037439	1044464	1040087	1033062
							1033062	1036358			

Isotope Ratio	Ratio	%RSD	SD	Replicates (ratio)					
Ce140Ce/Ce140	0.017	1.05	0.000	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016
				0.016	0.017						
Ba138++/Ba138	0.023	1.09	0.000	0.023	0.023	0.024	0.023	0.023	0.023	0.023	0.023
				0.023	0.023						



Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Signal to Noise

Tested Combination2 Back SSL / Front FID

Manual Injection

Name: 7690

Setpoint Status: Pass

Signal to Noise: 810547

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Noise and Drift

Tested Combination2 Back SSL / Front FID

Name: 7690

Setpoint Status: Pass

Base Signal: 6.9 pA

	ASTM Noise Response		Drift Response/h
	393.01		11115.63
Agilent Recommended:	<= 788.20	<=	11220.00
Status:	Pass		Pass

Overall Noise and Drift Test Status

Pass

Log Amp

Tested Combination1 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Overall Log Amp Test Status

Pass

RFPA

Tested Combination1 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Area: 1650 m/z Drift After Five Minutes: 0 mV RFPA Voltage: 463 mV

Agilent Recommended: >= -100 and <= 100 <= 1100

Overall RFPA Test Status

Pass

Tune EI

Tested Combination1 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Filament: 1

Setpoint Status: Pass

Filament: 2

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination1 Front SSL / External SQ

Injection Tower

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	G2019001
Manufacturer	Agilent Technologies
Name	7890
Raw Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

Tested Combination1

Injection Technique	Injection Tower
Inlet	Front
Detector	External
LTM Inducted?	No

Tested Combination2

Injection Technique	Manual Injection
Inlet	Back
Detector	Front
LTM Inducted?	No

Sampler 1

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN17490204
Firmware Revision	A.10.10
Usage	Sample Injection
Location	Front
Syringe Volume (uL)	10

Sampler 2

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN17490003
Firmware Revision	A.11.03
Vial Heater	Not Installed

Sampler 3

Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (uL)	10

Mainframe 1

Manufacturer	Agilent Technologies
Name	7890
Model Number	G3440B
Serial Number	CN17490084
Firmware Revision	B.02.05
Oven Type	Standard

Inlet 1

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

Name: 7693A

Source: EI - Extractor

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Instrument Detection Limit

Tested Combination1 Front SSL / External SQ

Injection Tower

Name: 7693A

Source: EI - Extractor

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area		Retention Time
Minimum RSD:	2.42	%	0.00	%
Agilent Recommended:	<= 5.00		<= 1.00	
Status:	Pass		Pass	

Instrument Detection Limit: 0.14972 fg

Agilent Recommended: <= 16.82500

Status: Pass

Overall Instrument Detection Limit Test Status

Pass

Mass Ratio Precision

Tested Combination1 Front SSL / External SQ

Injection Tower

Name: 7693A

Source: EI - Extractor

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area Mass 1 Abundance*5		Mass Ratio
RSD:	0.73	%	0.26	%
Agilent Recommended:	<= 5.00		<= 5.00	
	Pass		Pass	

Overall Mass Ratio Precision Test Status

Pass

Inlet 2

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

Detector 1

Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen

Detector 2

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5977B
Model Number	G7077B
Serial Number	US17490008
Firmware Revision	NA
High Vacuum System	Turbo Pump
Liquid Injection Scouting Run Standard	CPN Std

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Extractor
Number of Filaments	2

Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and logon to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	Eskmarn Puangsopa
Logged On User Name:	eskmarn_puangsopa@agilent.com
Signature Creation Date:	June 5, 2025
Reason for Signature:	Executed protocol and published this original version of document

ACE Self Qualification Status

The installed version of ACE used to deliver this service passed qualification; the results conform with expected values. The self qualification summary report is available in the session folder location SDS\ClearStore\Ace\SelfQualification.

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User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 4, 2025 1:54:26 PM	Audit	SessionCreated	Session	Host Name: ASA-5CG221439R, Drive Serial Number: 2A0F4E77
June 4, 2025 1:54:29 PM	start	Configuration	Session	None
June 4, 2025 1:54:29 PM	Audit	toolKernel	Licensing	User is Full Engineer and does not require unlock code
June 4, 2025 1:30:27 PM	Audit	EqpLoaded	Session	EQP details for primary technique (GC) • File path: [Public\Radio\Calib\Configurations\RJ2955\Alu\DLW.cfg] EQP File Name: [Alu\DLW.cfg] EQP Name: [Agilent Recommended] Product Revision: [G4513A] EQP details for automated technique (GMS) • File path: [Public\Radio\Calib\Configurations\RJ2955\Alu\DLW.cfg] EQP File Name: [Alu\DLW.cfg] EQP Name: [Agilent Recommended]
June 4, 2025 1:30:00 PM	End	Configuration	Session	None
June 4, 2025 1:30:00 PM	start	Qualification	Session	CQ
June 4, 2025 1:30:00 PM	Start	Execution	ICIS Layer Verification • GC • 7890 • Qualification test	None
June 4, 2025 1:25:14 PM	End	Execution	ICIS Layer Verification • GC • 7890 • Qualification test	Run Count : 1

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 4, 2025 1:30:03 PM	End	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Run Count : 1
June 4, 2025 1:30:37 PM	start	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	None
June 4, 2025 1:55:25 PM	Audit	Data	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Manual Data Entry
June 4, 2025 1:55:28 PM	End	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Run Count : 1
June 4, 2025 1:55:31 PM	start	Execution	GC Oven Temperature Stability • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0°C	None
June 4, 2025 2:21:32 PM	Audit	Data	GC Oven Temperature Stability • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0°C	Manual Data Entry
June 4, 2025 2:21:36 PM	End	Execution	GC Oven Temperature Stability • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0°C	Run Count : 1
June 4, 2025 2:21:42 PM	start	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	None
June 4, 2025 2:14:43 PM	Audit	AssEstablished	Session	None
June 5, 2025 9:50:04 AM	Audit	AssRestarted	Session	Host Name: ASA-5CG221439R, Drive Serial Number: 2A0F4E77

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 9:50:22 AM	start	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	None
June 5, 2025 9:50:24 AM	start	Qualification	Session	CQ
June 5, 2025 9:53:24 AM	start	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	None
June 5, 2025 9:57:12 AM	Audit	Data	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	Data like Path : 2-1003 Raising(FID1[Front]_FID)
June 5, 2025 9:57:47 AM	End	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	Run Count : 1
June 5, 2025 9:57:51 AM	start	Execution	Signal to Noise • Manual Injection, Back SSL, Front FID • Detector: FID • L: == 300000	None
June 5, 2025 9:58:23 AM	Audit	Data	Signal to Noise • Manual Injection, Back SSL, Front FID • Detector: FID • L: == 300000	Data like Path : 2-1003 Raising(HDR1[Sig_FID])
June 5, 2025 9:58:48 AM	End	Execution	Signal to Noise • Manual Injection, Back SSL, Front FID • Detector: FID • L: == 300000	Run Count : 1
June 5, 2025 9:59:09 AM	start	Execution	Noise and Drift • Front FID • Detector: FID • L: (None) == 0.70 pA • D/R: (>= 0.70 pA/hour	None
June 5, 2025 9:59:35 AM	Audit	Data	Noise and Drift • Front FID • Detector: FID • L: (None) == 0.70 pA • D/R: (>= 0.70 pA/hour	Data like Path : 2-1003 Raising(HDR2[FID1A_FID])

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 4, 2025 1:54:26 PM	Audit	SessionCreated	Session	Host Name: ASA-5CG221439R, Drive Serial Number: 2A0F4E77
June 4, 2025 1:54:29 PM	start	Configuration	Session	None
June 4, 2025 1:54:29 PM	Audit	toolKernel	Licensing	User is Full Engineer and does not require unlock code
June 4, 2025 1:30:27 PM	Audit	EqpLoaded	Session	EQP details for primary technique (GC) • File path: [Public\Radio\Calib\Configurations\RJ2955\Alu\DLW.cfg] EQP File Name: [Alu\DLW.cfg] EQP Name: [Agilent Recommended] Product Revision: [G4513A] EQP details for automated technique (GMS) • File path: [Public\Radio\Calib\Configurations\RJ2955\Alu\DLW.cfg] EQP File Name: [Alu\DLW.cfg] EQP Name: [Agilent Recommended]
June 4, 2025 1:30:00 PM	End	Configuration	Session	None
June 4, 2025 1:30:00 PM	start	Qualification	Session	CQ
June 4, 2025 1:30:00 PM	Start	Execution	ICIS Layer Verification • GC • 7890 • Qualification test	None
June 4, 2025 1:25:14 PM	End	Execution	ICIS Layer Verification • GC • 7890 • Qualification test	Run Count : 1

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 4, 2025 1:30:03 PM	End	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Run Count : 1
June 4, 2025 1:30:37 PM	start	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	None
June 4, 2025 1:55:25 PM	Audit	Data	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Manual Data Entry
June 4, 2025 1:55:28 PM	End	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Run Count : 1
June 4, 2025 1:55:31 PM	start	Execution	GC Oven Temperature Stability • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0°C	None
June 4, 2025 2:21:32 PM	Audit	Data	GC Oven Temperature Stability • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0°C	Manual Data Entry
June 4, 2025 2:21:36 PM	End	Execution	GC Oven Temperature Stability • 7890 • Temperature Oven = 0, 105.0°C +/- +/- +/-0°C	Run Count : 1
June 4, 2025 2:21:42 PM	start	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	None
June 4, 2025 2:14:43 PM	Audit	AssEstablished	Session	None
June 5, 2025 9:50:04 AM	Audit	AssRestarted	Session	Host Name: ASA-5CG221439R, Drive Serial Number: 2A0F4E77

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 9:50:22 AM	start	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	None
June 5, 2025 9:50:24 AM	start	Qualification	Session	CQ
June 5, 2025 9:53:24 AM	start	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	None
June 5, 2025 9:57:12 AM	Audit	Data	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	Data like Path : 2-1003 Raising(FID1[Front]_FID)
June 5, 2025 9:57:47 AM	End	Execution	GC Scouting Run • Manual Injection, Back SSL, Front FID • Part of System Preparation • No limits associated	Run Count : 1
June 5, 2025 9:57:51 AM	start	Execution	Signal to Noise • Manual Injection, Back SSL, Front FID • Detector: FID • L: == 300000	None
June 5, 2025 9:58:23 AM	Audit	Data	Signal to Noise • Manual Injection, Back SSL, Front FID • Detector: FID • L: == 300000	Data like Path : 2-1003 Raising(HDR1[Sig_FID])
June 5, 2025 9:58:48 AM	End	Execution	Signal to Noise • Manual Injection, Back SSL, Front FID • Detector: FID • L: == 300000	Run Count : 1
June 5, 2025 9:59:09 AM	start	Execution	Noise and Drift • Front FID • Detector: FID • L: (None) == 0.70 pA • D/R: (>= 0.70 pA/hour	None
June 5, 2025 9:59:35 AM	Audit	Data	Noise and Drift • Front FID • Detector: FID • L: (None) == 0.70 pA • D/R: (>= 0.70 pA/hour	Data like Path : 2-1003 Raising(HDR2[FID1A_FID])

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 4, 2025 1:40:16 PM	Audit	Data	Detector Raw Accuracy • Front FID • Type: Front - S: 0x0 m/z=n/a, I: +/- 1.50% setpoint	Manual Data Entry
June 4, 2025 1:40:19 PM	End	Execution	Detector Raw Accuracy • Front FID • Type: Front - S: 0x0 m/z=n/a, I: +/- 1.50% setpoint	Run Count : 1
June 4, 2025 1:40:20 PM	start	Execution	Detector Raw Accuracy • Front FID • Type: Front - S: 40.62 m/z=n/a, I: +/- 1.50% setpoint	None
June 4, 2025 1:40:17 PM	Audit	Data	Detector Raw Accuracy • Front FID • Type: Front - S: 40.62 m/z=n/a, I: +/- 1.50% setpoint	Manual Data Entry
June 4, 2025 1:40:20 PM	End	Execution	Detector Raw Accuracy • Front FID • Type: Front - S: 40.62 m/z=n/a, I: +/- 1.50% setpoint	Run Count : 1
June 4, 2025 1:40:21 PM	start	Execution	Detector Raw Accuracy • Front FID • Type: Makeup - S: 2x0 m/z=n/a, I: +/- 1.50% setpoint	None
June 4, 2025 1:47:42 PM	Audit	Data	Detector Raw Accuracy • Front FID • Type: Makeup - S: 2x0 m/z=n/a, I: +/- 1.50% setpoint	Manual Data Entry
June 4, 2025 1:47:45 PM	End	Execution	Detector Raw Accuracy • Front FID • Type: Makeup - S: 2x0 m/z=n/a, I: +/- 1.50% setpoint	Run Count : 1
June 4, 2025 1:47:46 PM	start	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 200.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	None
June 4, 2025 1:50:33 PM	Audit	Data	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 200.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Manual Data Entry

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 4, 2025 1:40:16 PM	Audit	Data	Detector Raw Accuracy • Front FID • Type: Front - S: 0x0 m/z=n/a, I: +/- 1.50% setpoint	Manual Data Entry
June 4, 2025 1:40:19 PM	End	Execution	Detector Raw Accuracy • Front FID • Type: Front - S: 0x0 m/z=n/a, I: +/- 1.50% setpoint	Run Count : 1
June 4, 2025 1:40:20 PM	start	Execution	Detector Raw Accuracy • Front FID • Type: Front - S: 40.62 m/z=n/a, I: +/- 1.50% setpoint	None
June 4, 2025 1:40:17 PM	Audit	Data	Detector Raw Accuracy • Front FID • Type: Front - S: 40.62 m/z=n/a, I: +/- 1.50% setpoint	Manual Data Entry
June 4, 2025 1:40:20 PM	End	Execution	Detector Raw Accuracy • Front FID • Type: Front - S: 40.62 m/z=n/a, I: +/- 1.50% setpoint	Run Count : 1
June 4, 2025 1:40:21 PM	start	Execution	Detector Raw Accuracy • Front FID • Type: Makeup - S: 2x0 m/z=n/a, I: +/- 1.50% setpoint	None
June 4, 2025 1:47:42 PM	Audit	Data	Detector Raw Accuracy • Front FID • Type: Makeup - S: 2x0 m/z=n/a, I: +/- 1.50% setpoint	Manual Data Entry
June 4, 2025 1:47:45 PM	End	Execution	Detector Raw Accuracy • Front FID • Type: Makeup - S: 2x0 m/z=n/a, I: +/- 1.50% setpoint	Run Count : 1
June 4, 2025 1:47:46 PM	start	Execution	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 200.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	None
June 4, 2025 1:50:33 PM	Audit	Data	GC Oven Temperature Accuracy • 7890 • Temperature Oven = 0, 200.0°C +/- +/- +/-0 AND +/- %/% setpoint in K	Manual Data Entry

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 9:09:52 AM	End	Execution	Noise and Drift • Front FID • Detector: FID • L: (None) == 0.70 pA • D/R: (>= 0.70 pA/hour	Run Count : 1
June 5, 2025 9:09:03 AM	start	Execution	Log Amp • 5977B SQ • Source: EI - Extractor	None
June 5, 2025 9:03:15 AM	End	Execution	Log Amp • 5977B SQ • Source: EI - Extractor	Run Count : 1
June 5, 2025 9:03:56 AM	start	Execution	RFPA • 5977B SQ • Source: EI - Extractor	None
June 5, 2025 9:12:04 AM	End	Execution	RFPA • 5977B SQ • Source: EI - Extractor	Run Count : 1
June 5, 2025 9:12:36 AM	start	Execution	Tune EI • 5977B SQ • Source: EI - Extractor • Filament: 1 (Calibrate • No setpoints associated)	None
June 5, 2025 9:05:45 AM	End	Execution	Tune EI • 5977B SQ • Source: EI - Extractor • Filament: 1 (Calibrate • No setpoints associated)	Run Count : 1
June 5, 2025 9:06:02 AM	start	Execution	Tune EI • 5977B SQ • Source: EI - Extractor • Filament: 2 (Calibrate • No setpoints associated)	None
June 5, 2025 9:43:26 AM	End	Execution	Tune EI • 5977B SQ • Source: EI - Extractor • Filament: 2 (Calibrate • No setpoints associated)	Run Count : 1
June 5, 2025 9:44:08 AM	start	Execution	Scouting Run • Injection Tower, Front SSL, SQ • Source: EI - Extractor • Part of GCMS System Preparation	None

User Name: eskmarn_puangsopa System ID: C2019001
Report Generated by Hostname: ASA-5CG221439R Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CN17490084_CQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 10:07:11 AM	start	Execution	Scouting Run • Injection Tower, Front SSL, SQ • Source: EI - Extractor, Part of GCMS System Preparation	None
June 5, 2025 12:01:00 PM	Audit	Data	Scouting Run • Injection Tower, Front SSL, SQ • Source: EI - Extractor, Part of GCMS System Preparation	Data like Path : 2-1003 Raising(MSHR[EI1_2])
June 5, 2025 12:01:16 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 • [Integration Type : Inject on Baseline Correction Mode: Advanced Inhibit Slope Sensitivity: 10 Inhibit Peak Width: 0.01 Area Reject: 0 Amt Height Reject: 0 Integration: Off at 0 Integration: On at 4]
June 5, 2025 12:01:33 PM	Audit	Reporting	Reintegration	Reintegration Count: 2 • [Integration Type : Inject on Baseline Correction Mode: Advanced Inhibit Slope Sensitivity: 10 Inhibit Peak Width: 0.01 Area Reject: 0 Amt Height Reject: 0 Integration: Off at 0 Integration: On at 4]
June 5, 2025 12:01:39 PM	Audit	Reporting	Reintegration	Reintegration Count: 3 • [Integration Type : Inject on Baseline Correction Mode: Advanced Inhibit Slope Sensitivity: 10 Inhibit Peak Width: 0.01 Area Reject: 0 Amt Height Reject: 0 Integration: Off at 0 Integration: On at 4]

User Name: ostrom_jcuengrupo System ID: G2019001
Report Generated by Hostname: ASJuG0222143KR Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CH17480066_OQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 12:41:59 PM	End	Execution	Resolving Run - Injection Tower, Front SSL, SQ, • Source, • Ti Extraction • Part Of QCMS Failure Precaution	Run Count : 1
June 5, 2025 12:41:59 PM	start	Execution	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	None
June 5, 2025 12:44:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\1.1 pt
June 5, 2025 12:44:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.2pt
June 5, 2025 12:44:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.1pt
June 5, 2025 12:44:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.05pt
June 5, 2025 12:44:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.02pt

User Name: ostrom_jcuengrupo System ID: G2019001
Report Generated by Hostname: ASJuG0222143KR Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CH17480066_OQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 12:04:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.1pt
June 5, 2025 12:04:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.2pt
June 5, 2025 12:04:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.05pt
June 5, 2025 12:04:03 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Data files Path : D:\SQS Reports\SHARED\0.02pt
June 5, 2025 12:04:27 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 • Integration Type: Injection Baseline Correction Mode: Advanced Peak Integrity Algorithm Area Reject: 0.0 Height Reject: 100 Integration: Off at 0 Integration: On at 0

User Name: ostrom_jcuengrupo System ID: G2019001
Report Generated by Hostname: ASJuG0222143KR Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CH17480066_OQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 12:59:31 PM	End	Execution	Instrument Detection Limit - Injection Tower, Front SSL, SQ, • Source, • El - Extraction • RSD i, (Area) => 5.245% • RSD i, (Rel. Time) => 1.245%	Run Count : 1
June 5, 2025 12:59:31 PM	start	Execution	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, C9 - Extractor •, (RSD) => 5.26%	None
June 5, 2025 1:45:35 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, C9 - Extractor •, (RSD) => 5.26%	Data files Path : D:\SQS Reports\SHARED_MRP\MS_MRP2
June 5, 2025 1:45:35 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, E9 - Extractor •, (RSD) => 5.26%	Data files Path : D:\SQS Reports\SHARED_MRP\MS_MRP2
June 5, 2025 1:45:35 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, F9 - Extractor •, (RSD) => 5.26%	Data files Path : D:\SQS Reports\SHARED_MRP\MS_MRP2
June 5, 2025 1:45:35 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, G9 - Extractor •, (RSD) => 5.26%	Data files Path : D:\SQS Reports\SHARED_MRP\MS_MRP2
June 5, 2025 1:45:35 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, F9 - Extractor •, (RSD) => 5.26%	Data files Path : D:\SQS Reports\SHARED_MRP\MS_MRP2
June 5, 2025 1:45:35 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, C9 - Extractor •, (RSD) => 5.26%	Data files Path : D:\SQS Reports\SHARED_MRP\MS_MRP2

User Name: ostrom_jcuengrupo System ID: G2019001
Report Generated by Hostname: ASJuG0222143KR Print Date: June 5, 2025 2:09:18 PM

SQS_RYG_CH17480066_OQ Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 5, 2025 1:49:09 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front SSL, SQ, • Source, D - Extractor •, (RSD) => 5.26%	Run Count : 1
June 5, 2025 1:49:19 PM	End	Qualification	Session	OQ
June 5, 2025 1:49:19 PM	start	Reporting	Session	None
June 5, 2025 2:00:10 PM	Audit	Reporting	Session	Report Generated : Certificate
June 5, 2025 2:07:40 PM	Audit	Reporting	Session	Report Generated : Report