

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

ภาคผนวก ค-1

คุณภาพอากาศในบรรยากาศ



Analysis / Test Report



Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540368

Date Received : May 13, 2025
Date Reported : May 15, 2025

Report Number: 3293697-1

TESTING
No.0042

Page 1 of 1

Sample Description		Air Quality			
Location		โรงงานอุตสาหกรรมท่าอากาศยาน (GPS 47P 0735497, 1445317)			
Date Analysis Commenced		May 13, 2025			
Condition of Sample		Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag			
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2540368-1	May 02 - May 03, 2025	0.055	0.029	751*	27.9*
2540368-2	May 03 - May 04, 2025	0.036	0.021	751*	25.7*
2540368-3	May 04 - May 05, 2025	0.035	0.019	751*	28.2*
2540368-4	May 05 - May 06, 2025	0.046	0.027	751*	28.5*
2540368-5	May 06 - May 07, 2025	0.038	0.024	751*	29.0*
2540368-6	May 07 - May 08, 2025	0.036	0.022	751*	29.3*
2540368-7	May 08 - May 09, 2025	0.031	0.023	751*	28.9*
Guideline		0.33	0.12	-	-

Reference Method

Total Suspended Particulate : United States Environmental Protection Agency 40 CFR, method 50, Appendix B, revised as of July 1, 2008
Particulate Matter (PM-10) : United States Environmental Protection Agency 40 CFR, method 50, Appendix 1, revised as of July 1, 2008

Guideline : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Nantawat Sarin

Remark : Result (s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

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Analysis / Test Report



Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540368

Date Received : May 13, 2025
Date Reported : May 15, 2025

Report Number: 3293697-2

TESTING
No.0042

Page 1 of 1

Sample Description		Air Quality			
Location	ท่าอากาศยานนานาชาติท่าอากาศยาน (GPS 47P 0738199, 1443916)				
Date Analysis Commenced	May 13, 2025				
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag				
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2540368-8	May 02 - May 03, 2025	0.040	0.029	751*	27.9*
2540368-9	May 03 - May 04, 2025	0.034	0.024	751*	25.8*
2540368-10	May 04 - May 05, 2025	0.031	0.022	751*	28.6*
2540368-11	May 05 - May 06, 2025	0.038	0.028	751*	28.8*
2540368-12	May 06 - May 07, 2025	0.030	0.020	751*	29.5*
2540368-13	May 07 - May 08, 2025	0.031	0.020	751*	28.7*
2540368-14	May 08 - May 09, 2025	0.032	0.024	751*	29.2*
Guideline		0.33	0.12	-	-

Reference Method

Total Suspended Particulate : United States Environmental Protection Agency 40 CFR, method 50, Appendix B, revised as of July 1, 2008
Particulate Matter (PM-10) : United States Environmental Protection Agency 40 CFR, method 50, Appendix 1, revised as of July 1, 2008

Guideline : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Nantawat Sarin

Remark : Result (s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.

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Analysis / Test Report



TESTING
No.0042

Lot ID: 2540368

Date Received : May 13, 2025
Date Reported : May 15, 2025
Report Number: 3293697-3

Client : Gulf T53 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GT53

Page 1 of 1

Sample Description	Air Quality	โรงงานทอผ้า (โรงงานฝ้าย) (GPS 47P 0739512, 1447941)				
Location		May 13, 2025				
Date Analysis Commenced		May 13, 2025				
Condition of Sample		Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag				
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)	
2540368-15	May 02 - May 03, 2025	0.045	0.027	751*	27.4*	
2540368-16	May 03 - May 04, 2025	0.031	0.021	751*	25.7*	
2540368-17	May 04 - May 05, 2025	0.038	0.022	751*	27.6*	
2540368-18	May 05 - May 06, 2025	0.043	0.027	751*	28.8*	
2540368-19	May 06 - May 07, 2025	0.035	0.022	751*	29.4*	
2540368-20	May 07 - May 08, 2025	0.035	0.022	751*	28.6*	
2540368-21	May 08 - May 09, 2025	0.035	0.026	751*	28.4*	
Guideline		0.33	0.12	-	-	
Reference Method	Total Suspended Particulate : United States Environmental Protection Agency 40 CFR, method 50, Appendix B, revised as of July 1, 2008 Particulate Matter (PM-10) : United States Environmental Protection Agency 40 CFR, method 50, Appendix J, revised as of July 1, 2008					
Guideline	Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004					
Sampled By	Nantawat Sarin					
Remark	Result (s) marked * by are not included in scope of Accreditation ISO/IEC 17025.					

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Analysis / Test Report



TESTING
No.0042

Lot ID: 2540368

Date Received : May 13, 2025
Date Reported : May 15, 2025
Report Number: 3293697-4

Client : Gulf T53 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GT53

Page 1 of 1

Sample Description	Air Quality				
Location	โรงงานทอผ้า (GPS 47° 0738170, 1442937)				
Date Analysis Commenced	May 13, 2025				
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag				
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2540368-22	May 02 - May 03, 2025	0.045	0.032	751*	27.6*
2540368-23	May 03 - May 04, 2025	0.035	0.022	751*	25.5*
2540368-24	May 04 - May 05, 2025	0.033	0.020	751*	28.6*
2540368-25	May 05 - May 06, 2025	0.039	0.025	751*	28.8*
2540368-26	May 06 - May 07, 2025	0.030	0.018	751*	29.0*
2540368-27	May 07 - May 08, 2025	0.029	0.022	751*	28.2*
2540368-28	May 08 - May 09, 2025	0.030	0.025	751*	28.4*
Guideline		0.33	0.12	-	-

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTSS3

Lot ID: 2540363
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3293693-1

Page 1 of 1

Sample Description		Air Quality									
Location		โรงงานอุตสาหกรรมสีฟอสฟอรัส (GPS 47P 0735497, 1445317)									
Parameter		Nitrogen dioxide (ppm)									
Measurement Date		May 02, 2025 - May 09, 2025									
Measurement by		Nantawat Sarin									
Time		2540363-1	2540363-2	2540363-3	2540363-4	2540363-5	2540363-6	2540363-7			
		May 02, 2025	May 03, 2025	May 04, 2025	May 05, 2025	May 06, 2025	May 07, 2025	May 08, 2025			
01:00 PM - 02:00 PM		0.0083	0.0101	0.0053	0.0071	0.0086	0.0080	0.0100			
02:00 PM - 03:00 PM		0.0081	0.0106	0.0039	0.0052	0.0085	0.0060	0.0105			
03:00 PM - 04:00 PM		0.0082	0.0086	0.0045	0.0051	0.0064	0.0076	0.0103			
04:00 PM - 05:00 PM		0.0100	0.0095	0.0041	0.0057	0.0105	0.0104	0.0122			
05:00 PM - 06:00 PM		0.0158	0.0145	0.0074	0.0095	0.0072	0.0111	0.0084			
06:00 PM - 07:00 PM		0.0217	0.0206	0.0084	0.0184	0.0070	0.0150	0.0115			
07:00 PM - 08:00 PM		0.0140	0.0177	0.0092	0.0175	0.0063	0.0086	0.0084			
08:00 PM - 09:00 PM		0.0234	0.0162	0.0169	0.0165	0.0064	0.0094	0.0182			
09:00 PM - 10:00 PM		0.0207	0.0143	0.0152	0.0189	0.0075	0.0107	0.0120			
10:00 PM - 11:00 PM		0.0208	0.0223	0.0120	0.0157	0.0061	0.0089	0.0168			
11:00 PM - 12:00 AM		0.0212	0.0231	0.0131	0.0111	0.0066	0.0082	0.0126			
12:00 AM - 01:00 AM		0.0221	0.0196	0.0082	0.0106	0.0074	0.0071	0.0116			
01:00 AM - 02:00 AM		0.0215	0.0186	0.0069	0.0100	0.0069	0.0073	0.0112			
02:00 AM - 03:00 AM		0.0178	0.0133	0.0068	0.0094	0.0077	0.0081	0.0098			
03:00 AM - 04:00 AM		0.0069	0.0112	0.0068	0.0093	0.0077	0.0092	0.0102			
04:00 AM - 05:00 AM		0.0068	0.0092	0.0070	0.0093	0.0095	0.0085	0.0105			
05:00 AM - 06:00 AM		0.0077	0.0124	0.0083	0.0110	0.0107	0.0100	0.0092			
06:00 AM - 07:00 AM		0.0114	0.0123	0.0113	0.0150	0.0133	0.0118	0.0117			
07:00 AM - 08:00 AM		0.0118	0.0106	0.0173	0.0186	0.0109	0.0152	0.0134			
08:00 AM - 09:00 AM		0.0113	0.0087	0.0087	0.0098	0.0095	0.0086	0.0116			
09:00 AM - 10:00 AM		0.0125	0.0083	0.0077	0.0074	0.0067	0.0067	0.0081			
10:00 AM - 11:00 AM		0.0118	0.0077	0.0076	0.0104	0.0056	0.0070	0.0067			
11:00 AM - 12:00 PM		0.0093	0.0072	0.0060	0.0115	0.0061	0.0049	0.0070			
12:00 PM - 01:00 PM		0.0074	0.0069	0.0075	0.0103	0.0065	0.0065	0.0072			
Average		0.0138	0.0128	0.0088	0.0114	0.0079	0.0090	0.0108			
1hr - Maximum		0.0234	0.0231	0.0173	0.0189	0.0133	0.0152	0.0182			
Standard 1hr - Average		0.170	0.170	0.170	0.170	0.170	0.170	0.170			

Standard : Notification of the National Environment Board No. 33, 2009 (B.E. 2552).
Reference Method : U.S. Environmental Protection Agency/Method Part 50 App. F (Chemiluminescence)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This report shall not be reproduced or used without the written approval of the laboratory.

Approved by

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTSS3

Lot ID: 2540363
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308982-1

Page 1 of 1

Sample Description		Air Quality									
Location		โรงงานอุตสาหกรรมสีฟอสฟอรัส (GPS 47P 0738199, 1443916)									
Parameter		Nitrogen dioxide (ppm)									
Measurement Date		May 02, 2025 - May 09, 2025									
Measurement by		Nantawat Sarin									
Time		2540363-8	2540363-9	2540363-10	2540363-11	2540363-12	2540363-13	2540363-14			
		May 02, 2025	May 03, 2025	May 04, 2025	May 05, 2025	May 06, 2025	May 07, 2025	May 08, 2025			
12:00 PM - 01:00 PM		0.0070	0.0068	0.0050	0.0098	0.0092	0.0052	0.0076			
01:00 PM - 02:00 PM		0.0063	0.0079	0.0050	0.0087	0.0053	0.0062	0.0103			
02:00 PM - 03:00 PM		0.0084	0.0079	0.0053	0.0101	0.0050	0.0043	0.0121			
03:00 PM - 04:00 PM		0.0077	0.0116	0.0049	0.0107	0.0045	0.0060	0.0162			
04:00 PM - 05:00 PM		0.0114	0.0069	0.0036	0.0104	0.0045	0.0110	0.0145			
05:00 PM - 06:00 PM		0.0123	0.0102	0.0046	0.0086	0.0067	0.0147	0.0156			
06:00 PM - 07:00 PM		0.0151	0.0114	0.0085	0.0099	0.0071	0.0139	0.0140			
07:00 PM - 08:00 PM		0.0188	0.0125	0.0089	0.0176	0.0105	0.0086	0.0152			
08:00 PM - 09:00 PM		0.0134	0.0188	0.0093	0.0183	0.0107	0.0096	0.0139			
09:00 PM - 10:00 PM		0.0134	0.0113	0.0093	0.0166	0.0130	0.0114	0.0145			
10:00 PM - 11:00 PM		0.0134	0.0085	0.0081	0.0131	0.0099	0.0078	0.0125			
11:00 PM - 12:00 AM		0.0108	0.0138	0.0091	0.0099	0.0081	0.0078	0.0127			
12:00 AM - 01:00 AM		0.0113	0.0129	0.0059	0.0077	0.0074	0.0063	0.0108			
01:00 AM - 02:00 AM		0.0149	0.0088	0.0045	0.0057	0.0058	0.0070	0.0085			
02:00 AM - 03:00 AM		0.0094	0.0069	0.0055	0.0065	0.0058	0.0097	0.0064			
03:00 AM - 04:00 AM		0.0062	0.0059	0.0061	0.0066	0.0054	0.0091	0.0071			
04:00 AM - 05:00 AM		0.0043	0.0074	0.0053	0.0070	0.0047	0.0073	0.0076			
05:00 AM - 06:00 AM		0.0073	0.0095	0.0073	0.0065	0.0066	0.0079	0.0073			
06:00 AM - 07:00 AM		0.0086	0.0124	0.0065	0.0059	0.0065	0.0077	0.0056			
07:00 AM - 08:00 AM		0.0118	0.0112	0.0071	0.0074	0.0061	0.0058	0.0047			
08:00 AM - 09:00 AM		0.0118	0.0067	0.0072	0.0065	0.0058	0.0078	0.0051			
09:00 AM - 10:00 AM		0.0153	0.0068	0.0082	0.0095	0.0048	0.0088	0.0086			
10:00 AM - 11:00 AM		0.0137	0.0084	0.0100	0.0088	0.0047	0.0074	0.0055			
11:00 AM - 12:00 PM		0.0116	0.0067	0.0076	0.0089	0.0055	0.0057	0.0060			
Average		0.0111	0.0096	0.0067	0.0096	0.0068	0.0083	0.0101			
1hr - Maximum		0.0188	0.0161	0.0100	0.0183	0.0130	0.0147	0.0162			
Standard 1hr - Average		0.170	0.170	0.170	0.170	0.170	0.170	0.170			

Standard : Notification of the National Environment Board No. 33, 2009 (B.E. 2552).
Reference Method : U.S. Environmental Protection Agency/Method Part 50 App. F (Chemiluminescence)

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540363
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308983-1

Page 1 of 1

Sample Description		Air Quality	
Location	Parameter	Nitrogen dioxide (ppm)	
Measurement Date	Measurement by	Nantawat Sarin	
Time		2540363-15	2540363-16
		May 02, 2025	May 03, 2025
12:00 PM - 01:00 PM		0.0028	0.0084
01:00 PM - 02:00 PM		0.0017	0.0035
02:00 PM - 03:00 PM		0.0021	0.0037
03:00 PM - 04:00 PM		0.0016	0.0055
04:00 PM - 05:00 PM		0.0019	0.0024
05:00 PM - 06:00 PM		0.0041	0.0079
06:00 PM - 07:00 PM		0.0057	0.0139
07:00 PM - 08:00 PM		0.0064	0.0093
08:00 PM - 09:00 PM		0.0037	0.0104
09:00 PM - 10:00 PM		0.0042	0.0093
10:00 PM - 11:00 PM		0.0033	0.0099
11:00 PM - 12:00 AM		0.0034	0.0079
12:00 AM - 01:00 AM		0.0032	0.0063
01:00 AM - 02:00 AM		0.0038	0.0050
02:00 AM - 03:00 AM		0.0045	0.0032
03:00 AM - 04:00 AM		0.0053	0.0026
04:00 AM - 05:00 AM		0.0023	0.0025
05:00 AM - 06:00 AM		0.0036	0.0025
06:00 AM - 07:00 AM		0.0071	0.0025
07:00 AM - 08:00 AM		0.0054	0.0026
08:00 AM - 09:00 AM		0.0060	0.0030
09:00 AM - 10:00 AM		0.0083	0.0016
10:00 AM - 11:00 AM		0.0110	0.0024
11:00 AM - 12:00 PM		0.0106	0.0047
Average		0.0047	0.0055
1hr - Maximum		0.0110	0.0139
Standard 1hr - Average		0.170	0.170
Standard			
: Notification of the National Environment Board No. 33, 2009 (B.E. 2552).			
Reference Method : U.S. Environmental Protection Agency/Method Part 50 App. F (Chemiluminescence)			

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540363
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308985-1

Page 1 of 1

Sample Description		Air Quality ค่าเฉลี่ยค่ามาตรฐาน (GPS 47P 0738170, 1442937) Nitrogen dioxide (ppm) May 02, 2025 - May 09, 2025 Nantawat Sarin														
Location	Parameter	Measurement Date	2540363-22		2540363-23		2540363-24		2540363-25		2540363-26		2540363-27		2540363-28	
		Time	May 02, 2025	May 03, 2025	May 04, 2025	May 05, 2025	May 06, 2025	May 07, 2025	May 08, 2025	May 09, 2025	May 10, 2025	May 11, 2025	May 12, 2025	May 13, 2025	May 14, 2025	May 15, 2025
		12:00 PM - 01:00 PM	0.0101	0.0081	0.0065	0.0075	0.0088	0.0042	0.0094	0.0094	0.0088	0.0061	0.0053	0.0053	0.0053	0.0059
		01:00 PM - 02:00 PM	0.0108	0.0079	0.0061	0.0068	0.0061	0.0053	0.0059	0.0059	0.0061	0.0052	0.0036	0.0036	0.0036	0.0079
		02:00 PM - 03:00 PM	0.0087	0.0077	0.0050	0.0071	0.0052	0.0036	0.0079	0.0079	0.0052	0.0046	0.0052	0.0052	0.0052	0.0070
		03:00 PM - 04:00 PM	0.0078	0.0070	0.0045	0.0088	0.0046	0.0052	0.0070	0.0070	0.0046	0.0046	0.0052	0.0052	0.0052	0.0070
		04:00 PM - 05:00 PM	0.0093	0.0062	0.0044	0.0077	0.0065	0.0113	0.0103	0.0103	0.0065	0.0065	0.0113	0.0113	0.0113	0.0103
		05:00 PM - 06:00 PM	0.0131	0.0067	0.0053	0.0092	0.0063	0.0116	0.0095	0.0095	0.0063	0.0063	0.0116	0.0116	0.0116	0.0095
		06:00 PM - 07:00 PM	0.0136	0.0112	0.0082	0.0116	0.0051	0.0093	0.0081	0.0081	0.0051	0.0051	0.0093	0.0093	0.0093	0.0081
		07:00 PM - 08:00 PM	0.0182	0.0149	0.0081	0.0161	0.0059	0.0108	0.0062	0.0062	0.0059	0.0059	0.0108	0.0108	0.0108	0.0062
		08:00 PM - 09:00 PM	0.0147	0.0122	0.0111	0.0207	0.0057	0.0112	0.0067	0.0067	0.0057	0.0057	0.0112	0.0112	0.0112	0.0067
		09:00 PM - 10:00 PM	0.0108	0.0115	0.0096	0.0179	0.0072	0.0103	0.0105	0.0105	0.0072	0.0072	0.0103	0.0103	0.0103	0.0105
		10:00 PM - 11:00 PM	0.0106	0.0126	0.0078	0.0123	0.0079	0.0092	0.0110	0.0110	0.0079	0.0079	0.0092	0.0092	0.0092	0.0110
		11:00 PM - 12:00 AM	0.0078	0.0114	0.0072	0.0081	0.0078	0.0084	0.0124	0.0124	0.0078	0.0078	0.0084	0.0084	0.0084	0.0124
		12:00 AM - 01:00 AM	0.0082	0.0110	0.0049	0.0074	0.0078	0.0061	0.0116	0.0116	0.0078	0.0078	0.0061	0.0061	0.0061	0.0116
		01:00 AM - 02:00 AM	0.0115	0.0088	0.0055	0.0081	0.0070	0.0061	0.0085	0.0085	0.0070	0.0070	0.0061	0.0061	0.0061	0.0085
		02:00 AM - 03:00 AM	0.0107	0.0057	0.0049	0.0081	0.0050	0.0075	0.0097	0.0097	0.0050	0.0050	0.0075	0.0075	0.0075	0.0097
		03:00 AM - 04:00 AM	0.0052	0.0055	0.0053	0.0070	0.0043	0.0081	0.0084	0.0084	0.0043	0.0043	0.0081	0.0081	0.0081	0.0084
		04:00 AM - 05:00 AM	0.0043	0.0070	0.0049	0.0067	0.0045	0.0073	0.0080	0.0080	0.0045	0.0045	0.0073	0.0073	0.0073	0.0075
		05:00 AM - 06:00 AM	0.0054	0.0081	0.0044	0.0070	0.0045	0.0070	0.0080	0.0080	0.0045	0.0045	0.0070	0.0070	0.0070	0.0080
		06:00 AM - 07:00 AM	0.0071	0.0095	0.0067	0.0101	0.0124	0.0120	0.0089	0.0089	0.0124	0.0124	0.0120	0.0120	0.0120	0.0115
		07:00 AM - 08:00 AM	0.0098	0.0086	0.0109	0.0113	0.0107	0.0115	0.0114	0.0114	0.0107	0.0107	0.0115	0.0115	0.0115	0.0115
		08:00 AM - 09:00 AM	0.0100	0.0067	0.0078	0.0095	0.0076	0.0082	0.0114	0.0114	0.0076	0.0076	0.0082	0.0082	0.0082	0.0114
		09:00 AM - 10:00 AM	0.0117	0.0061	0.0063	0.0075	0.0047	0.0062	0.0070	0.0070	0.0047	0.0047	0.0062	0.0062	0.0062	0.0070
		10:00 AM - 11:00 AM	0.0103	0.0089	0.0078	0.0084	0.0064	0.0067	0.0067	0.0067	0.0064	0.0064	0.0067	0.0067	0.0067	0.0067
		11:00 AM - 12:00 PM	0.0102	0.0066	0.0072	0.0087	0.0045	0.0056	0.0059	0.0059	0.0045	0.0045	0.0056	0.0056	0.0056	0.0059
		Average	0.0100	0.0087	0.0067	0.0097	0.0064	0.0080	0.0088	0.0088	0.0064	0.0064	0.0080	0.0080	0.0080	0.0088
		1hr - Maximum	0.0182	0.0149	0.0111	0.0207	0.0124	0.0120	0.0124	0.0124	0.0124	0.0124	0.0120	0.0120	0.0120	0.0124
		Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
		Standard														
		Reference Method	: Notification of the National Environment Board No. 33, 2009 (B.E. 2552). : U.S. Environmental Protection Agency/Method Part 50 App. F (Chemiluminescence)													

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This report shall not be reproduced or used without the written approval of the laboratory.</



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTSS3

Lot ID: 2540364
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3293695-1

Page 1 of 1

Sample Description	Air Quality									
	โรงงานอุตสาหกรรมในพื้นที่อุตสาหกรรม (GPS 47° 07'35.947", 14°45'31.7")									
Location	Sulfur Dioxide (ppm)									
Parameter										
Measurement Date	May 02, 2025 - May 09, 2025									
Measurement by	Nantawat Sarin									

Time	2540364-1		2540364-2		2540364-3		2540364-4		2540364-5		2540364-6		2540364-7	
	May 02, 2025	May 03, 2025	May 03, 2025	May 04, 2025	May 04, 2025	May 05, 2025	May 05, 2025	May 06, 2025	May 06, 2025	May 07, 2025	May 07, 2025	May 08, 2025	May 08, 2025	May 08, 2025
01:00 PM - 02:00 PM	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008
02:00 PM - 03:00 PM	0.0008	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008
03:00 PM - 04:00 PM	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007
04:00 PM - 05:00 PM	0.0009	0.0009	0.0007	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008
05:00 PM - 06:00 PM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
06:00 PM - 07:00 PM	0.0008	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
07:00 PM - 08:00 PM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
08:00 PM - 09:00 PM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
09:00 PM - 10:00 PM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
10:00 PM - 11:00 PM	0.0008	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
11:00 PM - 12:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
12:00 AM - 01:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
01:00 AM - 02:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
02:00 AM - 03:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
03:00 AM - 04:00 AM	0.0010	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
04:00 AM - 05:00 AM	0.0010	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
05:00 AM - 06:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
06:00 AM - 07:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
07:00 AM - 08:00 AM	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008
08:00 AM - 09:00 AM	0.0008	0.0008	0.0007	0.0006	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
09:00 AM - 10:00 AM	0.0007	0.0007	0.0007	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
10:00 AM - 11:00 AM	0.0007	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
11:00 AM - 12:00 PM	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
12:00 PM - 01:00 PM	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
Average	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
1hr - Maximum	0.0010	0.0009	0.0009	0.0010	0.0010	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Standard	: Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).													
Reference Method	: U.S. Environmental Protection Agency, EPA Method Part 53 and 58													

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTSS3

Lot ID: 2540364
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308987-1

Page 1 of 1

Sample Description	Air Quality									
	โรงงานอุตสาหกรรมในพื้นที่อุตสาหกรรม (GPS 47° 07'38.199", 14°43'91.6")									
Location	Sulfur Dioxide (ppm)									
Parameter										
Measurement Date	May 02, 2025 - May 09, 2025									
Measurement by	Nantawat Sarin									

Time	2540364-8		2540364-9		2540364-10		2540364-11		2540364-12		2540364-13		2540364-14	
	May 02, 2025	May 03, 2025	May 03, 2025	May 04, 2025	May 04, 2025	May 05, 2025	May 05, 2025	May 06, 2025	May 06, 2025	May 07, 2025	May 07, 2025	May 08, 2025	May 08, 2025	
12:00 PM - 01:00 PM	0.0003	0.0003	0.0006	0.0004	0.0004	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	
01:00 PM - 02:00 PM	0.0003	0.0003	0.0009	0.0004	0.0004	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	
02:00 PM - 03:00 PM	0.0003	0.0003	0.0010	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
03:00 PM - 04:00 PM	0.0003	0.0003	0.0008	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
04:00 PM - 05:00 PM	0.0004	0.0004	0.0009	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	
05:00 PM - 06:00 PM	0.0004	0.0004	0.0007	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	
06:00 PM - 07:00 PM	0.0003	0.0003	0.0006	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	
07:00 PM - 08:00 PM	0.0005	0.0005	0.0006	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	
08:00 PM - 09:00 PM	0.0005	0.0005	0.0005	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0006	0.0006	
09:00 PM - 10:00 PM	0.0006	0.0006	0.0005	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0007	0.0007	0.0007	
10:00 PM - 11:00 PM	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006	0.0006	
11:00 PM - 12:00 AM	0.0004	0.0004	0.0005	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007	0.0007	
12:00 AM - 01:00 AM	0.0004	0.0004	0.0004	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0008	0.0008	
01:00 AM - 02:00 AM	0.0004	0.0004	0.0005	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0006	0.0006	
02:00 AM - 03:00 AM	<0.0001	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0006	0.0006	
03:00 AM - 04:00 AM	0.0002	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006	0.0007	0.0007	
04:00 AM - 05:00 AM	0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0007	0.0007	0.0007	
05:00 AM - 06:00 AM	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0007	0.0007	0.0007	
06:00 AM - 07:00 AM	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	
07:00 AM - 08:00 AM	0.0006	0.0006	0.0007	0.0004	0.0004	0.0005	0.0005	0.0004	0.0004	0.0004	0.0006	0.0006	0.0006	
08:00 AM - 09:00 AM	0.0007	0.0007	0.0005	0.0003	0.0003	0.0005	0.0005	0.0003	0.0003	0.0003	0.0005	0.0005	0.0005	
09:00 AM - 10:00 AM	0.0008	0.0008	0.0002	0.0002	0.0002	0.0004	0.0004	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	
10:00 AM - 11:00 AM	0.0007	0.0007	0.0002	0.0003	0.0003	0.0003	0.0003	0.0001	0.0001	0.0002	0.0002	0.0004	0.0004	
11:00 AM - 12:00 PM	0.0006	0.0006	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	
Average	0.0004	0.0004	0.0006	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	
1hr - Maximum	0.0008	0.0008	0.0010	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0007	0.0007	0.0008	0.0008	
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	
Standard Reference	: Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).													
Reference Method	: U.S. Environmental Protection Agency, EPA Method Part 53 and 58													



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassik, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540364
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308988-1

Page 1 of 1

Sample Description		Air Quality	
Location	Parameter	Location	Parameter
Sulfur Dioxide (ppm)		GPS 47P 0739512, 1447941	
Measurement Date	Measurement by	Measurement Date	Measurement by
May 02, 2025 - May 09, 2025	Nantawat Sarin	May 02, 2025 - May 09, 2025	Nantawat Sarin
Time		Time	
12:00 PM - 01:00 PM	0.0007	2540364-15	0.0001
01:00 PM - 02:00 PM	0.0001	2540364-16	0.0001
02:00 PM - 03:00 PM	0.0007	2540364-17	0.0001
03:00 PM - 04:00 PM	0.0006	2540364-18	0.0001
04:00 PM - 05:00 PM	0.0002	2540364-19	0.0001
05:00 PM - 06:00 PM	0.0002	2540364-20	0.0001
06:00 PM - 07:00 PM	0.0002	2540364-21	0.0001
07:00 PM - 08:00 PM	0.0001		
08:00 PM - 09:00 PM	0.0001		
09:00 PM - 10:00 PM	0.0001		
10:00 PM - 11:00 PM	0.0001		
11:00 PM - 12:00 AM	0.0001		
12:00 AM - 01:00 AM	0.0001		
01:00 AM - 02:00 AM	0.0001		
02:00 AM - 03:00 AM	0.0001		
03:00 AM - 04:00 AM	0.0001		
04:00 AM - 05:00 AM	0.0001		
05:00 AM - 06:00 AM	0.0001		
06:00 AM - 07:00 AM	0.0001		
07:00 AM - 08:00 AM	0.0001		
08:00 AM - 09:00 AM	0.0001		
09:00 AM - 10:00 AM	0.0001		
10:00 AM - 11:00 AM	0.0001		
11:00 AM - 12:00 PM	0.0001		
Average	0.0002		
1hr - Maximum	0.0007		
Standard 1hr - Average	0.3		
Standard 24 hrs - Average	0.12		
Standard			
Reference Method			

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by
Orawan R.
Orawan Rakying
Scientist (3)

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassik, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540364
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308989-1

Page 1 of 1

Sample Description		Air Quality	
Location	Parameter	Location	Parameter
Sulfur Dioxide (ppm)		GPS 47P 0738170, 1442937	
Measurement Date	Measurement by	Measurement Date	Measurement by
May 02, 2025 - May 09, 2025	Nantawat Sarin	May 02, 2025 - May 09, 2025	Nantawat Sarin
Time		Time	
12:00 PM - 01:00 PM	0.0022	2540364-22	0.0022
01:00 PM - 02:00 PM	0.0022	2540364-23	0.0023
02:00 PM - 03:00 PM	0.0021	2540364-24	0.0023
03:00 PM - 04:00 PM	0.0022	2540364-25	0.0023
04:00 PM - 05:00 PM	0.0021	2540364-26	0.0023
05:00 PM - 06:00 PM	0.0021	2540364-27	0.0023
06:00 PM - 07:00 PM	0.0021	2540364-28	0.0023
07:00 PM - 08:00 PM	0.0021		
08:00 PM - 09:00 PM	0.0021		
09:00 PM - 10:00 PM	0.0021		
10:00 PM - 11:00 PM	0.0021		
11:00 PM - 12:00 AM	0.0021		
12:00 AM - 01:00 AM	0.0021		
01:00 AM - 02:00 AM	0.0021		
02:00 AM - 03:00 AM	0.0022		
03:00 AM - 04:00 AM	0.0022		
04:00 AM - 05:00 AM	0.0022		
05:00 AM - 06:00 AM	0.0022		
06:00 AM - 07:00 AM	0.0022		
07:00 AM - 08:00 AM	0.0021		
08:00 AM - 09:00 AM	0.0021		
09:00 AM - 10:00 AM	0.0021		
10:00 AM - 11:00 AM	0.0021		
11:00 AM - 12:00 PM	0.0021		
Average	0.0022		
1hr - Maximum	0.0023		
Standard 1hr - Average	0.3		
Standard 24 hrs - Average	0.12		
Standard			
Reference Method			

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by
Orawan R.
Orawan Rakying
Scientist (3)

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15430 61/ EMAIL S:\Reports_Air SONOX.rpt (3.25PM)



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540366

Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Sample Number 2540366-1 to 7

Parameter Wind Speed / Wind Direction

Location ตำบลบ้านนาใหม่ (GPS 47P 0735497, 1445317)

Sampling Date May 02 - May 09, 2025

Sampling by Nantawat Sarin

Time	May 02 - May 03, 2025		May 03 - May 04, 2025		May 04 - May 05, 2025		May 05 - May 06, 2025		May 06 - May 07, 2025		May 07 - May 08, 2025		May 08 - May 09, 2025	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
01:00 PM - 02:00 PM	0.6	283.0 NNW	0.0	-	0.0	-	0.0	-	0.0	-	2.4	147.0 SSE	1.5	282.0 NNW
02:00 PM - 03:00 PM	0.3	299.0 NNW	0.9	133.0 SE	0.3	191.0 S	0.0	-	1.2	104.0 ESE	3.2	489.0 S	0.8	240.0 WSW
03:00 PM - 04:00 PM	1.8	98.0 E	1.9	269.0 W	0.0	-	0.8	209.0 SSW	0.9	83.0 E	2.4	140.0 SE	0.0	-
04:00 PM - 05:00 PM	0.0	-	0.7	184.0 S	0.7	79.0 E	0.0	-	1.0	117.0 ESE	1.8	123.0 ESE	0.1	-
05:00 PM - 06:00 PM	0.5	106.0 ESE	1.5	315.0 NW	1.6	160.0 SSE	0.0	-	1.1	124.0 SE	1.2	113.0 ESE	0.0	-
06:00 PM - 07:00 PM	0.3	153.0 SSE	1.1	255.0 WSW	0.5	139.0 SE	0.5	279.0 W	0.9	99.0 E	1.4	129.0 SE	0.5	191.0 S
07:00 PM - 08:00 PM	0.4	52.0 NE	0.5	163.0 SSE	0.7	152.0 SSE	0.0	-	1.3	175.0 S	0.5	131.0 SE	0.0	-
08:00 PM - 09:00 PM	0.2	-	0.0	-	0.0	-	0.0	-	0.0	-	0.5	126.0 SE	0.0	-
09:00 PM - 10:00 PM	0.0	-	0.3	341.0 NNW	1.0	266.0 W	0.4	260.0 W	0.7	171.0 S	0.0	-	0.0	-
10:00 PM - 11:00 PM	0.0	-	0.5	328.0 NNW	0.0	-	0.0	-	0.0	-	0.0	-	0.4	233.0 SW
11:00 PM - 12:00 AM	0.5	301.0 NNW	0.0	-	0.0	-	0.0	-	0.5	145.0 SE	0.4	203.0 SSW	0.0	-
12:00 AM - 01:00 AM	0.2	-	0.0	-	0.0	-	0.0	-	0.0	-	0.3	145.0 SE	0.0	-
01:00 AM - 02:00 AM	0.0	-	0.0	-	0.2	-	0.2	-	0.0	-	0.0	-	0.0	-
02:00 AM - 03:00 AM	0.3	69.0 ENE	1.5	326.0 NW	0.0	-	0.0	-	0.0	-	0.0	-	0.3	271.0 W
03:00 AM - 04:00 AM	0.6	174.0 S	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
04:00 AM - 05:00 AM	0.2	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
05:00 AM - 06:00 AM	0.7	4.0 N	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
06:00 AM - 07:00 AM	0.0	-	0.4	152.0 SSE	0.0	-	0.7	143.0 SE	0.8	176.0 S	0.0	-	0.6	289.0 WSW
07:00 AM - 08:00 AM	1.1	285.0 NNW	2.2	148.0 SSE	1.7	202.0 SSW	0.3	82.0 E	1.0	66.0 ENE	0.8	156.0 SSE	0.2	-
08:00 AM - 09:00 AM	0.8	107.0 ESE	1.4	139.0 SE	0.9	147.0 SSE	1.2	107.0 ESE	1.1	192.0 SSW	1.6	307.0 NW	0.4	205.0 SSW
09:00 AM - 10:00 AM	0.0	-	0.5	280.0 W	0.6	311.0 NW	0.5	121.0 ESE	1.4	102.0 ESE	1.0	113.0 ESE	1.2	224.0 SW
10:00 AM - 11:00 AM	2.9	279.0 W	0.4	272.0 W	0.4	201.0 SSW	2.0	95.0 E	2.2	145.0 SE	2.0	285.0 NNW	0.8	196.0 SSW
11:00 AM - 12:00 PM	1.1	76.0 ENE	1.0	247.0 WSW	0.0	-	0.0	-	0.3	212.0 SSW	0.3	119.0 ESE	0.9	198.0 SSW
12:00 PM - 01:00 PM	4.1	295.0 NNW	0.0	-	0.8	80.0 E	2.8	60.0 ENE	1.6	125.0 SE	1.9	345.0 NNW	1.1	217.0 SW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analytical method used in this report. The results are not to be used for any other purpose without written consent from the Laboratory. ALS Laboratory Group (Thailand) Co., Ltd. is not responsible for any errors or omissions in this report. Strongly recommended that this report is not reproduced except in full.

Approved by

Sarayu Jitranont

Assistant General Manager

Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

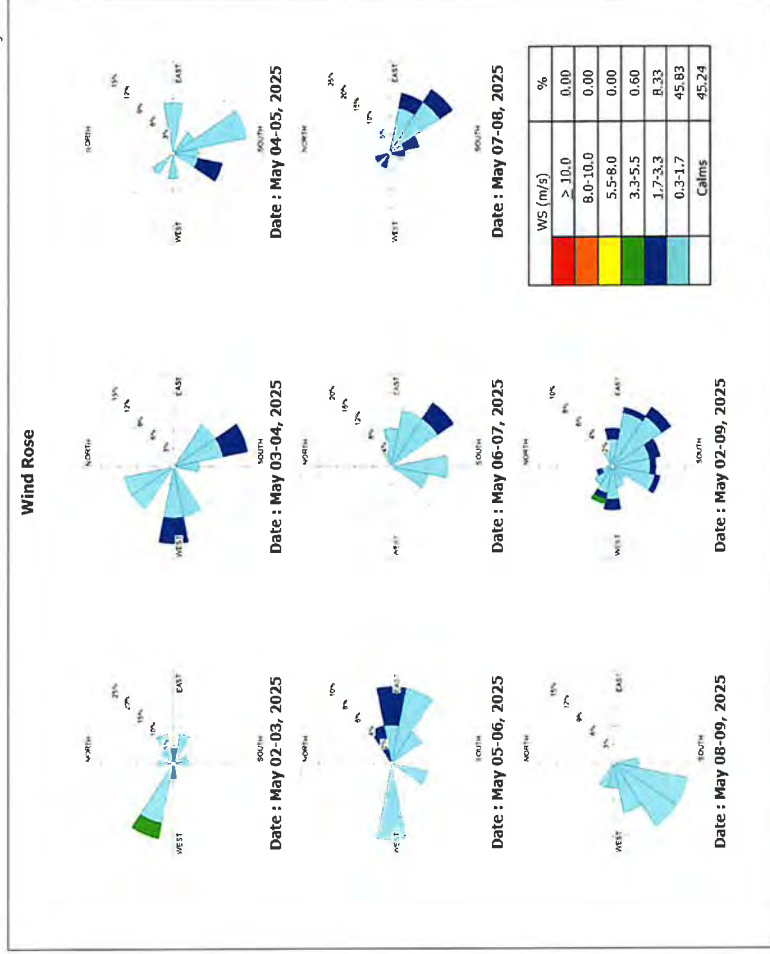
Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540366

Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Page 2 of 2



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Approved by

Sarayu Jitranont

Assistant General Manager



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTSS

Lot ID: 2540366
Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Page 1 of 2

Sample Number : 2540366-8 to 14
Parameter : Wind Speed / Wind Direction
Location : ตำบลบ้านใหม่ อำเภอวังจันทร์ จังหวัดระยอง (GPS: 479 0738199, 1443916)
Sampling Date : May 02 - May 09, 2025
Sampling by : Nantawat Sarin

Time	May 02 - May 03, 2025		May 03 - May 04, 2025		May 04 - May 05, 2025		May 05 - May 06, 2025		May 06 - May 07, 2025		May 07 - May 08, 2025		May 08 - May 09, 2025		
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	
12:00 PM - 01:00 PM	0.6	333.0 NNW	1.9	319.0 NW	1.5	98.0 E	1.8	272.0 W	2.9	230.0 SW	4.3	121.0 ESE	1.3	240.0 WSW	
01:00 PM - 02:00 PM	1.6	281.0 W	1.3	165.0 SSE	0.8	340.0 NNW	1.8	179.0 S	1.2	200.0 SSW	0.0	-	-	1.6	261.0 W
02:00 PM - 03:00 PM	1.5	354.0 N	2.5	359.0 N	0.0	-	2.4	174.0 S	0.8	257.0 WSW	0.3	7.0 N	0.4	314.0 NW	-
03:00 PM - 04:00 PM	1.2	31.0 NNE	0.9	231.0 SW	0.4	214.0 SW	1.3	216.0 SW	1.3	236.0 SW	0.0	-	-	0.2	-
04:00 PM - 05:00 PM	0.3	87.0 E	1.1	291.0 NNW	0.4	213.0 SSW	1.8	248.0 WSW	1.6	210.0 SSW	0.4	104.0 ESE	2.0	98.0 E	-
05:00 PM - 06:00 PM	0.0	-	0.9	282.0 NNW	0.1	-	0.6	179.0 S	0.3	229.0 SW	0.4	90.0 E	0.5	58.0 ENE	-
06:00 PM - 07:00 PM	0.4	164.0 SSE	0.5	235.0 SW	0.0	-	0.6	162.0 SSE	0.2	-	-	-	-	0.5	50.0 NE
07:00 PM - 08:00 PM	0.8	212.0 SSW	0.9	166.0 SSE	0.3	271.0 W	0.3	149.0 SSE	0.0	-	0.7	188.0 S	0.9	88.0 E	-
08:00 PM - 09:00 PM	0.2	-	0.7	122.0 ESE	0.5	271.0 W	1.5	113.0 ESE	0.1	-	0.5	119.0 ESE	0.5	86.0 E	-
09:00 PM - 10:00 PM	0.0	-	0.2	-	0.4	271.0 W	0.3	108.0 ESE	0.5	89.0 E	0.6	88.0 E	0.9	86.0 E	-
10:00 PM - 11:00 PM	0.2	-	0.6	100.0 E	0.7	68.0 ENE	0.8	109.0 ESE	0.2	-	0.0	-	0.4	86.0 E	-
11:00 PM - 12:00 AM	0.4	54.0 NE	0.3	101.0 E	0.4	61.0 ENE	0.3	155.0 SSE	0.0	-	0.4	91.0 E	0.1	-	-
12:00 AM - 01:00 AM	0.0	-	0.0	-	0.0	-	0.0	-	0.4	59.0 ENE	0.0	-	0.5	46.0 NE	-
01:00 AM - 02:00 AM	0.5	105.0 ESE	0.2	-	0.6	62.0 ENE	0.4	78.0 ENE	0.0	-	0.6	94.0 E	0.1	-	-
02:00 AM - 03:00 AM	0.0	-	0.1	-	0.3	80.0 E	0.0	-	0.2	-	0.4	64.0 ENE	0.0	-	-
03:00 AM - 04:00 AM	0.6	114.0 ESE	0.6	81.0 E	0.0	-	0.3	72.0 ENE	0.5	95.0 E	0.2	-	0.5	357.0 N	-
04:00 AM - 05:00 AM	0.0	-	0.0	-	0.4	80.0 E	0.5	71.0 ENE	0.1	-	0.0	-	0.9	12.0 NNE	-
05:00 AM - 06:00 AM	0.2	-	0.4	81.0 E	0.8	80.0 E	0.2	-	0.6	56.0 NE	0.8	83.0 E	0.6	14.0 NNE	-
06:00 AM - 07:00 AM	0.6	68.0 ENE	0.2	-	0.0	-	1.1	270.0 W	0.4	63.0 ENE	0.6	99.0 E	0.4	22.0 NNE	-
07:00 AM - 08:00 AM	0.2	-	1.1	359.0 N	0.2	-	0.5	258.0 WSW	0.0	-	0.4	104.0 ESE	1.0	113.0 ESE	-
08:00 AM - 09:00 AM	0.4	174.0 S	1.8	346.0 NNW	0.4	99.0 E	0.9	341.0 NNW	0.1	-	0.6	71.0 ENE	1.2	195.0 SSW	-
09:00 AM - 10:00 AM	3.4	250.0 WSW	0.3	359.0 N	1.1	219.0 SW	1.6	130.0 SE	0.6	318.0 NW	1.9	146.0 SE	1.5	110.0 ESE	-
10:00 AM - 11:00 AM	2.6	274.0 W	0.5	3.0 N	1.4	333.0 NNW	0.4	213.0 SSW	0.9	271.0 W	0.5	137.0 SE	0.9	115.0 ESE	-
11:00 AM - 12:00 PM	1.3	277.0 W	0.1	-	1.7	269.0 W	1.1	312.0 NNW	1.7	337.0 NNW	0.9	226.0 SW	1.1	132.0 SE	-

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jitranont
Assistant General Manager

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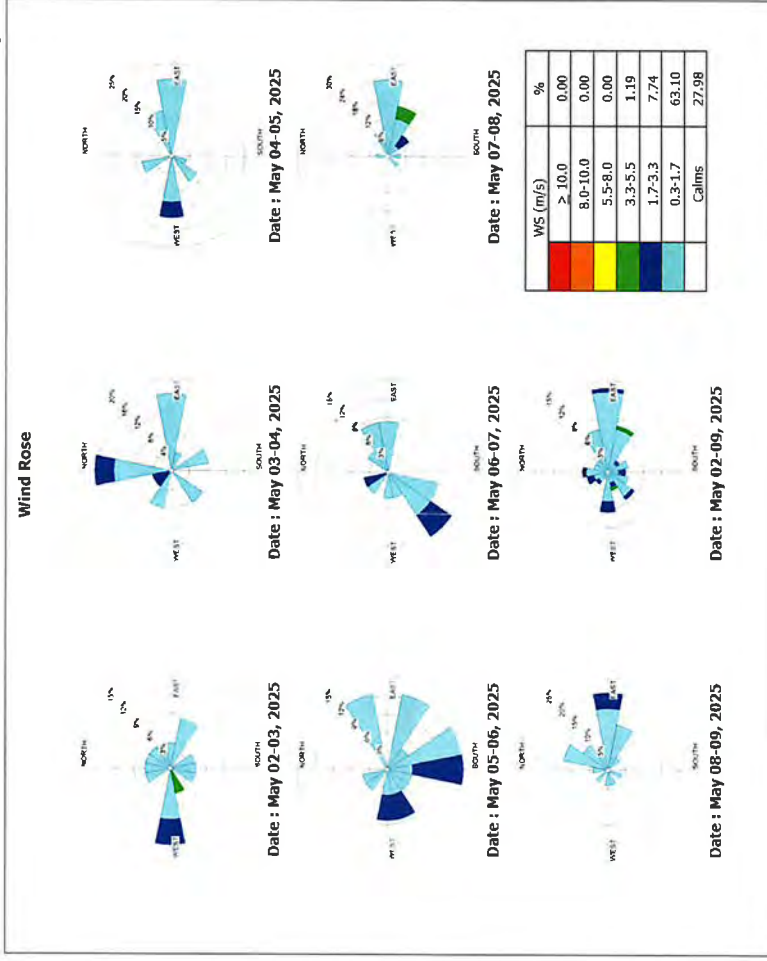


Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTSS

Lot ID: 2540366
Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Page 2 of 2



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Approved by

Sarayuth Jitranont
Assistant General Manager

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540366

Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Sample Number : 2540366-15 to 21

Parameter : Wind Speed / Wind Direction

Location : ตำบลบ้านใหม่ (บ้านใหม่) (GPS 47P 0739512, 1447941)

Sampling Date : May 02 - May 09, 2025

Sampling by : Nantawat Sarin

Time	May 02 - May 03, 2025		May 03 - May 04, 2025		May 04 - May 05, 2025		May 05 - May 06, 2025		May 06 - May 07, 2025		May 07 - May 08, 2025		May 08 - May 09, 2025														
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)													
12:00 PM - 01:00 PM	1.4	284.0	WNW	1.1	296.0	WNW	0.0	-	0.0	-	0.0	-	0.9	180.0	S	0.0	-										
01:00 PM - 02:00 PM	1.6	295.0	WNW	0.4	319.0	NW	0.6	74.0	ENE	2.8	152.0	SSE	1.0	52.0	NE	1.7	197.0	SSW	0.1	-							
02:00 PM - 03:00 PM	1.9	210.0	SSW	0.4	154.0	SSE	0.5	90.0	E	1.8	166.0	SSE	1.7	109.0	ESE	1.7	132.0	SE	1.1	162.0	SSE						
03:00 PM - 04:00 PM	0.9	239.0	WSW	0.0	-	0.0	-	0.0	-	1.7	176.0	S	1.7	126.0	SE	2.9	149.0	SSE	1.1	197.0	SSW						
04:00 PM - 05:00 PM	0.4	97.0	E	0.0	-	0.3	249.0	WSW	0.0	-	0.5	100.0	E	0.3	57.0	ENE	1.9	168.0	SSE	1.1	197.0	SSE					
05:00 PM - 06:00 PM	0.0	-	0.0	-	0.0	-	1.2	97.0	E	0.0	-	0.4	145.0	SE	1.8	211.0	SSW	0.6	157.0	SSE	0.6	157.0	SSE				
06:00 PM - 07:00 PM	0.6	4.0	N	0.0	-	0.5	105.0	ESE	0.7	93.0	E	1.2	97.0	E	0.6	109.0	ESE	0.9	96.0	E	0.9	96.0	E				
07:00 PM - 08:00 PM	0.7	38.0	NE	0.4	239.0	WSW	0.8	230.0	SW	0.0	-	0.9	175.0	S	1.3	76.0	ENE	0.0	-	-	0.0	-	-				
08:00 PM - 09:00 PM	0.4	344.0	NNW	0.0	-	0.3	278.0	W	0.3	42.0	NE	0.0	-	0.0	-	0.5	359.0	N	0.5	156.0	SSE	0.5	156.0	SSE			
09:00 PM - 10:00 PM	0.0	-	0.5	40.0	NE	0.0	-	0.1	-	0.0	-	0.0	-	0.0	-	0.9	84.0	E	0.0	-	-	0.0	-	-			
10:00 PM - 11:00 PM	0.0	-	0.3	285.0	WNW	0.0	-	0.0	-	0.6	95.0	E	0.5	102.0	ESE	0.0	-	0.5	102.0	ESE	0.0	-	0.3	190.0	S		
11:00 PM - 12:00 AM	0.0	-	0.0	-	0.0	-	0.0	-	0.6	301.0	WNW	0.3	121.0	ESE	0.0	-	0.0	-	0.3	190.0	S	0.0	-	0.3	190.0	S	
12:00 AM - 01:00 AM	0.0	-	0.0	-	0.0	-	0.0	-	0.2	-	0.7	65.0	ENE	0.3	172.0	S	0.1	-	0.1	-	-	0.0	-	0.1	-		
01:00 AM - 02:00 AM	0.2	-	0.0	-	0.0	-	0.0	-	0.0	-	0.4	339.0	NNW	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-		
02:00 AM - 03:00 AM	0.7	3.0	N	0.0	-	0.0	-	0.0	-	0.4	222.0	SW	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	
03:00 AM - 04:00 AM	0.5	184.0	S	1.2	308.0	NW	0.9	111.0	ESE	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-		
04:00 AM - 05:00 AM	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.6	241.0	WSW	0.0	-	0.0	-	0.0	-		
05:00 AM - 06:00 AM	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.5	166.0	SSE	0.5	166.0	SSE	0.5	166.0	SSE
06:00 AM - 07:00 AM	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	
07:00 AM - 08:00 AM	0.0	-	2.3	156.0	SSE	1.1	80.0	E	1.0	63.0	ENE	0.4	120.0	ESE	0.5	300.0	WNW	0.6	161.0	SSE	0.6	161.0	SSE	0.6	161.0	SSE	
08:00 AM - 09:00 AM	0.4	253.0	WSW	0.3	111.0	ESE	0.1	-	2.3	166.0	SSE	0.0	-	0.0	-	3.4	164.0	SSE	0.0	-	0.0	-	0.0	-	0.0	-	
09:00 AM - 10:00 AM	0.0	-	1.8	268.0	W	0.6	115.0	ESE	1.4	103.0	ESE	2.9	88.0	E	0.0	-	0.8	179.0	S	0.8	179.0	S	0.8	179.0	S		
10:00 AM - 11:00 AM	0.8	337.0	NNW	1.0	223.0	SW	0.0	-	1.5	175.0	S	1.0	205.0	SSW	3.6	198.0	SSW	0.9	218.0	SW	0.9	218.0	SW	0.9	218.0	SW	
11:00 AM - 12:00 PM	2.1	17.0	NNE	1.7	160.0	SSE	1.5	212.0	SSW	0.6	155.0	SSE	4.1	172.0	S	0.0	-	1.1	197.0	SSW	1.1	197.0	SSW	1.1	197.0	SSW	

Reference Method : Cup Anemometer & Anodized Aluminum Vane Method

The above results are valid only for the analyzed (tested) sample(s) as indicated in this report. The use of these results for other purposes is not recommended. Any use without written consent from the Laboratory (ALS) is not recommended. (ALS strongly recommends that this report is not reproduced except in full.)

Approved by

Sarayuht Jitranont

Assistant General Manager

Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

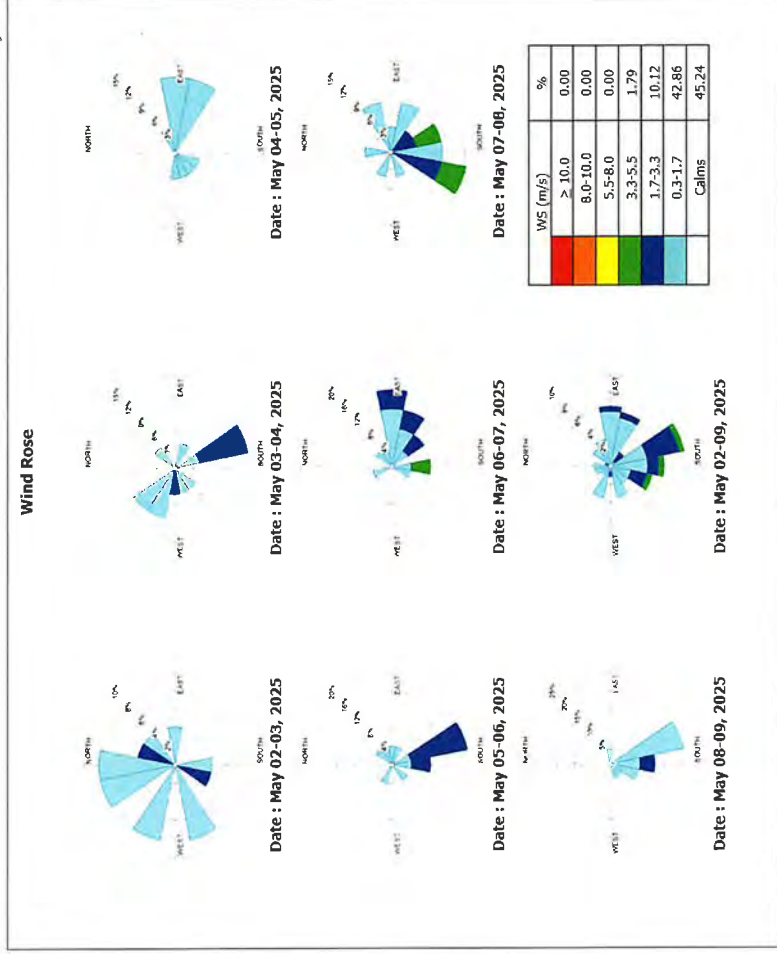
Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540366

Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Page 2 of 2



The above results are valid only for the analyzed (tested) sample(s) as indicated in this report. The use of these results for other purposes is not recommended. Any use without written consent from the Laboratory (ALS) is not recommended. (ALS strongly recommends that this report is not reproduced except in full.)

Approved by

Sarayuht Jitranont

Assistant General Manager



Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTSS

Lot ID: 2540366

Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Sample Number 2540366-22 to 28

Parameter Wind Speed / Wind Direction

Location ตำบลนาไม้ขี้ขาว (GPS 47P 0738170, 1442937)

Sampling Date May 02 - May 09, 2025

Sampling by นันทawat Sarin

Page 1 of 2

Time	May 02 - May 03, 2025		May 03 - May 04, 2025		May 04 - May 05, 2025		May 05 - May 06, 2025		May 06 - May 07, 2025		May 07 - May 08, 2025		May 08 - May 09, 2025									
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)								
12:00 PM - 01:00 PM	1.9	171.0	S	0.3	52.0	NE	0.0	-	0.8	145.0	SE	0.9	69.0	ENE	0.9	82.0	E					
01:00 PM - 02:00 PM	0.6	150.0	SSE	1.6	173.0	S	1.0	148.0	SSE	3.0	80.0	E	0.6	65.0	ENE	0.4	59.0	ENE				
02:00 PM - 03:00 PM	0.3	158.0	SSE	0.6	196.0	SSW	0.0	-	2.3	78.0	ENE	0.7	60.0	ENE	0.3	59.0	ENE					
03:00 PM - 04:00 PM	0.4	171.0	S	0.3	166.0	SSE	0.5	85.0	E	1.7	51.0	NE	0.3	60.0	ENE	0.7	220.0	SW				
04:00 PM - 05:00 PM	0.3	85.0	E	0.3	122.0	ESE	0.0	-	1.0	60.0	ENE	0.0	-	0.3	0.0	N	0.3	88.0	E			
05:00 PM - 06:00 PM	0.5	104.0	ESE	0.3	98.0	E	0.0	-	0.0	-	0.0	-	0.0	-	0.6	0.0	N	0.5	88.0	E		
06:00 PM - 07:00 PM	0.3	111.0	ESE	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.3	88.0	E		
07:00 PM - 08:00 PM	0.6	89.0	E	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.3	154.0	SSE		
08:00 PM - 09:00 PM	0.0	-	-	0.0	-	0.0	-	0.6	177.0	S	0.0	-	0.0	-	0.0	-	0.0	-	-	-		
09:00 PM - 10:00 PM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-		
10:00 PM - 11:00 PM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-		
11:00 PM - 12:00 AM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.4	0.0	N	0.0	-	0.0	-	0.0	-	-	-		
12:00 AM - 01:00 AM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.3	0.0	N	0.0	-	-	-		
01:00 AM - 02:00 AM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-		
02:00 AM - 03:00 AM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	1.3	140.0	SE	0.4	0.0	N	0.3	155.0	SSE		
03:00 AM - 04:00 AM	0.3	64.0	ENE	0.0	-	0.3	207.0	SSW	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	-		
04:00 AM - 05:00 AM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-		
05:00 AM - 06:00 AM	0.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-		
06:00 AM - 07:00 AM	0.3	141.0	SE	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-		
07:00 AM - 08:00 AM	0.6	144.0	SE	0.0	-	0.0	-	0.0	-	0.3	76.0	ENE	0.0	-	0.0	-	1.0	173.0	S	0.6	185.0	S
08:00 AM - 09:00 AM	0.3	68.0	ENE	0.0	-	0.0	-	0.0	-	0.3	0.0	-	0.0	-	0.5	169.0	S	1.2	91.0	E	0.0	
09:00 AM - 10:00 AM	0.4	184.0	S	0.3	86.0	E	0.5	130.0	SE	0.6	146.0	SE	0.5	83.0	E	0.3	72.0	ENE	0.6	89.0	E	
10:00 AM - 11:00 AM	1.3	68.0	ENE	0.0	-	0.0	-	0.0	-	0.5	0.0	N	0.6	173.0	S	0.3	77.0	ENE	0.9	85.0	E	
11:00 AM - 12:00 PM	0.6	60.0	ENE	0.6	175.0	S	0.0	-	0.0	-	0.5	69.0	ENE	0.3	84.0	E	0.6	79.0	F	0.3	91.0	F

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuht Jitraront

Assistant General Manager

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Approved by

Sarayuht Jitraront

Assistant General Manager



Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

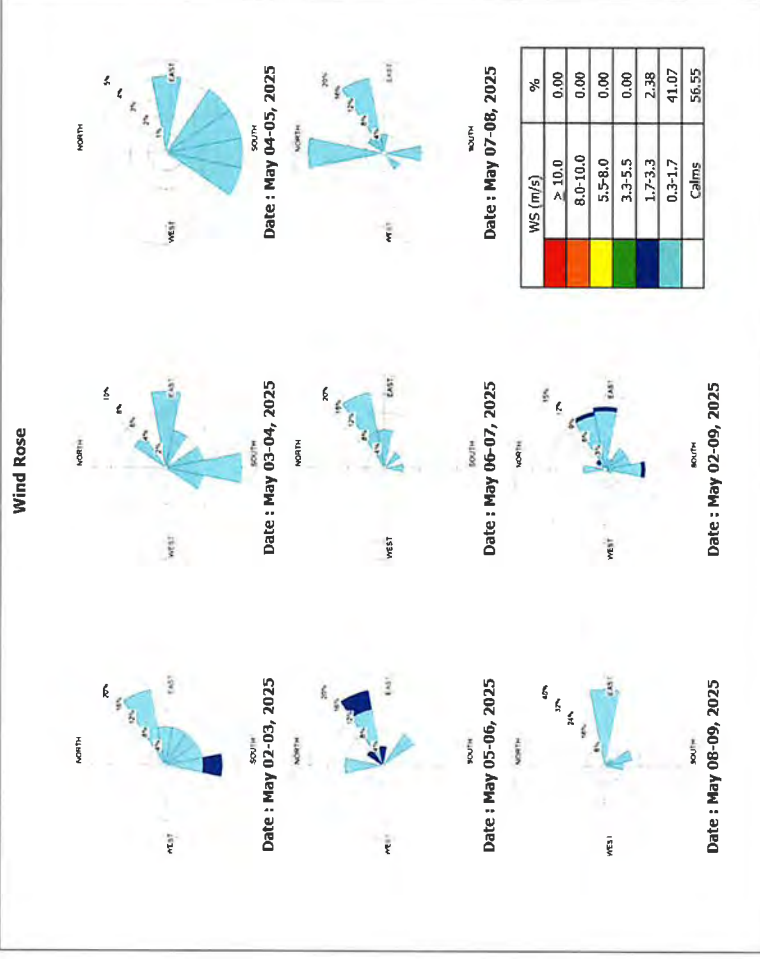
Project Name : Monitoring EIA

Project Location : GTSS

Lot ID: 2540366

Date Received : May 13, 2025
Date Reported : May 19, 2025
Report Number : 3293696-1

Page 2 of 2



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ภาคผนวก ค-2

คุณภาพอากาศจากปล่องระบายอากาศ



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540386
Date Received : May 08, 2025
Date Reported : May 19, 2025
Report Number : 3293724-1

Page 1 of 1

Sample Number	2540386-1
Sample Description	Emission from Stationary Source
Location	Area HRSG 11 (GPS 47P 0737052, 1445430)
Measurement Date	May 08, 2025

Ambient Temperature		34.1	°C	Stack Description		Diameter	3.00	m	Oxygen	13.88	%
Ambient Pressure		747.8	mmHg	Shape		Circle			Carbon dioxide	3.77	%
Type of Process		Combustion		Stack Temperature		123	°C		Gas Velocity	17.56	m/s
Type of Fuel		Natural Gas		Moisture					Flow Rate	308050	Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen at Actual O ₂	Sulfur Dioxide (ppm)
1	10:40 AM - 11:00 AM	13.91	3.76	15.67	0.68
2	11:01 AM - 11:21 AM	13.88	3.77	16.16	0.65
3	11:22 AM - 11:42 AM	13.83	3.79	17.11	0.64
Average (ppm)		13.88	3.77	16.32	0.66
Guideline ^{1/} (ppm)				60	6
Guideline ^{2/} (ppm)				120	20
Result (mg/Nm ³)				30.70	1.72
Emission Rate at Actual O ₂ (g/s)				2.6267	0.1470
Guideline ^{1/} (g/s)				7.4	1.0
Method				US EPA Method 7E	US EPA Method 6C

Sampled By : Saksit Phaisanphait

Guideline : ^{1/}Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

^{2/}Notification of the Ministry of Natural Resources and Environment, 2023 (B.E. 2566) on Emission Standard from Power Plants.

Technical Management

Wichan Choonharat
Manager
เบอร์โทรศัพท์ 7-204-0-0006

Approved by

Sarayuth Jitranont
Assistant General Manager
เบอร์โทรศัพท์ 7-204-0-0003

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540386
Date Received : May 08, 2025
Date Reported : May 19, 2025
Report Number : 3293724-1

Page 1 of 1

Sample Number	2540386-1
Sample Description	Emission from Stationary Source
Location	Area HRSG 11 (GPS 47P 0737052, 1445430)
Measurement Date	May 08, 2025

Ambient Temperature		34.1	°C	Stack Description		Diameter	3.00	m	Oxygen	13.88	%
Ambient Pressure		747.8	mmHg	Shape		Circle			Carbon dioxide	3.77	%
Type of Process		Combustion		Stack Temperature		123	°C		Gas Velocity	17.56	m/s
Type of Fuel		Natural Gas		Moisture					Flow Rate	308050	Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Carbon Monoxide at Actual O ₂	At 7% O ₂
1	10:40 AM - 11:00 AM	13.91	3.76	1.96	3.90
2	11:01 AM - 11:21 AM	13.88	3.77	1.64	3.26
3	11:22 AM - 11:42 AM	13.83	3.79	1.62	3.18
Average (ppm)		13.88	3.77	1.74	3.45
Guideline (ppm)				-	690
Result (mg/Nm ³)				1.99	3.95
Emission Rate at Actual O ₂ (g/s)				0.1706	
Method				US EPA Method 10	

Sampled By : Saksit Phaisanphait

Guideline :

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

Technical Management

Wichan Choonharat
Manager
เบอร์โทรศัพท์ 7-204-0-0006

Approved by

Sarayuth Jitranont
Assistant General Manager
เบอร์โทรศัพท์ 7-204-0-0003

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2540390

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand
21140
P/O : 4210402620
Date Received : May 08, 2025
Date Reported : May 16, 2025
Report Number: 3293731-1

Project Name : Monitoring EIA
Project Location : GTS3

Page 1 of 2

Sample Number	2540390-1	Sample Date	May 08, 2025	Sample Description	Emission from Stationary Source	Location	11km HRSG 11	Date Analysis Commenced	May 09, 2025	Condition of Sample	Extracted into one filter paper placed in plastic petri dish and one plastic bottle
Condition of Sample											
Stack Description											
Ambient Pressure	748	mmHg	3.00	Diameter	m	Oxygen	13.9	%			
Ambient Temperature	34.1	°C	Circle	Shape		Carbon Dioxide	3.8	%			
Type of Process	Combustion		122	Stack Temperature	°C	Gas Velocity	17.6	m/s			
Type of Fuel	Natural Gas		6.96	Moisture	%	Flow Rate (Actual O2)	308756	Nm3/hr			
Analyte	Sampled Time	Unit	LOQ	Result	Guideline	Method	Testing	Location			
Air Testing											
Total Suspended Particulate	11:20 AM - 11:56 AM	mg/m3	0.5	<0.5	<0.5	U.S. Environmental Protection Agency 40 CFR method 5, Appendix A, December 7, 2020 (Include sampling)	Rayong				

Guideline :

Guideline (1) Environmental Impact Assessment Report of Gulf TS3 Co., Ltd.
Guideline (2) Notification of the Ministry of Natural Resources and Environment, 2023 (B.E. 2566) on Emission Standard from Power Plants.

Technical Management

Tharitat.

Approved by

Dej Changchon
Senior Manager

หน้างานที่ 7-323-0-0001

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13430-61/EMAIL

S:\Reports\Air Stack_O2_SGL_rpt (10-13AM)

Analysis / Test Report

TESTING
No.0042

Lot ID: 2540390

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand
21140
P/O : 4210402620
Date Received : May 08, 2025
Date Reported : May 16, 2025
Report Number: 3293731-1

Project Name : Monitoring EIA
Project Location : GTS3

Page 2 of 2

Sample Number	2540390-1	Sample Date	May 08, 2025	Sample Description	Emission from Stationary Source	Location	11km HRSG 11	Date Analysis Commenced	May 09, 2025	Condition of Sample	Extracted into one filter paper placed in plastic petri dish and one plastic bottle
Condition of Sample											
Stack Description											
Ambient Pressure	748	mmHg	3.00	Diameter	m	Oxygen	13.9	%			
Ambient Temperature	34.1	°C	Circle	Shape		Carbon Dioxide	3.8	%			
Type of Process	Combustion		122	Stack Temperature	°C	Gas Velocity	17.6	m/s			
Type of Fuel	Natural Gas		6.96	Moisture	%	Flow Rate (Actual O2)	308756	Nm3/hr			
Analyte	Sampled Time	Unit	LOQ	Result	Guideline	Method	Testing	Location			
Air Testing											
Total Suspended Particulate	11:20 AM - 11:56 AM	g/s	-	<0.043	1.8	Calculated	Rayong				

Guideline :

Guideline (1) Environmental Impact Assessment Report of Gulf TS3 Co., Ltd.
Guideline (2) Notification of the Ministry of Natural Resources and Environment, 2023 (B.E. 2566) on Emission Standard from Power Plants.

Sampling By : Sathaporn Thakaw วสุฒานนท์ 7-323-0-0036

Remark :

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

Technical Management

Tharitat.

Approved by

Thanita Kulsuriwong
Scientist (4)

หน้างานที่ 7-323-0-0029

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S:\Reports\Air Stack_O2_SGL_rpt (10-13AM)



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Lot ID: 2540389
Date Received : May 08, 2025
Date Reported : May 19, 2025
Report Number : 3293726-1

Page 1 of 1

Sample Number 2540389-1
Sample Description Emission from Stationary Source
Location Jaija HRSG 12
Measurement Date May 08, 2025

		Stack Description							
		Ambient Temperature	34.1 °C	Diameter	3.00 m	Oxygen	14.25 %		
		Ambient Pressure	747.8 mmHg	Shape	Circle	Carbon dioxide	3.96 %		
		Type of Process	Combustion	Stack Temperature	119 °C	Gas Velocity	18.07 m/s		
		Type of Fuel	Natural Gas	Moisture	7.98 %	Flow Rate	316157 Nm3/hr		
Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	Sulfur Dioxide (ppm)				
1	10:40 AM - 11:00 AM	14.30	3.94	13.56	0.98	at Actual O ₂	at 7% O ₂	at 7% O ₂	
2	11:01 AM - 11:21 AM	14.24	3.97	14.40	0.86				2.06
3	11:22 AM - 11:42 AM	14.22	3.97	14.97	0.77				1.79
Average (ppm)		14.25	3.96	14.31	0.87				1.60
Guideline ¹ (ppm)				60	-				1.82
Guideline ² (ppm)				120	-				6
Result (mg/Nm ³)				26.93	56.30				20
Emission Rate at Actual O ₂ (g/s)				2.3649	4.75				0.1995
Guideline ³ (g/s)				7.4					1.0
Method				US EPA Method 7E	US EPA Method 5C				

Sampled By : Apisit Singha

Guideline : ¹Environmental Impact Assessment Report of Gulf TS3 Co., Ltd.

²Notification of the Ministry of Natural Resources and Environment, 2023 (B.E. 2566) on Emission Standard from Power Plants.

Technical Management

Wichan Choonharat
Manager
เบอร์โทร 7-204-0-0006

Approved by

Sarayuth Jittranont
Assistant General Manager
เบอร์โทร 7-204-0-0003

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
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Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Lot ID: 2540389
Date Received : May 08, 2025
Date Reported : May 19, 2025
Report Number : 3293726-1

Page 1 of 1

Sample Number 2540389-1
Sample Description Emission from Stationary Source
Location Jaija HRSG 12
Measurement Date May 08, 2025

		Stack Description							
		Ambient Temperature	34.1 °C	Diameter	3.00 m	Oxygen	14.25 %		
		Ambient Pressure	747.8 mmHg	Shape	Circle	Carbon dioxide	3.96 %		
		Type of Process	Combustion	Stack Temperature	119 °C	Gas Velocity	18.07 m/s		
		Type of Fuel	Natural Gas	Moisture	7.98 %	Flow Rate	316157 Nm3/hr		
Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)					
1	10:40 AM - 11:00 AM	14.30	3.94	1.12	at Actual O ₂	at 7% O ₂			
2	11:01 AM - 11:21 AM	14.24	3.97	1.09					2.37
3	11:22 AM - 11:42 AM	14.22	3.97	0.76					2.28
Average (ppm)		14.25	3.96	0.99					1.58
Guideline (ppm)				-					2.08
Result (mg/Nm ³)				1.14					690
Emission Rate at Actual O ₂ (g/s)				0.0999					2.38
Method				US EPA Method 10					

Sampled By : Apisit Singha

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D,

dated December 4, 2006 (B.E. 2549)

Technical Management

Wichan Choonharat
Manager
เบอร์โทร 7-204-0-0006

Approved by

Sarayuth Jittranont
Assistant General Manager
เบอร์โทร 7-204-0-0003

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.
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Analysis / Test Report

TESTING
No.0042

Lot ID: 2540392

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand
21140
Date Received : May 08, 2025
Date Reported : May 16, 2025
Report Number: 3293732-1

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Page 1 of 2

Sample Number 2540392-1

Sampled Date May 08, 2025

Sample Description Emission from Stationary Source

Location 11.56 HRSG 12

Date Analysis Commenced May 09, 2025

Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description									
Ambient Pressure	748	mmHg	Diameter	3.00	m	Oxygen	14.2	%	
Ambient Temperature	34.1	°C	Shape	Circle		Carbon Dioxide	3.8	%	
Type of Process	Combustion		Stack Temperature	119	°C	Gas Velocity	18.1	m/s	
Type of Fuel	Natural Gas		Moisture	7.90	%	Flow Rate (Actual O2)	316855	Nm3/hr	

Analyte	Sampled Time	Unit	LOQ (LOR)	Result	Guideline (1)	Method (2)	Testing Location
---------	--------------	------	-----------	--------	---------------	------------	------------------

Air Testing							
Total Suspended Particulate	11:20 AM - 11:56 AM	mg/m3	0.5	<0.5	<0.5	U.S. Environmental Protection Agency 40 CFR method 5, Appendix A, December 7, 2020 (Include sampling)	Rayong

Guideline :

Guideline (1) Environmental Impact Assessment Report of Gulf TS3 Co., Ltd.
Guideline (2) Notification of the Ministry of Natural Resources and Environment, 2023 (B.E. 2566) on Emission Standard from Power Plants.

Technical Management

Approved by

Dej Changchon
Senior Manager

โทรศัพท์ 3-323-4-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory.
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13430-61/EMAIL

S:\Reports_Air Stack_O2_2GL.rpt (10:16AM)

Analysis / Test Report

TESTING
No.0042

Lot ID: 2540392

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand
21140
Date Received : May 08, 2025
Date Reported : May 16, 2025
Report Number: 3293732-1

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Page 2 of 2

Sample Number 2540392-1

Sampled Date May 08, 2025

Sample Description Emission from Stationary Source

Location 11.56 HRSG 12

Date Analysis Commenced May 09, 2025

Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description									
Ambient Pressure	748	mmHg	Diameter	3.00	m	Oxygen	14.2	%	
Ambient Temperature	34.1	°C	Shape	Circle		Carbon Dioxide	3.8	%	
Type of Process	Combustion		Stack Temperature	119	°C	Gas Velocity	18.1	m/s	
Type of Fuel	Natural Gas		Moisture	7.90	%	Flow Rate (Actual O2)	316855	Nm3/hr	

Analyte	Sampled Time	Unit	LOQ (LOR)	Result	Guideline (1)	Method (2)	Testing Location
---------	--------------	------	-----------	--------	---------------	------------	------------------

Air Testing							
Total Suspended Particulate	11:20 AM - 11:56 AM	g/s	-	<0.044	1.8	Calculated	Rayong

Guideline :

Guideline (1) Environmental Impact Assessment Report of Gulf TS3 Co., Ltd.
Guideline (2) Notification of the Ministry of Natural Resources and Environment, 2023 (B.E. 2566) on Emission Standard from Power Plants.

Sampling By : Tinnakorn Kulchart โทรศัพท์ 3-323-4-0062

Remark :

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

Technical Management

Approved by

Thanita Kulsuriwong
Scientist (4)

โทรศัพท์ 3-323-4-0029

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory.
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S:\Reports_Air Stack_O2_2GL.rpt (10:16AM)

ภาคผนวก ค-3

ระดับเสียงโดยทั่วไป



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Cilent : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308912-1

Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2540369-1
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณพื้นที่โครงการ (GPS 47P 0737122, 1445264)
Measurement Date	May 02 - May 03, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 623387

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.7	71.9	59.9
12:00 PM - 01:00 PM	61.1	75.4	59.8
01:00 PM - 02:00 PM	62.6	76.3	61.4
02:00 PM - 03:00 PM	62.2	72.3	61.1
03:00 PM - 04:00 PM	62.4	72.7	61.3
04:00 PM - 05:00 PM	61.9	72.3	60.7
05:00 PM - 06:00 PM	61.5	74.8	60.2
06:00 PM - 07:00 PM	61.1	72.0	60.1
07:00 PM - 08:00 PM	63.3	84.7	60.7
08:00 PM - 09:00 PM	61.6	78.1	60.6
09:00 PM - 10:00 PM	61.4	70.6	60.5
10:00 PM - 11:00 PM	61.3	71.7	60.5
11:00 PM - 12:00 AM	61.3	71.1	60.6
12:00 AM - 01:00 AM	61.6	73.3	60.4
01:00 AM - 02:00 AM	60.3	72.5	59.5
02:00 AM - 03:00 AM	59.6	70.4	58.6
03:00 AM - 04:00 AM	60.0	73.0	59.1
04:00 AM - 05:00 AM	60.1	85.0	59.1
05:00 AM - 06:00 AM	60.4	72.5	59.3
06:00 AM - 07:00 AM	62.0	71.2	59.7
07:00 AM - 08:00 AM	63.2	78.7	61.2
08:00 AM - 09:00 AM	62.1	73.9	61.1
09:00 AM - 10:00 AM	61.7	71.8	60.6
10:00 AM - 11:00 AM	62.0	72.8	61.0

Leq Average 24 hrs. (dB(A))	61.6
Lmax (dB(A))	85.0
L90 (dB(A))	60.5
Ldn (dB(A))	67.4
Standard (dB(A))	70
Reference Method : ISO1996-1 and 1996-2	
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป 2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการก่อกวน และระดับเสียงที่อาจก่อให้เกิดการก่อกวน จากงาน พ.ศ. 2548	
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.	

Chontichak

Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.

Supot Salameh
Section Head

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S (Reports) Air Noise rpt (2.31PM)



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Cilent : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308913-1

Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2540369-2
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณพื้นที่โครงการ (GPS 47P 0737122, 1445264)
Measurement Date	May 03 - May 04, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 623387

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.7	74.2	60.4
12:00 PM - 01:00 PM	61.7	78.6	60.4
01:00 PM - 02:00 PM	62.1	71.2	61.1
02:00 PM - 03:00 PM	62.8	79.4	61.7
03:00 PM - 04:00 PM	72.4	102.1	62.5
04:00 PM - 05:00 PM	63.0	81.2	61.7
05:00 PM - 06:00 PM	62.7	77.0	61.6
06:00 PM - 07:00 PM	61.7	72.5	61.0
07:00 PM - 08:00 PM	62.4	80.6	60.9
08:00 PM - 09:00 PM	61.9	76.3	60.9
09:00 PM - 10:00 PM	61.6	74.6	60.8
10:00 PM - 11:00 PM	61.9	76.9	61.1
11:00 PM - 12:00 AM	61.7	69.4	60.9
12:00 AM - 01:00 AM	61.3	66.9	60.4
01:00 AM - 02:00 AM	59.7	66.5	58.9
02:00 AM - 03:00 AM	59.5	73.3	58.8
03:00 AM - 04:00 AM	59.9	71.0	59.2
04:00 AM - 05:00 AM	60.1	73.9	59.3
05:00 AM - 06:00 AM	60.1	73.0	59.3
06:00 AM - 07:00 AM	59.8	72.8	59.0
07:00 AM - 08:00 AM	60.5	77.4	58.8
08:00 AM - 09:00 AM	59.4	72.9	58.3
09:00 AM - 10:00 AM	59.0	69.4	58.3
10:00 AM - 11:00 AM	59.0	68.9	58.4

Leq Average 24 hrs. (dB(A))	63.0
Lmax (dB(A))	102.1
L90 (dB(A))	67.6
Ldn (dB(A))	70
Standard (dB(A))	115
Reference Method : ISO1996-1 and 1996-2	
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป 2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการก่อกวน และระดับเสียงที่อาจก่อให้เกิดการก่อกวน จากงาน พ.ศ. 2548	
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.	

Chontichak

Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.

Supot Salameh
Section Head

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S (Reports) Air Noise rpt (2.31PM)



TESTING
No.0042

Lot ID: 2540369

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Taasik, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Date Reported : May 13, 2025
Report Number: 3308914-1

Analysis / Test Report

Page 1 of 1

Sample Number	2540369-3
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณใกล้โรงงาน (GPS 47P 0737122, 1445264)
Measurement Date	May 04 - May 05, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 623387

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	59.1	69.7	58.3
12:00 PM - 01:00 PM	59.1	69.8	58.4
01:00 PM - 02:00 PM	59.0	70.2	58.4
02:00 PM - 03:00 PM	58.8	71.1	58.3
03:00 PM - 04:00 PM	60.9	71.9	58.1
04:00 PM - 05:00 PM	61.1	72.7	58.5
05:00 PM - 06:00 PM	60.6	75.0	60.0
06:00 PM - 07:00 PM	60.8	73.2	60.1
07:00 PM - 08:00 PM	60.7	76.7	60.1
08:00 PM - 09:00 PM	60.7	66.8	60.3
09:00 PM - 10:00 PM	60.8	68.6	60.4
10:00 PM - 11:00 PM	60.8	66.9	59.2
11:00 PM - 12:00 AM	59.4	69.5	59.0
12:00 AM - 01:00 AM	59.2	69.0	58.9
01:00 AM - 02:00 AM	59.3	72.3	58.9
02:00 AM - 03:00 AM	59.2	66.8	58.9
03:00 AM - 04:00 AM	59.4	66.9	58.9
04:00 AM - 05:00 AM	60.1	72.6	59.0
05:00 AM - 06:00 AM	61.6	73.5	59.2
06:00 AM - 07:00 AM	62.2	76.7	60.5
07:00 AM - 08:00 AM	62.1	76.3	60.9
08:00 AM - 09:00 AM	62.7	70.8	61.0
09:00 AM - 10:00 AM	62.2	72.9	60.8
10:00 AM - 11:00 AM	60.5		
Leq Average 24 hrs. (dB(A))	60.5		
Lmax (dB(A))	83.1		
L90 (dB(A))	59.0		
Ldn (dB(A))	66.6		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกรมควบคุมมลพิษว่าด้วยเกณฑ์มาตรฐานเสียงรบกวนชุมชน พ.ศ. 2540 (พ.ศ. 2540) ใช้กำหนดค่ามาตรฐานระดับเสียงรบกวน
2. ประกาศกรมควบคุมมลพิษว่าด้วยวิธีการวัดและประเมินค่าระดับเสียงรบกวนชุมชน พ.ศ. 2548

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

Technical Management
Chonticha Subongkoch
Scientist (3)

Approved by

Supot Salameeh
Section Head

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S Upaporn_Air Noise rpt (2 31PM)



TESTING
No.0042

Lot ID: 2540369

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Taasik, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Date Reported : May 13, 2025
Report Number: 3308915-1

Analysis / Test Report

Page 1 of 1

Sample Number	2540369-4
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณใกล้โรงงาน (GPS 47P 0737122, 1445264)
Measurement Date	May 05 - May 06, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 623387

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.7	73.2	60.2
12:00 PM - 01:00 PM	60.9	71.2	59.7
01:00 PM - 02:00 PM	62.0	71.7	60.7
02:00 PM - 03:00 PM	62.0	71.6	60.9
03:00 PM - 04:00 PM	62.0	72.1	61.0
04:00 PM - 05:00 PM	64.0	74.1	61.1
05:00 PM - 06:00 PM	61.6	79.5	60.6
06:00 PM - 07:00 PM	61.2	72.2	60.5
07:00 PM - 08:00 PM	62.0	80.2	60.5
08:00 PM - 09:00 PM	61.4	76.2	60.3
09:00 PM - 10:00 PM	61.2	71.0	60.4
10:00 PM - 11:00 PM	61.4	71.2	60.8
11:00 PM - 12:00 AM	61.6	72.3	60.8
12:00 AM - 01:00 AM	61.2	69.6	60.3
01:00 AM - 02:00 AM	59.7	69.3	58.6
02:00 AM - 03:00 AM	59.2	67.9	58.6
03:00 AM - 04:00 AM	59.7	72.3	58.9
04:00 AM - 05:00 AM	59.6	65.5	58.9
05:00 AM - 06:00 AM	60.1	72.3	59.0
06:00 AM - 07:00 AM	61.4	75.3	59.5
07:00 AM - 08:00 AM	62.5	78.6	60.9
08:00 AM - 09:00 AM	62.4	78.3	61.3
09:00 AM - 10:00 AM	62.5	77.0	61.1
10:00 AM - 11:00 AM	62.1	75.6	60.9
Leq Average 24 hrs. (dB(A))	61.5		
Lmax (dB(A))	94.1		
L90 (dB(A))	60.5		
Ldn (dB(A))	67.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกรมควบคุมมลพิษว่าด้วยเกณฑ์มาตรฐานเสียงรบกวนชุมชน พ.ศ. 2540 (พ.ศ. 2540) ใช้กำหนดค่ามาตรฐานระดับเสียงรบกวน
2. ประกาศกรมควบคุมมลพิษว่าด้วยวิธีการวัดและประเมินค่าระดับเสียงรบกวนชุมชน พ.ศ. 2548

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

Technical Management
Chonticha Subongkoch
Scientist (3)

Approved by

Supot Salameeh
Section Head

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S Upaporn_Air Noise rpt (2 32PM)



TESTING
No.0042

Lot ID: 2540369

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Task, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308916-1

P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Analysis / Test Report

Page 1 of 1

Sample Number	2540369-5
Parameter	Noise (Leq 24 hrs.)
Location	บ้านสวนศรีโพธิ์ (GPS 47P 0737122, 1445264)
Measurement Date	May 06 - May 07, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 623387

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.7	75.1	60.1
12:00 PM - 01:00 PM	60.9	71.7	59.5
01:00 PM - 02:00 PM	62.3	72.7	61.0
02:00 PM - 03:00 PM	62.2	79.2	60.7
03:00 PM - 04:00 PM	62.2	77.3	61.0
04:00 PM - 05:00 PM	61.8	74.9	60.5
05:00 PM - 06:00 PM	61.5	76.2	60.3
06:00 PM - 07:00 PM	61.5	73.9	60.5
07:00 PM - 08:00 PM	61.8	72.9	60.4
08:00 PM - 09:00 PM	61.9	75.1	60.8
09:00 PM - 10:00 PM	61.8	73.7	60.8
10:00 PM - 11:00 PM	61.7	74.6	60.8
11:00 PM - 12:00 AM	61.8	70.1	60.9
12:00 AM - 01:00 AM	61.6	74.8	60.3
01:00 AM - 02:00 AM	60.2	74.3	59.1
02:00 AM - 03:00 AM	59.8	71.9	59.1
03:00 AM - 04:00 AM	59.9	68.4	59.1
04:00 AM - 05:00 AM	60.0	70.3	59.2
05:00 AM - 06:00 AM	60.3	72.4	59.3
06:00 AM - 07:00 AM	62.0	76.2	59.6
07:00 AM - 08:00 AM	62.5	80.2	60.6
08:00 AM - 09:00 AM	62.4	82.0	60.9
09:00 AM - 10:00 AM	62.2	72.8	60.8
10:00 AM - 11:00 AM	62.0	72.5	60.6

Leq Average 24 hrs. (dB(A))	61.6
Lmax (dB(A))	82.0
L90 (dB(A))	60.5
Ldn (dB(A))	
Standard (dB(A))	115

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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

Chontichak

Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.

Supot Salameh
Section Head

Life Sciences

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S (Reports)_Air Noise (pl / 2 32PM)



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Task, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308917-1

P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2540369-6
Parameter	Noise (Leq 24 hrs.)
Location	บ้านสวนศรีโพธิ์ (GPS 47P 0737122, 1445264)
Measurement Date	May 07 - May 08, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 623387

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.9	82.0	60.1
12:00 PM - 01:00 PM	61.0	74.4	59.9
01:00 PM - 02:00 PM	62.0	77.6	60.8
02:00 PM - 03:00 PM	62.0	72.3	60.7
03:00 PM - 04:00 PM	61.5	73.4	60.4
04:00 PM - 05:00 PM	61.7	75.9	60.3
05:00 PM - 06:00 PM	62.5	84.6	60.7
06:00 PM - 07:00 PM	61.4	72.9	60.5
07:00 PM - 08:00 PM	62.2	75.7	60.4
08:00 PM - 09:00 PM	61.4	73.0	60.5
09:00 PM - 10:00 PM	61.5	74.8	60.5
10:00 PM - 11:00 PM	61.4	68.7	60.6
11:00 PM - 12:00 AM	61.6	71.2	60.6
12:00 AM - 01:00 AM	61.2	70.9	60.2
01:00 AM - 02:00 AM	59.8	67.9	58.9
02:00 AM - 03:00 AM	59.7	66.3	58.9
03:00 AM - 04:00 AM	59.8	69.7	58.9
04:00 AM - 05:00 AM	59.9	69.6	59.1
05:00 AM - 06:00 AM	60.6	78.5	59.3
06:00 AM - 07:00 AM	61.5	70.9	59.7
07:00 AM - 08:00 AM	62.7	79.1	60.8
08:00 AM - 09:00 AM	61.9	74.0	60.8
09:00 AM - 10:00 AM	62.2	72.4	60.9
10:00 AM - 11:00 AM	63.9	75.4	61.0

Leq Average 24 hrs. (dB(A))	61.6
Lmax (dB(A))	84.6
L90 (dB(A))	60.4
Ldn (dB(A))	
Standard (dB(A))	115

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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

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Chonticha Subongkoch
Scientist (3)

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Supot Salameh
Section Head

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S (Reports)_Air Noise (pl / 2 32PM)



TESTING
No.0042

Lot ID: 2540369

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
P/O : 4210402620
Date Reported : May 17, 2025
Project Name : Monitoring EIA
Report Number: 3308918-1
Project Location : GT53

Analysis / Test Report

Page 1 of 1

Sample Number	2540369-7			
Parameter	Noise (Leq 24 hrs.)			
Location	บริเวณพื้นที่โรงงาน (GPS 47P 0737122, 1445264)			
Measurement Date	May 08 - May 09, 2025			
Measurement by	Nantawat Sarin			
Sound Level meter	Serial No. 623387			
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))	
11:00 AM - 12:00 PM	64.5	89.1	60.8	
12:00 PM - 01:00 PM	64.2	90.5	61.0	
01:00 PM - 02:00 PM	63.8	81.2	61.9	
02:00 PM - 03:00 PM	62.4	77.5	61.2	
03:00 PM - 04:00 PM	62.4	81.0	60.9	
04:00 PM - 05:00 PM	61.9	73.8	60.7	
05:00 PM - 06:00 PM	61.6	72.2	60.7	
06:00 PM - 07:00 PM	62.0	77.4	60.9	
07:00 PM - 08:00 PM	62.2	77.5	60.7	
08:00 PM - 09:00 PM	62.3	78.1	61.2	
09:00 PM - 10:00 PM	61.9	74.7	61.0	
10:00 PM - 11:00 PM	61.6	72.9	60.8	
11:00 PM - 12:00 AM	61.7	70.0	60.8	
12:00 AM - 01:00 AM	61.6	70.4	60.3	
01:00 AM - 02:00 AM	60.3	68.8	59.4	
02:00 AM - 03:00 AM	60.0	75.1	59.3	
03:00 AM - 04:00 AM	60.1	69.3	59.3	
04:00 AM - 05:00 AM	60.2	75.2	59.3	
05:00 AM - 06:00 AM	60.4	73.5	59.3	
06:00 AM - 07:00 AM	62.3	76.2	59.8	
07:00 AM - 08:00 AM	62.8	78.5	61.0	
08:00 AM - 09:00 AM	62.4	74.9	61.0	
09:00 AM - 10:00 AM	62.3	71.1	60.9	
10:00 AM - 11:00 AM	62.0	74.1	60.7	

Technical Management
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Chonticha Subongkotch
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Approved by

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TESTING
No.0042

Lot ID: 2540369

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
P/O : 4210402620
Date Reported : May 17, 2025
Project Name : Monitoring EIA
Report Number: 3308919-1
Project Location : GT53

Analysis / Test Report

Page 1 of 1

Sample Number	2540369-8		
Parameter	Noise (Leq 24 hrs.)		
Location	โรงงานหุ่ยหงษ์ (GPS 47P 0735491, 1445328)		
Measurement Date	May 02 - May 03, 2025		
Measurement by	Nantawat Sarin		
Sound Level meter	Serial No. 734223		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	59.0	85.0	50.2
04:00 PM - 05:00 PM	55.6	72.7	47.7
05:00 PM - 06:00 PM	58.7	88.8	48.8
06:00 PM - 07:00 PM	59.2	82.9	49.5
07:00 PM - 08:00 PM	57.1	78.6	48.3
08:00 PM - 09:00 PM	57.7	81.4	48.2
09:00 PM - 10:00 PM	53.2	71.7	45.9
10:00 PM - 11:00 PM	55.7	85.9	45.5
11:00 PM - 12:00 AM	50.6	73.5	44.4
12:00 AM - 01:00 AM	49.2	74.3	44.0
01:00 AM - 02:00 AM	47.6	71.2	43.6
02:00 AM - 03:00 AM	52.6	84.7	43.8
03:00 AM - 04:00 AM	47.7	64.5	43.8
04:00 AM - 05:00 AM	48.4	69.3	43.7
05:00 AM - 06:00 AM	54.6	70.6	48.0
06:00 AM - 07:00 AM	55.8	76.4	46.4
07:00 AM - 08:00 AM	61.0	87.7	49.7
08:00 AM - 09:00 AM	57.8	81.6	48.9
09:00 AM - 10:00 AM	55.5	78.0	47.5
10:00 AM - 11:00 AM	55.3	82.2	46.2
11:00 AM - 12:00 PM	54.1	78.9	44.4
12:00 PM - 01:00 PM	57.7	90.2	45.8
01:00 PM - 02:00 PM	54.3	79.5	45.3
02:00 PM - 03:00 PM	57.3	81.4	46.3

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Chonticha Subongkotch
Scientist (3)

Approved by

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Supot Salameh
Section Head

Life Sciences

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308920-1

Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2540369-9
Parameter	Noise (Leq 24 hrs.)
Location	โรงงานน้ำตาล (GPS 47P 0735491, 1445328)
Measurement Date	May 03 - May 04, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	72.9	101.8	48.9
04:00 PM - 05:00 PM	70.3	103.5	55.2
05:00 PM - 06:00 PM	60.9	83.3	54.8
06:00 PM - 07:00 PM	60.5	87.8	51.1
07:00 PM - 08:00 PM	59.6	81.0	49.8
08:00 PM - 09:00 PM	63.0	93.4	49.4
09:00 PM - 10:00 PM	57.4	86.1	48.5
10:00 PM - 11:00 PM	53.1	72.9	47.5
11:00 PM - 12:00 AM	55.0	83.6	47.7
12:00 AM - 01:00 AM	50.4	70.1	45.7
01:00 AM - 02:00 AM	49.0	77.5	45.1
02:00 AM - 03:00 AM	49.1	72.8	45.4
03:00 AM - 04:00 AM	48.9	75.3	45.5
04:00 AM - 05:00 AM	50.1	75.2	46.7
05:00 AM - 06:00 AM	51.7	70.0	48.1
06:00 AM - 07:00 AM	55.3	79.1	46.5
07:00 AM - 08:00 AM	59.5	86.6	47.4
08:00 AM - 09:00 AM	57.1	78.9	47.4
09:00 AM - 10:00 AM	56.4	79.4	45.8
10:00 AM - 11:00 AM	57.0	85.9	45.9
11:00 AM - 12:00 PM	57.6	90.0	46.3
12:00 PM - 01:00 PM	54.8	79.3	46.2
01:00 PM - 02:00 PM	54.4	78.3	45.3
02:00 PM - 03:00 PM	55.3	81.4	45.2

Leq Average 24 hrs. (dB(A))	62.4
Lmax (dB(A))	103.5
L90 (dB(A))	46.7
Ldn (dB(A))	
Standard (dB(A))	115

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าระดับเสียงมาตรฐาน และระดับเสียงที่โรงงานอุตสาหกรรมต้องปฏิบัติตาม
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าระดับเสียงมาตรฐาน และระดับเสียงที่โรงงานอุตสาหกรรมต้องปฏิบัติตาม
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Approved by

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Supot Salamteh
Section Head

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S (Report)_Air Noise (p1 (233PM)



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308921-1

Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2540369-10
Parameter	Noise (Leq 24 hrs.)
Location	โรงงานน้ำตาล (GPS 47P 0735491, 1445328)
Measurement Date	May 04 - May 05, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	55.5	84.2	46.5
04:00 PM - 05:00 PM	53.5	75.1	45.4
05:00 PM - 06:00 PM	57.6	79.4	47.7
06:00 PM - 07:00 PM	58.1	86.6	49.0
07:00 PM - 08:00 PM	56.1	79.8	47.8
08:00 PM - 09:00 PM	56.5	83.7	48.1
09:00 PM - 10:00 PM	53.8	77.0	47.0
10:00 PM - 11:00 PM	54.4	80.5	46.6
11:00 PM - 12:00 AM	53.5	80.0	44.6
12:00 AM - 01:00 AM	48.0	68.9	43.8
01:00 AM - 02:00 AM	49.6	73.1	43.6
02:00 AM - 03:00 AM	47.5	73.6	43.5
03:00 AM - 04:00 AM	46.3	66.8	43.5
04:00 AM - 05:00 AM	49.0	67.1	43.8
05:00 AM - 06:00 AM	51.3	70.5	44.7
06:00 AM - 07:00 AM	57.3	84.7	46.8
07:00 AM - 08:00 AM	61.7	91.8	50.2
08:00 AM - 09:00 AM	55.8	78.7	46.3
09:00 AM - 10:00 AM	52.7	73.3	45.2
10:00 AM - 11:00 AM	52.7	71.2	45.5
11:00 AM - 12:00 PM	55.4	86.3	44.8
12:00 PM - 01:00 PM	55.6	79.2	45.5
01:00 PM - 02:00 PM	54.9	78.2	45.0
02:00 PM - 03:00 PM	54.5	77.6	45.9

Leq Average 24 hrs. (dB(A))	55.2
Lmax (dB(A))	91.8
L90 (dB(A))	45.5
Ldn (dB(A))	
Standard (dB(A))	115

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าระดับเสียงมาตรฐาน และระดับเสียงที่โรงงานอุตสาหกรรมต้องปฏิบัติตาม
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าระดับเสียงมาตรฐาน และระดับเสียงที่โรงงานอุตสาหกรรมต้องปฏิบัติตาม
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Technical Management

Chonticha Subongkroh
Scientist (3)

Approved by

Supt S.

Supot Salamteh
Section Head

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S (Report)_Air Noise (p1 (2 33PM)



TESTING
No.0042

Lot ID: 2540369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308922-1

Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Sample Number : 2540369-11
Parameter : Noise (Leq 24 hrs.)
Location : ตำบลบ้านนาสาร (GPS 47P 0735491, 1445328)
Measurement Date : May 05 - May 06, 2025
Measurement by : Nantawat Sarin
Sound Level meter : Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	55.7	82.2	45.5
04:00 PM - 05:00 PM	61.6	97.5	46.8
05:00 PM - 06:00 PM	60.9	81.8	49.8
06:00 PM - 07:00 PM	60.2	79.6	50.8
07:00 PM - 08:00 PM	58.0	78.7	49.6
08:00 PM - 09:00 PM	56.7	74.5	49.1
09:00 PM - 10:00 PM	55.3	65.4	47.0
10:00 PM - 11:00 PM	53.7	79.9	46.3
11:00 PM - 12:00 AM	52.2	77.4	45.3
12:00 AM - 01:00 AM	49.9	75.4	45.0
01:00 AM - 02:00 AM	47.5	66.7	44.8
02:00 AM - 03:00 AM	47.4	70.4	44.6
03:00 AM - 04:00 AM	47.3	69.0	44.6
04:00 AM - 05:00 AM	47.5	71.2	44.5
05:00 AM - 06:00 AM	56.9	83.7	45.1
06:00 AM - 07:00 AM	56.6	79.1	47.3
07:00 AM - 08:00 AM	60.4	82.9	51.0
08:00 AM - 09:00 AM	57.1	78.9	48.1
09:00 AM - 10:00 AM	53.8	76.5	47.0
10:00 AM - 11:00 AM	55.5	81.1	47.1
11:00 AM - 12:00 PM	56.3	85.7	45.1
12:00 PM - 01:00 PM	53.7	71.0	45.7
01:00 PM - 02:00 PM	55.8	86.7	45.8
02:00 PM - 03:00 PM	61.2	94.4	45.8

Leq Average 24 hrs. (dB(A)) : 56.9
Lmax (dB(A)) : 97.5
L90 (dB(A)) : 45.8
Ldn (dB(A)) : 70

Standard (dB(A)) : 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540
2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540

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

Supot Salamteh
Section Head

Approved by

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Chonticha Subongkroh
Scientist (3)

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S:\Reports_Air Noise m (2.33PM)



TESTING
No.0042

Lot ID: 2540369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308923-1

Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Sample Number : 2540369-12
Parameter : Noise (Leq 24 hrs.)
Location : ตำบลบ้านนาสาร (GPS 47P 0735491, 1445328)
Measurement Date : May 06 - May 07, 2025
Measurement by : Nantawat Sarin
Sound Level meter : Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	61.7	99.3	45.7
04:00 PM - 05:00 PM	58.2	84.6	48.4
05:00 PM - 06:00 PM	58.3	78.3	50.1
06:00 PM - 07:00 PM	60.1	87.9	49.1
07:00 PM - 08:00 PM	57.8	80.2	48.8
08:00 PM - 09:00 PM	57.1	83.1	48.2
09:00 PM - 10:00 PM	53.9	74.5	47.2
10:00 PM - 11:00 PM	54.7	81.4	45.9
11:00 PM - 12:00 AM	51.2	75.6	45.5
12:00 AM - 01:00 AM	48.3	68.1	45.0
01:00 AM - 02:00 AM	47.3	69.5	44.9
02:00 AM - 03:00 AM	47.5	73.0	45.0
03:00 AM - 04:00 AM	47.2	60.4	45.3
04:00 AM - 05:00 AM	50.8	80.6	45.2
05:00 AM - 06:00 AM	52.3	72.7	46.0
06:00 AM - 07:00 AM	55.8	82.4	47.5
07:00 AM - 08:00 AM	60.9	86.1	51.1
08:00 AM - 09:00 AM	58.5	81.3	49.1
09:00 AM - 10:00 AM	53.6	76.8	46.1
10:00 AM - 11:00 AM	54.6	77.7	46.2
11:00 AM - 12:00 PM	62.4	82.8	46.4
12:00 PM - 01:00 PM	53.9	75.8	46.8
01:00 PM - 02:00 PM	53.2	75.0	47.1
02:00 PM - 03:00 PM	53.3	72.0	46.5

Leq Average 24 hrs. (dB(A)) : 56.8
Lmax (dB(A)) : 99.3
L90 (dB(A)) : 46.4
Ldn (dB(A)) : 115

Standard (dB(A)) : 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540
2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540

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

Chontichak
Chonticha Subongkroh
Scientist (3)

Technical Management

Approved by

Supot Salamteh
Section Head

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S:\Reports_Air Noise m (2.33PM)



TESTING
No.0042

Lot ID: 25403369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308924-1



Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GT53

Page 1 of 1

Sample Number	2540369-13
Parameter	Noise (Leq 24 hrs.)
Location	โรงงานอุตสาหกรรม (GPS 47P 0735491, 1445328)
Measurement Date	May 07 - May 08, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	58.3	92.8	46.9
04:00 PM - 05:00 PM	56.7	86.0	47.2
05:00 PM - 06:00 PM	62.3	93.0	48.7
06:00 PM - 07:00 PM	59.0	82.9	49.1
07:00 PM - 08:00 PM	58.4	81.4	49.3
08:00 PM - 09:00 PM	60.2	82.9	48.2
09:00 PM - 10:00 PM	55.3	78.7	47.5
10:00 PM - 11:00 PM	53.5	81.8	45.9
11:00 PM - 12:00 AM	52.3	80.7	46.1
12:00 AM - 01:00 AM	50.8	73.6	45.7
01:00 AM - 02:00 AM	49.4	68.2	44.9
02:00 AM - 03:00 AM	47.7	68.9	44.8
03:00 AM - 04:00 AM	47.7	68.8	44.9
04:00 AM - 05:00 AM	49.2	72.2	45.1
05:00 AM - 06:00 AM	52.9	74.8	45.7
06:00 AM - 07:00 AM	54.7	74.3	47.3
07:00 AM - 08:00 AM	60.3	81.8	51.3
08:00 AM - 09:00 AM	59.2	81.0	48.0
09:00 AM - 10:00 AM	54.3	78.6	45.4
10:00 AM - 11:00 AM	53.8	79.0	44.8
11:00 AM - 12:00 PM	52.9	78.0	42.6
12:00 PM - 01:00 PM	62.5	87.8	47.2
01:00 PM - 02:00 PM	55.4	78.7	46.8
02:00 PM - 03:00 PM	54.7	77.3	47.0

Leq Average 24 hrs. (dB(A))	57.0
Lmax (dB(A))	93.2
L90 (dB(A))	46.8
Ldn (dB(A))	
Standard (dB(A))	70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานระดับเสียงจากโรงงานอุตสาหกรรม
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานระดับเสียงจากโรงงาน และระดับเสียงจากอาคารประกอบ

รายงาน พ.ศ. 2548

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

Technical Management

Chontichak

Chonticha Subongkroh
Scientist (3)

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Supt S.

Supot Salameh
Section Head

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S (Reports_Air Noise rpt) (2.34PM)



Analysis / Test Report

TESTING
No.0042

Lot ID: 25403369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308925-1



Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GT53

Page 1 of 1

Sample Number	2540369-14
Parameter	Noise (Leq 24 hrs.)
Location	โรงงานอุตสาหกรรม (GPS 47P 0735491, 1445328)
Measurement Date	May 08 - May 09, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
03:00 PM - 04:00 PM	55.8	80.4	46.5
04:00 PM - 05:00 PM	57.4	86.6	48.0
05:00 PM - 06:00 PM	58.0	86.0	48.1
06:00 PM - 07:00 PM	57.6	79.1	49.0
07:00 PM - 08:00 PM	58.9	81.8	49.4
08:00 PM - 09:00 PM	57.3	76.1	48.7
09:00 PM - 10:00 PM	57.2	85.1	46.3
10:00 PM - 11:00 PM	54.1	81.8	45.0
11:00 PM - 12:00 AM	51.6	79.0	45.0
12:00 AM - 01:00 AM	49.4	75.8	44.5
01:00 AM - 02:00 AM	47.1	70.1	44.1
02:00 AM - 03:00 AM	48.5	73.6	43.9
03:00 AM - 04:00 AM	49.9	73.9	43.8
04:00 AM - 05:00 AM	49.1	81.9	43.9
05:00 AM - 06:00 AM	52.8	77.2	44.6
06:00 AM - 07:00 AM	58.5	83.9	46.4
07:00 AM - 08:00 AM	60.6	87.0	51.0
08:00 AM - 09:00 AM	57.8	78.3	48.6
09:00 AM - 10:00 AM	53.4	73.3	45.6
10:00 AM - 11:00 AM	59.9	77.2	45.4
11:00 AM - 12:00 PM	60.3	75.5	45.1
12:00 PM - 01:00 PM	58.4	77.6	43.3
01:00 PM - 02:00 PM	52.7	73.0	41.6
02:00 PM - 03:00 PM	57.9	88.5	44.4

Leq Average 24 hrs. (dB(A))	56.7
Lmax (dB(A))	88.5
L90 (dB(A))	45.1
Ldn (dB(A))	
Standard (dB(A))	70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานระดับเสียงจากโรงงานอุตสาหกรรม
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานระดับเสียงจากโรงงาน และระดับเสียงจากอาคารประกอบ

รายงาน พ.ศ. 2548

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

Technical Management

Chontichak

Chonticha Subongkroh
Scientist (3)

Approved by

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Supot Salameh
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S (Reports_Air Noise rpt) (2.34PM)



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308926-1

P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Page 1 of 1

Sample Number	2540369-15
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณผดุงวิทยาร (GPS 47P 0738701, 1444162)
Measurement Date	May 02 - May 03, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	53.8	81.5	45.0
01:00 PM - 02:00 PM	52.0	74.2	45.4
02:00 PM - 03:00 PM	52.8	73.8	44.2
03:00 PM - 04:00 PM	50.9	73.7	42.4
04:00 PM - 05:00 PM	49.9	75.7	41.4
05:00 PM - 06:00 PM	50.5	73.5	41.9
06:00 PM - 07:00 PM	48.9	68.6	43.1
07:00 PM - 08:00 PM	50.5	76.8	47.2
08:00 PM - 09:00 PM	50.9	77.8	44.8
09:00 PM - 10:00 PM	50.7	78.5	44.5
10:00 PM - 11:00 PM	45.7	70.1	42.6
11:00 PM - 12:00 AM	47.6	82.3	43.2
12:00 AM - 01:00 AM	57.6	83.2	42.5
01:00 AM - 02:00 AM	44.8	65.5	41.6
02:00 AM - 03:00 AM	46.6	71.1	40.5
03:00 AM - 04:00 AM	45.5	70.4	39.1
04:00 AM - 05:00 AM	48.9	72.2	44.2
05:00 AM - 06:00 AM	58.4	84.2	43.7
06:00 AM - 07:00 AM	56.2	78.4	44.4
07:00 AM - 08:00 AM	56.3	76.9	45.9
08:00 AM - 09:00 AM	53.2	76.7	42.9
09:00 AM - 10:00 AM	50.7	76.6	40.8
10:00 AM - 11:00 AM	51.7	77.1	39.9
11:00 AM - 12:00 PM	53.2	77.2	41.3

Leq Average 24 hrs. (dB(A))	52.7
Lmax (dB(A))	84.2
L90 (dB(A))	42.9
Ldn (dB(A))	

Standard (dB(A)) 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียงมาตรฐานสำหรับชุมชน พ.ศ. 2540 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียงมาตรฐานสำหรับชุมชน พ.ศ. 2540
2. ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียงมาตรฐานสำหรับชุมชน พ.ศ. 2540

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

Supt S.

Supot Salameh
Section Head

Chonticha

Chonticha Subongkoch
Scientist (3)

Approved by



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308927-1

P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Page 1 of 1

Sample Number	2540369-16
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณผดุงวิทยาร (GPS 47P 0738701, 1444162)
Measurement Date	May 03 - May 04, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	50.6	71.3	43.8
01:00 PM - 02:00 PM	76.9	100.4	58.3
02:00 PM - 03:00 PM	65.2	89.7	55.1
03:00 PM - 04:00 PM	73.6	105.9	48.0
04:00 PM - 05:00 PM	56.7	79.0	48.1
05:00 PM - 06:00 PM	55.8	74.0	45.2
06:00 PM - 07:00 PM	51.2	73.0	47.6
07:00 PM - 08:00 PM	50.4	67.0	46.9
08:00 PM - 09:00 PM	49.4	64.9	46.7
09:00 PM - 10:00 PM	49.8	74.0	44.8
10:00 PM - 11:00 PM	47.2	64.7	45.1
11:00 PM - 12:00 AM	49.4	73.9	45.3
12:00 AM - 01:00 AM	47.3	73.5	44.7
01:00 AM - 02:00 AM	47.3	68.1	45.8
02:00 AM - 03:00 AM	48.5	62.9	43.5
03:00 AM - 04:00 AM	45.8	64.4	44.5
04:00 AM - 05:00 AM	49.8	67.4	46.9
05:00 AM - 06:00 AM	59.1	90.8	44.9
06:00 AM - 07:00 AM	59.2	83.2	46.2
07:00 AM - 08:00 AM	55.4	77.3	45.1
08:00 AM - 09:00 AM	60.4	83.9	41.9
09:00 AM - 10:00 AM	58.1	76.7	39.9
10:00 AM - 11:00 AM	50.3	76.8	40.3
11:00 AM - 12:00 PM	53.0	74.9	

Leq Average 24 hrs. (dB(A))	65.3
Lmax (dB(A))	105.9
L90 (dB(A))	
Ldn (dB(A))	

Standard (dB(A)) 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียงมาตรฐานสำหรับชุมชน พ.ศ. 2540 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียงมาตรฐานสำหรับชุมชน พ.ศ. 2540
2. ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียงมาตรฐานสำหรับชุมชน พ.ศ. 2540

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

Chonticha

Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.

Supot Salameh
Section Head



TESTING
No.0042

Lot ID: 2540369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308928-1

Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Page 1 of 1

Sample Number	2540369-17
Parameter	Noise (Leq 24 hrs.)
Location	บ้านหนองผักแว่น (GPS 47P 0738701, 1444162)
Measurement Date	May 04 - May 05, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	48.0	67.9	40.5
01:00 PM - 02:00 PM	49.2	68.8	40.2
02:00 PM - 03:00 PM	52.6	73.8	39.8
03:00 PM - 04:00 PM	49.0	74.4	39.1
04:00 PM - 05:00 PM	55.9	77.0	39.9
05:00 PM - 06:00 PM	54.0	76.4	44.8
06:00 PM - 07:00 PM	49.0	70.5	44.3
07:00 PM - 08:00 PM	49.6	75.7	46.0
08:00 PM - 09:00 PM	47.5	65.9	44.6
09:00 PM - 10:00 PM	47.0	71.2	43.1
10:00 PM - 11:00 PM	59.9	84.5	42.5
11:00 PM - 12:00 AM	44.6	71.2	41.3
12:00 AM - 01:00 AM	55.3	89.7	39.4
01:00 AM - 02:00 AM	40.7	65.3	38.3
02:00 AM - 03:00 AM	41.1	59.5	38.1
03:00 AM - 04:00 AM	45.8	72.5	38.8
04:00 AM - 05:00 AM	49.1	71.3	39.8
05:00 AM - 06:00 AM	57.5	78.0	44.6
06:00 AM - 07:00 AM	53.4	76.1	45.4
07:00 AM - 08:00 AM	52.6	77.0	44.2
08:00 AM - 09:00 AM	51.1	78.7	39.9
09:00 AM - 10:00 AM	52.2	74.6	39.6
10:00 AM - 11:00 AM	49.2	75.3	38.3
11:00 AM - 12:00 PM	54.0	74.5	40.0
Leq Average 24 hrs. (dB(A))	52.6	89.7	
Lmax (dB(A))			40.0
L90 (dB(A))			
Ldn (dB(A))	60.1		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ใช้เกณฑ์การประเมินสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เพื่อกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ใช้เกณฑ์การวัดค่าการรบกวน เพื่อกำหนดระดับเสียงการรบกวน และระดับเสียงที่ได้จากการประกอบกิจการ
รายงาน พ.ศ. 2548

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

Technical Management
Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.
Supot Salamteah
Section Head

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308929-1

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Page 1 of 1

Sample Number	2540369-18
Parameter	Noise (Leq 24 hrs.)
Location	บ้านหนองผักแว่น (GPS 47P 0738701, 1444162)
Measurement Date	May 05 - May 06, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	50.0	71.4	37.8
01:00 PM - 02:00 PM	50.6	69.9	41.0
02:00 PM - 03:00 PM	53.5	77.3	42.1
03:00 PM - 04:00 PM	49.9	71.2	41.8
04:00 PM - 05:00 PM	62.8	98.3	44.3
05:00 PM - 06:00 PM	58.5	77.9	47.6
06:00 PM - 07:00 PM	51.3	70.7	46.1
07:00 PM - 08:00 PM	51.3	76.2	47.1
08:00 PM - 09:00 PM	48.4	72.1	44.6
09:00 PM - 10:00 PM	47.0	68.5	43.7
10:00 PM - 11:00 PM	44.4	64.2	41.7
11:00 PM - 12:00 AM	43.2	63.3	41.1
12:00 AM - 01:00 AM	44.5	63.4	41.2
01:00 AM - 02:00 AM	49.3	79.6	40.6
02:00 AM - 03:00 AM	57.5	81.9	39.2
03:00 AM - 04:00 AM	49.4	78.4	40.2
04:00 AM - 05:00 AM	50.9	74.6	40.7
05:00 AM - 06:00 AM	58.8	77.3	44.2
06:00 AM - 07:00 AM	57.5	76.9	46.1
07:00 AM - 08:00 AM	53.4	75.2	44.1
08:00 AM - 09:00 AM	51.8	74.5	40.9
09:00 AM - 10:00 AM	50.5	79.3	39.7
10:00 AM - 11:00 AM	48.2	72.1	39.7
11:00 AM - 12:00 PM	50.1	71.1	38.2
Leq Average 24 hrs. (dB(A))	54.3		
Lmax (dB(A))		98.3	41.2
L90 (dB(A))			
Ldn (dB(A))	60.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ใช้เกณฑ์การประเมินสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เพื่อกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ใช้เกณฑ์การวัดค่าการรบกวน เพื่อกำหนดระดับเสียงการรบกวน และระดับเสียงที่ได้จากการประกอบกิจการ
รายงาน พ.ศ. 2548

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

Technical Management
Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.
Supot Salamteah
Section Head

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



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308930-1

P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Page 1 of 1

Sample Number	2540369-19
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณหลังอาคาร (GPS 47P 0738701, 1444162)
Measurement Date	May 06 - May 07, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	46.9	67.6	38.5
01:00 PM - 02:00 PM	49.9	72.3	42.8
02:00 PM - 03:00 PM	48.0	74.9	41.7
03:00 PM - 04:00 PM	51.3	75.9	40.9
04:00 PM - 05:00 PM	52.8	76.1	41.9
05:00 PM - 06:00 PM	50.8	75.1	42.1
06:00 PM - 07:00 PM	51.4	75.0	43.8
07:00 PM - 08:00 PM	48.0	72.3	47.5
08:00 PM - 09:00 PM	52.8	69.6	44.5
09:00 PM - 10:00 PM	45.3	75.6	43.9
10:00 PM - 11:00 PM	44.7	61.4	42.6
11:00 PM - 12:00 AM	43.6	67.4	41.6
12:00 AM - 01:00 AM	47.5	72.6	41.1
01:00 AM - 02:00 AM	43.5	73.8	41.8
02:00 AM - 03:00 AM	46.6	79.2	40.2
03:00 AM - 04:00 AM	49.2	68.2	38.7
04:00 AM - 05:00 AM	58.5	81.7	40.4
05:00 AM - 06:00 AM	55.3	77.2	43.6
06:00 AM - 07:00 AM	50.8	75.1	45.0
07:00 AM - 08:00 AM	49.7	66.1	45.4
08:00 AM - 09:00 AM	49.3	69.2	41.0
09:00 AM - 10:00 AM	52.9	65.4	42.0
10:00 AM - 11:00 AM	51.9	74.4	41.7
11:00 AM - 12:00 PM	51.9	81.7	41.9

Leq Average 24 hrs. (dB(A))	51.9
Lmax (dB(A))	81.7
L90 (dB(A))	41.9
Ldn (dB(A))	
Standard (dB(A))	70
Reference Method	: ISO1996-1 and 1996-2
Standard	: 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดมาตรฐานสิ่งแวดล้อมในอาคาร ฉบับที่ 15 (พ.ศ. 2540) เรื่อง กำหนดมาตรฐานสิ่งแวดล้อมในอาคาร 2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าระดับเสียงในอาคาร และระดับเสียงที่ได้จากการจราจรในอาคาร ทั้งนี้ พ.ศ. 2548
Remark	: The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak

Chonticha Subongkach
Scientist (3)

Approved by

Supt S.

Supot Salamteah
Section Head

LIP Sciences

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S (Reports)_Air Noise m (2 35PM)



Analysis / Test Report

TESTING
No.0042

Lot ID: 2540369

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number: 3308931-1

P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Page 1 of 1

Sample Number	2540369-20
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณหลังอาคาร (GPS 47P 0738701, 1444162)
Measurement Date	May 07 - May 08, 2025
Measurement by	Nantawat Sarin
Sound Level meter	Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	49.5	71.1	41.6
01:00 PM - 02:00 PM	49.5	66.5	43.3
02:00 PM - 03:00 PM	49.7	67.6	42.8
03:00 PM - 04:00 PM	54.1	75.0	42.6
04:00 PM - 05:00 PM	52.6	74.5	42.5
05:00 PM - 06:00 PM	52.6	76.1	42.6
06:00 PM - 07:00 PM	49.7	66.2	42.8
07:00 PM - 08:00 PM	50.1	72.2	46.2
08:00 PM - 09:00 PM	56.1	80.9	44.0
09:00 PM - 10:00 PM	56.3	81.5	43.6
10:00 PM - 11:00 PM	44.5	72.3	41.3
11:00 PM - 12:00 AM	44.6	62.0	41.1
12:00 AM - 01:00 AM	45.4	72.8	40.8
01:00 AM - 02:00 AM	45.3	70.9	42.3
02:00 AM - 03:00 AM	49.6	80.6	41.3
03:00 AM - 04:00 AM	46.0	68.0	39.4
04:00 AM - 05:00 AM	51.9	79.3	39.9
05:00 AM - 06:00 AM	56.3	77.3	39.9
06:00 AM - 07:00 AM	55.0	83.2	45.1
07:00 AM - 08:00 AM	50.9	73.4	44.0
08:00 AM - 09:00 AM	48.5	68.3	43.8
09:00 AM - 10:00 AM	50.3	69.4	41.5
10:00 AM - 11:00 AM	54.6	73.4	42.9
11:00 AM - 12:00 PM	71.6	99.2	40.4

Leq Average 24 hrs. (dB(A))	58.8
Lmax (dB(A))	99.2
L90 (dB(A))	
Ldn (dB(A))	60.7
Standard (dB(A))	70
Reference Method	: ISO1996-1 and 1996-2
Standard	: 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดมาตรฐานสิ่งแวดล้อมในอาคาร ฉบับที่ 15 (พ.ศ. 2540) เรื่อง กำหนดมาตรฐานสิ่งแวดล้อมในอาคาร 2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าระดับเสียงในอาคาร และระดับเสียงที่ได้จากการจราจรในอาคาร ทั้งนี้ พ.ศ. 2548
Remark	: The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak

Chonticha Subongkach
Scientist (3)

Approved by

Supt S.

Supot Salamteah
Section Head

LIP Sciences

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S (Reports)_Air Noise m (2 35PM)



Analysis / Test Report

TESTING
No.0042

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540369

Date Received : May 13, 2025
Date Reported : May 17, 2025
Report Number : 3308932-1

Page 1 of 1

Sample Number	2540369-21			
Parameter	Noise (Leq 24 hrs.)			
Location	บริเวณแหล่งการค้า (GPS 47P 0738701, 1444162)			
Measurement Date	May 08 - May 09, 2025			
Measurement by	Nantawat Sarin			
Sound Level meter	Serial No. 900074			
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))	
12:00 PM - 01:00 PM	60.7	91.3	46.5	
01:00 PM - 02:00 PM	51.2	71.6	45.1	
02:00 PM - 03:00 PM	51.5	74.6	44.3	
03:00 PM - 04:00 PM	50.1	67.6	44.0	
04:00 PM - 05:00 PM	50.4	74.2	44.7	
05:00 PM - 06:00 PM	50.0	72.9	45.6	
06:00 PM - 07:00 PM	51.5	80.5	46.3	
07:00 PM - 08:00 PM	51.9	78.1	49.0	
08:00 PM - 09:00 PM	49.6	62.6	47.8	
09:00 PM - 10:00 PM	49.4	65.1	47.5	
10:00 PM - 11:00 PM	48.8	61.0	46.7	
11:00 PM - 12:00 AM	50.7	84.7	47.9	
12:00 AM - 01:00 AM	59.3	83.4	47.9	
01:00 AM - 02:00 AM	50.1	62.2	48.2	
02:00 AM - 03:00 AM	48.4	64.8	46.6	
03:00 AM - 04:00 AM	49.0	68.2	45.3	
04:00 AM - 05:00 AM	49.4	67.7	45.2	
05:00 AM - 06:00 AM	53.9	74.8	45.2	
06:00 AM - 07:00 AM	51.2	70.9	46.8	
07:00 AM - 08:00 AM	53.1	78.8	46.6	
08:00 AM - 09:00 AM	50.2	78.2	40.4	
09:00 AM - 10:00 AM	49.6	67.4	39.8	
10:00 AM - 11:00 AM	50.5	68.0	40.0	
11:00 AM - 12:00 PM	50.2	72.3	39.3	

Technical Management
Chontichak
Chonticha Subongloch
Scientist (3)

Approved by
Supot Salamteih
Section Head

Supt S.

ADDRESS 616/10 Moo 5 T. Mueang Klu A. Pluakdaeng Rayong 21140 Thailand. P.O.BOX 466 0 3304 8555 FAX 466 0 3304 8556
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ภาคผนวก ค-4

คุณภาพน้ำทิ้งจากระบบการผลิต



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

TESTING
Lot ID: 24144009
Date Received : Jan 07, 2025
Date Reported : Jan 14, 2025
Report Number : 3202013-1

Page 1 of 2

Sample Number	24144009-1
Sampled Date	Jan 07, 2025 9:45 AM
Sample Description	Wastewater
Location	บริเวณน้ำทิ้ง
Date Analysis Commenced	Jan 07, 2025
Condition of Sample	Contained in one amber glass bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing						
BOD (5 days at 20 Degree C)	mg/L	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	5	8	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	5	6	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Oil & Grease	mg/L	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C			7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C		30.6	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	5	200	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	5	6	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.029/2567 : General Standards for Wastewater drainage into central wastewater treatment systems in Industrial Estates.
Sampling By : Warunyo Chimphaee รหัสประจำตัว 7-323-4-0020

Technical Management
Photchanas S.
Photchanas Seeda
Scientist (4)
รหัสประจำตัว 7-323-4-0028

Approved by
Dej Changchon
Senior Manager
รหัสประจำตัว 7-323-4-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the Laboratory.

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

TESTING
Lot ID: 24144009
Date Received : Jan 07, 2025
Date Reported : Jan 14, 2025
Report Number : 3202013-1

Page 2 of 2

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

Technical Management
Photchanas S.
Photchanas Seeda
Scientist (4)
รหัสประจำตัว 7-323-4-0028

Approved by
Dej Changchon
Senior Manager
รหัสประจำตัว 7-323-4-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2510587
Date Received : Feb 03, 2025
Date Reported : Feb 10, 2025
Report Number : 3225222-1

Sample Number
2510587-1

Sample Date
Feb 03, 2025 10:57 AM

Sample Description
Wastewater
น้ำทิ้งจากโรงงาน

Location
น้ำทิ้งจากโรงงาน

Date Analysis Commenced
Feb 03, 2025

Condition of Sample
Contained in one amber glass bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	7	≤600	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤600	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.4	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	452	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 105-105 degree C	mg/L	-	5	<5	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Surawit Narapong รหัสประจำตัว 7-323-4-0011

Technical Management

Photchanas S.
Photchana Seeda
Scientist (4)
รหัสประจำตัว 7-323-4-0028

Approved by

D. Chingchon
Dej Chingchon
Senior Manager
รหัสประจำตัว 7-323-4-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of this laboratory.

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2510587
Date Received : Feb 03, 2025
Date Reported : Feb 10, 2025
Report Number : 3225222-1

Remark :

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

Technical Management

Photchanas S.
Photchana Seeda
Scientist (4)
รหัสประจำตัว 7-323-4-0028

Approved by

D. Chingchon
Dej Chingchon
Senior Manager
รหัสประจำตัว 7-323-4-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2519753

Date Received : Mar 04, 2025
Date Reported : Mar 11, 2025
Report Number : 3245835-1

TESTING
No.0042

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	5	≤600	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤600	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	39.3	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	128	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.029/2567 : General Standards for Wastewater drainage into central wastewater treatment Systems in Industrial Estates.

Technical Management

Photchanas S.
Photchana Seeda
Scientist (4)
โทรศัพท์ ๖-323-๙-0028

Approved by

D. Phum
Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-0001

Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2519753

Date Received : Mar 04, 2025
Date Reported : Mar 11, 2025
Report Number : 3245835-1

TESTING
No.0042

Page 2 of 2

Sampling By : Nattawut Athomprommarat โทรศัพท์ ๖-323-๙-0006
Remark :
- LOD : Limit of Detection
- "L" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Photchanas S.
Photchana Seeda
Scientist (4)
โทรศัพท์ ๖-323-๙-0028

Approved by

D. Phum
Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042
Lot ID: 2530449

Date Received : Apr 09, 2025

Date Reported : Apr 19, 2025

Report Number : 3270910-1

Page 1 of 2

Sample Number		2530449-1					
Sample Date		Apr 09, 2025 3:27 PM					
Sample Description		Wastewater					
Location		น้ำทิ้งจากโรงงาน					
Date Analysis Commenced		Apr 09, 2025					
Condition of Sample		Contained in one amber glass bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	10	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	10	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 F	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.9	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	432	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Surawit Narapong รหัสประจำตัว 7-323-9-0011

Technical Management

Photchanas S.

Photchana Seeda

Scientist (4)

รหัสประจำตัว 7-323-9-0028

Approved by

D. Changchon

Dej Changchon

Senior Manager

รหัสประจำตัว 7-323-9-0001

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13080-617 EMAIL

S:\Reports\AL_Gd.pr (3.08PM)



Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042
Lot ID: 2530449

Date Received : Apr 09, 2025

Date Reported : Apr 19, 2025

Report Number : 3270910-1

Page 2 of 2

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

Technical Management

Photchanas S.

Photchana Seeda

Scientist (4)

รหัสประจำตัว 7-323-9-0028

Approved by

D. Changchon

Dej Changchon

Senior Manager

รหัสประจำตัว 7-323-9-0001

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location: GTS3

TESTING
No.0042

Lot ID: 2540422

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293789-1

Page 1 of 3

Sample Number	2540422-1
Sample Date	May 08, 2025 10:15 AM
Sample Description	Wastewater
Location	น้ำทิ้งจากโรงงาน
Date Analysis Commenced	May 08, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	10	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	7	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Cyanide as HCN	mg/L	0.001	0.005	<0.005	≤0.2	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-CN (C, E)	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed, 2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (b)	Rayong

Technical Management

Photchanas.S.

Photchana Seeda
Scientist (4)
โทรศัพท์ 3-323-4-0028

Approved by

Dej Changchon
Senior Manager
โทรศัพท์ 3-323-4-0001

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S: Report_LAB_CO_IP (1-4279)



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location: GTS3

TESTING
No.0042

Lot ID: 2540422

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293789-1

Page 2 of 3

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phenol	mg/L	0.005	0.01	Not Detected	≤1	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5530 B, D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong
Temperature *	Degree C	-	-	35.2	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	464	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Waruyoo Chimphelee โทรศัพท์ 3-323-4-0020 , Samart Khumplhee โทรศัพท์ 3-204-4-0064

Remark :

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

Technical Management

Photchanas.S.

Photchana Seeda
Scientist (4)
โทรศัพท์ 3-323-4-0028

Approved by

Dej Changchon
Senior Manager
โทรศัพท์ 3-323-4-0001

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13109-61/ENAL

S: Report_LAB_CO_IP (1-4279)



Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No.0042
Lot ID: 2540422
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293789-1



Page 3 of 3
* Analytes marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025



Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No.0009
Lot ID: 2540422
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293789-2



Page 1 of 5

Sample Number 2540422-1
Sample Date May 08, 2025 10:15 AM
Sample Description Wastewater
Location ตลาดน้ำพุดตาล
Date Analysis Commenced May 09, 2025
Condition of Sample Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.0006	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Barium	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Cadmium	mg/L	0.0003	0.0005	Not Detected	≤0.03	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.0006	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	<0.0005	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.05	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	Not Detected	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok

Technical Management

Photchanan S.
Photchanan Seeda
Scientist (4)
โทรศัพท์ 7-323-4-0028

Approved by

D. J. J. J.
Dej Changdon
Senior Manager
โทรศัพท์ 7-323-4-0001

Technical Management

Chanatt L.
Chanattagim Inthom
Section Head
โทรศัพท์ 7-204-4-0008

Approved by

K. A. A.
Kanokkom Anek
Assistant General Manager
โทรศัพท์ 7-204-4-0004

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Puak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location: GTS3

TESTING
No.0009
Lot ID: 2540422

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293789-2

Page 2 of 5

Sample Number	2540422-1
Sample Date	May 08, 2025 10:15 AM
Sample Description	Wastewater
Location	น้ำทิ้งจากโรงงาน
Date Analysis Commenced	May 09, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.0010	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Selenium	mg/L	0.0003	0.0005	Not Detected	≤0.02	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Silver	mg/L	0.0003	0.0005	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Trivalent Chromium *	mg/L	-	0.01	<0.01	≤0.75	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.01	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Pesticides - Organochlorine Group							
2,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
2,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management

Chanatt L.

Chanattagarn Inthom
Section Head
โทรศัพท์ 7-204-4-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
โทรศัพท์ 7-204-4-0004

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S (Report)_AL_Q (pt) (25599)



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Puak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location: GTS3

TESTING
No.0009
Lot ID: 2540422

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293789-2

Page 3 of 5

Sample Number	2540422-1
Sample Date	May 08, 2025 10:15 AM
Sample Description	Wastewater
Location	น้ำทิ้งจากโรงงาน
Date Analysis Commenced	May 09, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
2,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Aldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
alpha-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
beta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management

Chanatt L.

Chanattagarn Inthom
Section Head
โทรศัพท์ 7-204-4-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
โทรศัพท์ 7-204-4-0004

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1309 6V EMAIL

S (Report)_AL_Q (pt) (25599)



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0009
Lot ID: 2540422
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293789-2

Page 4 of 5

Sample Number	Sample Date	Sample Description	Location	Date Analysis Commenced	Condition of Sample	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
2540422-1	May 08, 2025 10:15 AM	Wastewater	น้ำทิ้งจากโรงงาน	May 09, 2025	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)	ug/L	0.02	0.04	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Pesticides - Organochlorine Group												
Chlordane *						ug/L	0.02	0.04	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
delta-BHC *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Dieldrin *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan I *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan II *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endrin *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Heptachlor *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management

Chanatt L.

Chanattagarn Inthom
Section Head
หน้างานวันที่ 7-204-q-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
หน้างานวันที่ 7-204-q-0004

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S:\Report\All_01 (2569P)



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0009
Lot ID: 2540422
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293789-2

Page 5 of 5

Sample Number	Sample Date	Sample Description	Location	Date Analysis Commenced	Condition of Sample	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
2540422-1	May 08, 2025 10:15 AM	Wastewater	น้ำทิ้งจากโรงงาน	May 09, 2025	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Pesticides - Organochlorine Group												
Heptachlor-Epoxide *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Lindane (gamma-BHC) *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Methoxychlor *						ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

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

Sampling By : Warunyo Chimphalee หน้างานวันที่ 7-323-q-0020 , Samart Khumplinee หน้างานวันที่ 7-204-q-0084

Remark :

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

Technical Management

Chanatt L.

Chanattagarn Inthom
Section Head
หน้างานวันที่ 7-204-q-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
หน้างานวันที่ 7-204-q-0004

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location: GTS3

TESTING
No.0009
Lot ID: 2540422
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293789-3

Page 1 of 2

Sample Number	2540422-1
Sampled Date	May 08, 2025 10:15 AM
Sample Description	Wastewater
Location	ใกล้ท่อระบายน้ำ
Date Analysis Commenced	May 08, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.20	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Pesticides - Organochlorine Group							
alpha-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
gamma-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Hexachlorobenzene *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Mirex *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							
Antonic Surfactant as MBAS *	mg/L	0.015	0.05	0.15	≤30	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5540 B, C	Bangkok
Chloride as Cl *	mg/L	0.5	1	266	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-C1 (D)	Rayong

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Approved by

Chanatt L.

Chanattagarn Inthom
Section Head

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location: GTS3

TESTING
No.0009
Lot ID: 2540422
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293789-3

Page 2 of 2

Sample Number	2540422-1
Sampled Date	May 08, 2025 10:15 AM
Sample Description	Wastewater
Location	ใกล้ท่อระบายน้ำ
Date Analysis Commenced	May 08, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Fluoride as F *	mg/L	0.06	0.2	<0.2	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-F (D)	Rayong
Odour *				Odourless	No Standard	T15, 257-2519	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.029/2557 : General Standards for Wastewater drainage into central wastewater treatment systems in Industrial Estates.
Sampling By : Warunyoo Chimpalee , Samart Khumphlee

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

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

Chanatt L.

Chanattagarn Inthom
Section Head

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042
Lot ID: 2548886

Date Received : Jun 05, 2025

Date Reported : Jun 12, 2025

Report Number : 3313438-1

Page 1 of 2

Sample Number	Unit	LOD	LOQ (LOI)	Result	Guideline / Specification	Method	Testing Location
2548886-1							
Sample Date	Jun 05, 2025 2:05 PM						
Sample Description	Wastewater						
Location	น้ำคลองน้ำจืดรวม						
Date Analysis Commenced	Jun 05, 2025						
Condition of Sample	Contained in one amber glass bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOI)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	6	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤600	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.0	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	940	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 105.105 degree C	mg/L	-	5	<5	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Warunyoo Chimphalee รหัสประจำตัว 3-323-4-0020

Technical Management

Jitsupa P.

Jitsupa Pratuangsuk
Scientist (2)
รหัสประจำตัว 3-323-4-0004

Approved by

Dej Changchon
Senior Manager
รหัสประจำตัว 3-323-4-0001

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042
Lot ID: 2548886

Date Received : Jun 05, 2025

Date Reported : Jun 12, 2025

Report Number : 3313438-1

Page 2 of 2

Remark :
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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Jitsupa P.

Jitsupa Pratuangsuk
Scientist (2)
รหัสประจำตัว 3-323-4-0004

Approved by

Dej Changchon
Senior Manager
รหัสประจำตัว 3-323-4-0001

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ภาคผนวก ค-5

คุณภาพน้ำที่ระบายจากหอหล่อเย็น



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong

Date Reported : Jan 16, 2025

Report Number : 3202021-1

Project Location: G | S3

Sample Number	24144010-1							
Sample Date	Jan 07, 2025 9:30 AM							
Sample Description	Wastewater							
Location	sienfawisaidfu							
Date Analysis Commenced	Jan 07, 2025							
Condition of Sample	Contained in four plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (b)	Rayong
Temperature *	Degree C	-	-	26.3	≤40	≤34	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	760	≤3000	≤1300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline: Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2550 (2017). Guideline (2) : Environmental Impact Assessment Report of Gulf T33 Co., Ltd.

Sampling By : Warunvoo Chimphalee โทรสารที่ ๖-๓๒๓-๖๐๒๐ , Samart Khumphlee โทรสารที่ ๖-๒๐๔-๖-๐๐๘๔

Remark :

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

Photchanas:

Botchana Seeda
Scientist (4)

ทะเบียนเลขที่ 7-323-จ-0028

Approved by

D. Linn.

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 7-323-ด-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTSS3

Lot ID: 24144010

Date Received : Jan 07, 2025

Date Reported : Jan 15, 2025

Report Number : 3202021-2

Page 1 of 1

Sample Number	24144010-1
Sampled Date	Jan 07, 2025 9:30 AM
Sample Description	Wastewater
Location	ในพื้นที่โรงงาน
Date Analysis Commenced	Jan 08, 2025
Condition of Sample	Contained in four plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing							
Calcium	mg/L	0.003	3.95	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium	mg/L	0.003	1.24	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR	-	-	3.64	No Standard	0-10	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium	mg/L	0.003	5.87	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Water Testing							
Chlorite	mg/L	0.05	0.1	No Standard	≤1.0	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen	mg/L	-	7.3	No Standard	≥4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-C (C)	Rayong

Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Warunyo Chimphalee , Smart Khumplhee

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

Results apply to the samples as submitted, unless the sampling was conducted by ALS Laboratory Group (Thailand) Co., Ltd. and the results are not to be used for any other purpose without the written approval of the laboratory.

Savitree N.

Approved by

Savitree Nolsingam
Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTSS3

TESTING
No.0042
Lot ID: 2510588

Date Received : Feb 03, 2025

Date Reported : Feb 11, 2025

Report Number : 3225223-1

Page 1 of 2

Sample Number	2510588-1
Sampled Date	Feb 03, 2025 10:44 AM
Sample Description	Wastewater
Location	ในพื้นที่โรงงาน
Date Analysis Commenced	Feb 03, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
pH at 25 degree C	-	-	-	8.3	5.5-9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.0	≤40	≤34	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	680	≤3000	≤1300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	13	≤50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Surawit Narongvichitvongsa 323-0-0011 , Smart Khumplhee vstduasaw 3204-0-0084

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

Photchan S.

Technical Management

Photchan S. Seeda
Scientist (4)

Approved by

Dej Changchon
Senior Manager

vstduasaw 323-0-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3



TESTING

No.0042
Lot ID: 2510588
Date Received : Feb 03, 2025
Date Reported : Feb 11, 2025
Report Number : 3225223-1

Page 2 of 2

Page 1 of 1

Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2510588
Date Received : Feb 03, 2025
Date Reported : Feb 11, 2025
Report Number : 3225223-2

Sample Number		2510588-1						
Sample Date	Feb 03, 2025 10:44 AM							
Sample Description	Wastewater							
Location	บ้านใหม่หาดใหญ่							
Date Analysis Commenced	Feb 04, 2025							
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
Calcium	meq/L	0.003	0.005	2.52	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium	meq/L	0.003	0.005	0.79	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR	-	-	-	4.30	No Standard	0-10	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium	meq/L	0.003	0.005	5.53	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Water Testing								
Chlorite	mg/L	0.05	0.1	0.21	No Standard	≤1.0	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen	mg/L	-	0.1	6.7	No Standard	≥4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Surawit Narapong , Samart Khumphiee

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

Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)
โทรศัพท์ ๐-๓๒๓-๐๐๒๘

Approved by

Dej Changchon

Senior Manager
โทรศัพท์ ๐-๓๒๓-๐๐๐๐๑

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Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No.0042
Lot ID: 2519754
Date Received : Mar 04, 2025
Date Reported : Mar 12, 2025
Report Number : 3245838-1



Page 1 of 2

Sample Number	2519754-1							
Sample Date	Mar 04, 2025 9:36 AM							
Sample Description	Wastewater							
Location	พื้นที่หน้าถ้ำ							
Date Analysis Commenced	Mar 04, 2025							
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	23	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	20	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.8	≤40	≤34	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	708	≤3000	≤1300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Nattawut Athompornmarat รหัสประจำตัว 7-323-3-0006 , Kardbundit Kitisupavanit รหัสประจำตัว 7-204-3-0001

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

Technical Management

Photchanas S.
Photchana Seeda
Scientist (4)
รหัสประจำตัว 7-323-3-0028

Approved by

D. Chuan
Dej Changchon
Senior Manager
รหัสประจำตัว 7-323-3-0001

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Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No.0042
Lot ID: 2519754
Date Received : Mar 04, 2025
Date Reported : Mar 12, 2025
Report Number : 3245838-1



- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Photchanas S.
Photchana Seeda
Scientist (4)
รหัสประจำตัว 7-323-3-0028

Approved by

D. Chuan
Dej Changchon
Senior Manager
รหัสประจำตัว 7-323-3-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTSS3

TESTING
No.0009

Lot ID: 2519754

Date Received : Mar 04, 2025

Date Reported : Mar 12, 2025

Report Number : 3245838-2

Page 1 of 1

Sample Number	2519754-1
Sample Date	Mar 04, 2025 9:36 AM
Sample Description	Wastewater
Location	น้ำทิ้งโรงงาน
Date Analysis Commenced	Mar 05, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
Calcium *	mg/L	0.003	0.005	1.82	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.53	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	-	-	7.93	No Standard	0-10	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	8.60	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Water Testing								
Chlorite *	mg/L	0.05	0.1	0.38	No Standard	No Standard	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen *	mg/L	-	0.1	7.0	No Standard	≥4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of the Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Nattawut Atthomprammarat , Kerdbundit Kilsupavanit

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

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Approved by **Savitree N.**
Savitree Naisianglam
Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTSS3

TESTING
No.0042

Lot ID: 2530450

Date Received : Apr 09, 2025

Date Reported : Apr 19, 2025

Report Number : 3270912-1

Page 1 of 2

Sample Number	2530450-1
Sample Date	Apr 09, 2025 3:16 PM
Sample Description	Wastewater
Location	น้ำทิ้งโรงงาน
Date Analysis Commenced	Apr 09, 2025
Condition of Sample	Contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	20	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	18	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
pH at 25 degree C	-	-	-	7.8	5.5-9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.1	≤40	≤34	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	820	≤3000	≤1300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of the Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Suravit Narapong นวรัตน์ 323-2-0011 , Samart Khumplinee นวรัตน์ 324-2-0084

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

Technical Management **Photchanas.**
Photchanas Seeda
Scientist (4)
นวรัตน์ 323-2-0028

Approved by

Dhuan.
Dej Changchon
Senior Manager
นวรัตน์ 323-2-0001

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Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No.0042
Lot ID: 2530450
Date Received : Apr 09, 2025
Date Reported : Apr 19, 2025
Report Number : 3270912-1



- Sampling is not included in scope of accreditation ISO/IEC 17025

Page 2 of 2



Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

Lot ID: 2530450
Date Received : Apr 09, 2025
Date Reported : Apr 21, 2025
Report Number : 3270912-2

Page 1 of 1

Sample Number 2530450-1
Sample Date Apr 09, 2025 3:16 PM
Sample Description Wastewater
Location โรงบำบัดน้ำเสีย
Date Analysis Commenced Apr 09, 2025
Condition of Sample Contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
Calcium	mg/L	0.003	0.005	4.38	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium	mg/L	0.003	0.005	1.35	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR	-	-	0.10	3.89	No Standard	0-10	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium	mg/L	0.003	0.005	6.58	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Water Testing								
Chlorite	mg/L	0.05	0.1	Not Detected	No Standard	≤1.0	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen	mg/L	-	0.1	6.7	No Standard	≥4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Surawit Narapong , Samart Khumphilee

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

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Approved by

Chanatt L.

Chanatagarn Inmchom
Section Head

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Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No.0042
Lot ID: 2530450
Date Received : Apr 09, 2025
Date Reported : Apr 19, 2025
Report Number : 3270912-1



- Sampling is not included in scope of accreditation ISO/IEC 17025

Page 2 of 2



Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

Lot ID: 2530450
Date Received : Apr 09, 2025
Date Reported : Apr 21, 2025
Report Number : 3270912-2

Sample Number 2530450-1
Sample Date Apr 09, 2025 3:16 PM
Sample Description Wastewater
Location โรงบำบัดน้ำเสีย
Date Analysis Commenced Apr 09, 2025
Condition of Sample Contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
Calcium	mg/L	0.003	0.005	4.38	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium	mg/L	0.003	0.005	1.35	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR	-	-	0.10	3.89	No Standard	0-10	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium	mg/L	0.003	0.005	6.58	No Standard	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Water Testing								
Chlorite	mg/L	0.05	0.1	Not Detected	No Standard	≤1.0	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen	mg/L	-	0.1	6.7	No Standard	≥4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Surawit Narapong , Samart Khumphilee

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

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Approved by

Chanatt L.

Chanatagarn Inmchom
Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042
Lot ID: 2540427

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293793-1

Page 1 of 2

Sample Number	2540427-1							
Sampled Date	May 08, 2025 9:55 AM							
Sample Description	Wastewater							
Location	แม่น้ำท่าช้าง							
Date Analysis Commenced	May 08, 2025							
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	31	≤120	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	19	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	17	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Cyanide as CN	mg/L	0.001	0.005	0.006	≤0.2	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-CN (C, E)	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	No Standard	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed., 2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5530 B, D	Rayong

Technical Management

Photchanas.

Phokchana Seeda

Scientist (4)

โทรศัพท์ 3-323-4-0028

Approved by

Dhuan.

Dej Changchon

Senior Manager

โทรศัพท์ 3-323-4-0001

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042
Lot ID: 2540427

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293793-1

Page 2 of 2

Sample Number		2540427-1						
Sampled Date		May 08, 2025 9:55 AM						
Sample Description		Wastewater						
Location		แม่น้ำท่าช้าง						
Date Analysis Commenced		May 08, 2025						
Condition of Sample		Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong
Temperature *	Degree C	-	-	31.9	≤40	≤34	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	772	≤3000	≤1300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	4.4	≤100	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Warunoo Chimphalee โทรศัพท์ 3-323-4-0020 , Smart Klumphaee โทรศัพท์ 3-204-4-0084

Remark :

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

Technical Management

Photchanas.

Phokchana Seeda

Scientist (4)

โทรศัพท์ 3-323-4-0028

Approved by

Dhuan.

Dej Changchon

Senior Manager

โทรศัพท์ 3-323-4-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING

No.0009

Lot ID: 2540427

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293793-2

Page 1 of 5

Sample Number	2540427-1
Sampled Date	May 08, 2025 9:55 AM
Sample Description	Wastewater
Location	น้ำทิ้งน้ำเสีย
Date Analysis Commenced	May 09, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Barium	mg/L	0.0003	0.0005	0.26	≤1.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Cadmium	mg/L	0.0003	0.0005	Not Detected	≤0.03	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.005	≤2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.25	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-C B	Bangkok
Lead	mg/L	0.0003	0.0005	<0.0005	≤0.20	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.42	≤5.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	Not Detected	≤0.005	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok

Technical Management

Chanatt L.

Chanattagarn Imchom
Section Head
โทรศัพท์ 7-204-4-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
โทรศัพท์ 7-204-4-0004

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L3495-61/ENWL

S:\Reports_ML_204_en (2024M)

Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING

No.0009

Lot ID: 2540427

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293793-2

Page 2 of 5

Sample Number	2540427-1
Sampled Date	May 08, 2025 9:55 AM
Sample Description	Wastewater
Location	น้ำทิ้งน้ำเสีย
Date Analysis Commenced	May 09, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
Nickel	mg/L	0.0003	0.0005	0.01	≤1.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Selenium	mg/L	0.0003	0.0005	0.003	≤0.02	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Trivalent Chromium *	mg/L	-	0.01	<0.01	≤0.75	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.18	≤5.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B.3030 F	Bangkok
Pesticides - Organochlorine Group								
2,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6650 D, part 6410 B	Bangkok
2,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6650 D, part 6410 B	Bangkok
2,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6650 D, part 6410 B	Bangkok

Technical Management

Chanatt L.

Chanattagarn Imchom
Section Head
โทรศัพท์ 7-204-4-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
โทรศัพท์ 7-204-4-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0009
Lot ID: 2540427

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293793-2

Page 3 of 5

Sample Number	2540427-1							
Sampled Date	May 08, 2025 9:55 AM							
Sample Description	Wastewater							
Location	น้ำทิ้งจากตู้							
Date Analysis Commenced	May 09, 2025							
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Pesticides - Organochlorine Group								
4,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Aldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
alpha-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
beta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Chlordane *	ug/L	0.02	0.04	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management

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Chanatagarn Inchom
Section Head
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Approved by

Kanokorn Anek

Assistant General Manager
โทรศัพท์ 7-204-9-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0009
Lot ID: 2540427

Date Received : May 08, 2025

Date Reported : May 17, 2025

Report Number : 3293793-2

Page 4 of 5

Sample Number	2540427-1							
Sampled Date	May 08, 2025 9:55 AM							
Sample Description	Wastewater							
Location	น้ำทิ้งจากตู้							
Date Analysis Commenced	May 09, 2025							
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Pesticides - Organochlorine Group								
delta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Dieldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan I *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan II *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endrin *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Heptachlor *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Heptachlor-Epoxide *	ug/L	0.01	0.02	Not Detected	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management

Chamatt L.

Chanatagarn Inchom
Section Head
โทรศัพท์ 7-204-9-0008

Approved by

Kanokorn Anek

Assistant General Manager
โทรศัพท์ 7-204-9-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

TESTING
No.0009
Lot ID: 2540427
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293793-2

Page 5 of 5

Sample Number	2540427-1
Sampled Date	May 08, 2025 9:55 AM
Sample Description	Wastewater
Location	ปลายน้ำห้วยไผ่
Date Analysis Commenced	May 09, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Pesticides - Organochlorine Group							
Lindane (gamma-BHC) *	ug/L	0.01	0.02	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Methoxychlor *	ug/L	0.01	0.02	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Warunyoo Chimpitalee รหัสประจำตัว 7-323-9-0020 , Samart Khumplinee รหัสประจำตัว 7-204-9-0084

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

Technical Management

Chanatt L.

Chanatagarn Inthom
Section Head
รหัสประจำตัว 7-204-9-0008

Approved by

Kanokorn Anek

Assistant General Manager
รหัสประจำตัว 7-204-9-0004

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tassit, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

TESTING
No.0009
Lot ID: 2540427
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293793-3

Page 1 of 2

Sample Number	2540427-1
Sampled Date	May 08, 2025 9:55 AM
Sample Description	Wastewater
Location	ปลายน้ำห้วยไผ่
Date Analysis Commenced	May 08, 2025
Condition of Sample	Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing							
Calcium *	mg/L	0.003	0.005	0.005	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.005	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	0.10	4.34	0.10	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	0.005	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok

Pesticides - Organochlorine Group

alpha-Chlordane *	ug/L	0.01	0.02	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
gamma-Chlordane *	ug/L	0.01	0.02	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Hexachlorobenzene *	ug/L	0.01	0.02	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Mirex *	ug/L	0.01	0.02	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Water Testing

Approved by

Chanatt L.

Chanatagarn Inthom
Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0009
Lot ID: 2540427
Date Received : May 08, 2025
Date Reported : May 17, 2025
Report Number : 3293793-3

Page 2 of 2

Sample Number 2540427-1
Sample Date May 08, 2025 9:55 AM
Sample Description Wastewater
Location บ้านน้ำใส
Date Analysis Commenced May 08, 2025
Condition of Sample Contained in two glass vials, three amber glass bottles and nine plastic bottles. Sample containers comply to pretreatment - preservation standards. (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
Chlorite *	mg/L	0.05	0.1	0.12	No Standard	≤1.0	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1995, EPA Method 300.1	Bangkok
Dissolved Oxygen *	mg/L	-	0.1	6.7	No Standard	≥4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Rayong
Odour *	-	-	-	Odourless	No Standard	No Standard	TSS, 257-2549	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Warunyoo Chimphalee , Samart Khumpliee

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

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

Chanatt L.

Chanatagarn Inthom
Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2548887
Date Received : Jun 05, 2025
Date Reported : Jun 13, 2025
Report Number : 3313453-1

Page 1 of 2

Sample Number 2548887-1
Sample Date Jun 05, 2025 1:50 PM
Sample Description Wastewater
Location บ้านน้ำใส
Date Analysis Commenced Jun 05, 2025
Condition of Sample Contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	14	≤300	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
pH at 25 degree C	-	-	-	8.3	5.5-9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Temperature *	Degree C	-	-	31.7	≤40	≤34	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	800	≤3000	≤1300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Guideline : Guideline (1) : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Guideline (2) : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.

Sampling By : Warunyoo Chimphalee , Pattarapol Savengjitam

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

Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)

Approved by

D. Changchom

Dej Changchom
Senior Manager

ผลการตรวจวิเคราะห์ : 323-3-0028

ผลการตรวจวิเคราะห์ : 323-3-0001

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Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Analysis / Test Report

TESTING
No. 0042
Lot ID: 2548887
Date Received : Jun 05, 2025
Date Reported : Jun 13, 2025
Report Number : 3313453-1



- Sampling is not included in scope of accreditation ISO/IEC 17025

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2548887
Date Received : Jun 05, 2025
Date Reported : Jun 13, 2025
Report Number : 3313453-2

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ภาคผนวก ค-6

คุณภาพน้ำผิวดิน



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location: GTS3

TESTING
No.0042
Lot ID: 2530451

Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

Page 1 of 12

Sample Number	2530451-1
Sampled Date	Apr 23, 2025 9:00 AM
Sample Description	Surface water
Location	หน้าเขื่อนฝายน้ำล้น 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Calcium *	mg/L	0.003	0.005	0.44	No Standard	In-house method: STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.27	No Standard	In-house method: STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	-	-	0.82	No Standard	In-house method: STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	0.49	No Standard	In-house method: STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok

Water Testing							
BOD *	mg/L	-	2	6.4	≤4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Chlorite *	mg/L	0.05	0.1	Not Detected	No Standard	In-house method: STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen *	mg/L	-	0.1	4.9	≥2	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
pH at 25 degree C	-	-	-	7.7	5.0-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Dej Changchon
Senior Manager

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location: GTS3

TESTING
No.0042
Lot ID: 2530451

Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

Page 2 of 12

Sample Number	2530451-1
Sampled Date	Apr 23, 2025 9:00 AM
Sample Description	Surface water
Location	หน้าเขื่อนฝายน้ำล้น 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	31.0	n ¹	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	120	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	32	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Notification of the National Environmental Board, No. 8, B.E.2537 issued under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, Dated February 24, B.E. 2537 (Class 4)
n¹ : Change from Natural condition not more than 3 degree C

Sampling By : Warunyo Chimphalee, Samart Khumphlee

- Remark :
- LOD : Limit of Detection
 - LOQ : Lower than LOQ (Unit of Quantitation) / LOR (Unit of Reporting)
 - n¹ : Analysis(s) marked "Is/are not included in scope of Accreditation ISO/IEC 17025"
 - [A] Analysis conducted by ALS Laboratory Group (Thailand) Co., Ltd, Bangkok Branch, DSS Accreditation No. 0009.
 - Sampling is not included in scope of accreditation ISO/IEC 17025

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Senior Manager

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Analysis / Test Report

TESTING
No.0042
Lot ID: 2530451

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Taat, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

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Sample Number	2530451-2
Sampled Date	Apr 23, 2025 9:30 AM
Sample Description	Surface water
Location	คลองน้ำใส วัดเขาชะเมา หมู่ 1 ตำบล 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Calcium *	mg/L	0.003	0.005	1.25	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.44	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	-	-	2.80	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	2.57	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Water Testing							
BOD *	mg/L	-	2	<2.0	≤4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Chlorite *	mg/L	0.05	0.1	Not Detected	No Standard	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Disolved Oxygen *	mg/L	-	0.1	5.9	≥2	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
pH at 25 degree C	-	-	-	7.8	5.0-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

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Approved by

D. Chanchon
Dej Chanchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042
Lot ID: 2530451

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Taat, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

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Sample Number	2530451-2
Sampled Date	Apr 23, 2025 9:30 AM
Sample Description	Surface water
Location	คลองน้ำใส วัดเขาชะเมา หมู่ 1 ตำบล 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	28.5	n°	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	286	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2590 C	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	40	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Warunyo Chinnaphalee, Smart Khumplinee

Remark :
- LOD : Limit of Detection
- "C" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- [A] Analysis conducted by ALS Laboratory Group (Thailand) Co., Ltd. Bangkok Branch, DSS Accreditation No. 0009
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

D. Chanchon
Dej Chanchon
Senior Manager

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Analysis / Test Report

Client : Gulf TSC Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2530451
Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

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Sample Number	2530451-3
Sampled Date	Apr 23, 2025 9:50 AM
Sample Description	Surface water
Location	คลองน้ำไหลในเขตโรงงานอุตสาหกรรม 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Calcium *	mg/L	0.003	0.005	2.12	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.68	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	-	-	2.01	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	2.37	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok

Water Testing							
BOD *	mg/L	-	2	2.1	≤4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210-B, part 4500 - O C	Rayong
Chlorite *	mg/L	0.05	0.1	Not Detected	No Standard	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1993, EPA Method 300.1	Bangkok
Dissolved Oxygen *	mg/L	-	0.1	6.3	≥2	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
pH at 25 degree C	-	-	-	7.7	5.0-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

D. Chanchon

Dej Chanchon
Senior Manager

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Analysis / Test Report

Client : Gulf TSC Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2530451
Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

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Sample Number	2530451-3
Sampled Date	Apr 23, 2025 9:50 AM
Sample Description	Surface water
Location	คลองน้ำไหลในเขตโรงงานอุตสาหกรรม 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	30.4	n	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550-B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	328	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540-C	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	46	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540-D	Rayong

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

Sampling By : Warunyo Chimphalee, Samart Khumplinee

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantification) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- [A] Analysis conducted by ALS Laboratory Group (Thailand) Co., Ltd. Bangkok Branch, DSS Accreditation No. 0009.
- Sampling is not included in scope of accreditation ISO/IEC 17025

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Senior Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2530451
Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

Page 7 of 12

Sample Number	2530451-4
Sampled Date	Apr 23, 2025 10:10 AM
Sample Description	Surface water
Location	คลองน้ำไหลในสวนอุตสาหกรรม 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Calcium *	mg/L	0.003	0.005	1.57	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.50	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	-	-	2.04	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	2.07	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok

Water Testing							
BOD *	mg/L	-	2	2.3	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Chlorite *	mg/L	0.05	0.1	Not Detected	No Standard	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	Bangkok
Dissolved Oxygen *	mg/L	-	0.1	5.9	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
pH at 25 degree C	-	-	-	7.7	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Please apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

Dej Changchon
Senior Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

TESTING
No.0042
Lot ID: 2530451
Date Received : Apr 23, 2025
Date Reported : May 02, 2025
Report Number : 3270913-1

Page 8 of 12

Sample Number	2530451-4
Sampled Date	Apr 23, 2025 10:10 AM
Sample Description	Surface water
Location	คลองน้ำไหลในสวนอุตสาหกรรม 200 เมตร
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	31.8	n ¹	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	276	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	29	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Quality Act. B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, Dated February 24, B.E. 2537 (Class 4)
n¹: Change from Natural condition not more than 3 degree C

Sampling By : Warunyo Chimpalakee, Smart Khumplinee

Remark :
- LOD : Limit of Detection
- "C" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- [A] Analysis conducted by ALS Laboratory Group (Thailand) Co., Ltd. Bangkok Branch, DSS Accreditation No. 0009.
- Sampling is not included in scope of accreditation ISO/IEC 17025

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Senior Manager

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location: GTS3

TESTING
No.0042
Lot ID: 2530451

Date Received : Apr 23, 2025

Date Reported : May 02, 2025

Report Number : 3270913-1

Page 9 of 12

Sample Number	2530451-5
Sampled Date	Apr 23, 2025 10:30 AM
Sample Description	Surface water
Location	ส่วนที่ 2 ของพื้นที่โครงการพัฒนาที่ดินของ บริษัท ไทยพาณิชย์ จำกัด (มหาชน) 2 นก.
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Calcium *	mg/L	0.003	0.005	0.98	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Magnesium *	mg/L	0.003	0.005	0.34	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
SAR *	-	-	-	1.76	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok
Sodium *	mg/L	0.003	0.005	1.43	No Standard	In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	Bangkok

Water Testing							
BOD *	mg/L	-	2	2.8	≤4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Chlorite *	mg/L	0.05	0.1	Not Detected	No Standard	In-house method : STM 04-061 based on United States Environmental Protection Agency, 1993, EPA Method 300.1	Bangkok
Dissolved Oxygen *	mg/L	-	0.1	6.4	≥2	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
pH at 25 degree C	-	-	-	8.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

D. Chongchon

Dej Chongchon
Senior Manager

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong
Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location: GTS3

TESTING
No.0042
Lot ID: 2530451

Date Received : Apr 23, 2025

Date Reported : May 02, 2025

Report Number : 3270913-1

Page 10 of 12

Sample Number	2530451-5
Sampled Date	Apr 23, 2025 10:30 AM
Sample Description	Surface water
Location	ส่วนที่ 2 ของพื้นที่โครงการพัฒนาที่ดินของ บริษัท ไทยพาณิชย์ จำกัด (มหาชน) 2 นก.
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	32.8	n'	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	174	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	12	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Warunyo Chimphalee , Samart Khumplilee

- Remark :
- LOD : Limit of Detection
 - "<" : Lower than LOQ (Unit of Quantitation) / LOR (Unit of reporting)
 - Analysis(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
 - [A] Analysis conducted by ALS Laboratory Group (Thailand) Co., Ltd. Bangkok Branch, DSS Accreditation No. 0009.
 - Sampling is not included in scope of accreditation ISO/IEC 17025

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Approved by

D. Chongchon

Dej Chongchon
Senior Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042

Lot ID: 2530451

Date Received : Apr 23, 2025

Date Reported : May 02, 2025

Report Number : 3270913-1

Page 11 of 12

Sample Number	2530451-6
Sample Date	Apr 23, 2025 11:05 AM
Sample Description	Surface water
Location	อ่าวน้ำพองหน้าวัดป่า พิกัดพิกัดแผนที่ 4 ม
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
	Calcium *	mg/L	0.003	0.005	1.02	No Standard	Bangkok
						In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	
	Magnesium *	mg/L	0.003	0.005	0.36	No Standard	Bangkok
						In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	
	SAR *	-	-	1.80	No Standard	No Standard	Bangkok
						In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	
	Sodium *	mg/L	0.003	0.005	1.50	No Standard	Bangkok
						In-house method : STM 05-014 based on United States Environmental Protection Agency, 1994, EPA Method 200.7	

Water Testing							
	BOD *	mg/L	2	2.9	≤4	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
	Chlorite *	mg/L	0.05	0.1	Not Detected	No Standard	Bangkok
						In-house method : STM 04-061 based on United States Environmental Protection Agency, 1999, EPA Method 300.1	
	Dissolved Oxygen *	mg/L	0.1	7.8	≥2	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
	pH at 25 degree C	-	-	8.4	5.0-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

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Approved by

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Dej Chanchon
Senior Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong

Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

TESTING
No.0042

Lot ID: 2530451

Date Received : Apr 23, 2025

Date Reported : May 02, 2025

Report Number : 3270913-1

Page 12 of 12

Sample Number	2530451-6
Sample Date	Apr 23, 2025 11:05 AM
Sample Description	Surface water
Location	อ่าวน้ำพองหน้าวัดป่า พิกัดพิกัดแผนที่ 4 ม
Date Analysis Commenced	Apr 23, 2025
Condition of Sample	Contained in two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
	Temperature *	Degree C	-	34.5	n'	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
	Total Dissolved Solids Dried at 180 degree C	mg/L	-	172	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
	Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	9	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Notification of the National Environmental Board, No. 8, B.E.2537 issued under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535, published in the Royal Government Gazette, Vol. 111, Part 16, dated February 24, B.E. 2537 (Class 4)

Change from Natural condition not more than 3 degrees C

Sampling By : Wanayoo Chimpalee, Samart Khumplee

Remark :

- LOD : Limit of Detection
- "C" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- (A) Analysis conducted by ALS Laboratory Group (Thailand) Co., Ltd. Bangkok Branch, BSS Accreditation No. 0009
- Sampling is not included in scope of accreditation ISO/IEC 17025

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

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ภาคผนวก ค-7

ระดับเสียงภายในสถานประกอบการ



Analysis / Test Report

Client: Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 4, Tasi, Pluak Daeng, Rayong Thailand 21141
Lot ID: 2512156
Date Received : Feb 28, 2025
Date Reported : Mar 05, 2025
Report Number: 3249519-1
P/O: 4210402620
Project Name: Monitoring EIA

Page 1 of 1

Sample Number	2512156-4
Parameter	Noise (Leq 8 hrs.)
Location	Urban Gas Turbine Accessories System (หน้าเครื่องฯ GTG 11 นว: GTG12)
Measurement Date	Feb 27, 2025
Measurement by	Chanon Boorcheun
Time	
08:37 AM - 09:37 AM	77.1
09:37 AM - 10:37 AM	79.1
10:37 AM - 11:37 AM	78.3
11:37 AM - 12:37 PM	77.7
12:37 PM - 01:37 PM	77.9
01:37 PM - 02:37 PM	78.6
02:37 PM - 03:37 PM	77.8
03:37 PM - 04:37 PM	78.2
	78.4
	76.4
	75.9
	75.9
	75.8
	76.2
	76.0
	75.5
	75.5
	76.3

Len Average 8 hrs. (dB(A))	76.5
Lmax (dB(A))	85
Standard (dB(A))	
Reference Method : ISO1996-1 and 1996-2	
Standard : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.	
หมายเหตุ: การทดสอบครั้งนี้ ใช้เครื่องวัดระดับเสียงแบบเคลื่อนที่ ในการวัดค่าเสียงตามพื้นที่การปฏิบัติงานจริง	

Technical Management

Chontichak
Chonticha Subongkroch
Scientist (3)

Approved by

Supot S.

Supot Salamteh
Section Head

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Analysis / Test Report

Client : Gulf T33 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
Lot ID: 2512156
Date Received : Feb 28, 2025
Date Reported : Mar 05, 2025
Report Number: 3249520-1
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2512156-5			
Parameter	Noise (Leq 8 hrs.)			
Location	บริเวณ Steam Turbine Generator			
Measurement Date	Feb 27, 2025			
Measurement by	Chanon Booncheun			
	Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
	08:55 AM - 09:55 AM	77.8	79.3	77.5
	09:55 AM - 10:55 AM	76.8	78.3	76.5
	10:55 AM - 11:55 AM	78.7	87.7	77.3
	11:55 AM - 12:55 PM	77.9	79.4	77.6
	12:55 PM - 01:55 PM	77.5	87.6	74.6
	01:55 PM - 02:55 PM	77.6	88.1	76.7
	02:55 PM - 03:55 PM	77.4	81.9	77.0
	03:55 PM - 04:55 PM	77.3	78.8	77.0

Leq Average 8 hrs. (dB(A))
Lmax (dB(A))
Standard (dB(A))

88.1

140

85

Reference Method : ISO1996-1 and 1996-2

Standard : Environmental Impact Assessment Report of Gulf T33 Co., Ltd.

ประเภทเครื่องจักรกล : เครื่องจักรกลอุตสาหกรรม

ผลการประเมิน : ผลการประเมินค่าเสียงตามมาตรฐาน

ผลการประเมินค่าเสียงตามมาตรฐานในการพิจารณา

Technical Management

Chontichak

Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.

Supot Salameh
Section Head

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Analysis / Test Report

Client : Gulf T33 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
Lot ID: 2512156
Date Received : Feb 28, 2025
Date Reported : Mar 05, 2025
Report Number: 3249521-1
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Page 1 of 1

Sample Number	2512156-6			
Parameter	Noise (Leq 8 hrs.)			
Location	บริเวณ Steam Turbine Lube Oil Skid			
Measurement Date	Feb 27, 2025			
Measurement by	Chanon Booncheun			
	Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
	08:58 AM - 09:58 AM	77.4	82.8	76.9
	09:58 AM - 10:58 AM	77.3	86.9	74.4
	10:58 AM - 11:58 AM	76.4	85.4	75.0
	11:58 AM - 12:58 PM	76.7	84.5	75.8
	12:58 PM - 01:58 PM	76.9	85.9	75.5
	01:58 PM - 02:58 PM	77.2	78.7	76.9
	02:58 PM - 03:58 PM	77.0	82.4	76.5
	03:58 PM - 04:58 PM	77.8	87.9	74.9

Leq Average 8 hrs. (dB(A))
Lmax (dB(A))
Standard (dB(A))

87.9

140

85

Reference Method : ISO1996-1 and 1996-2

Standard : Environmental Impact Assessment Report of Gulf T33 Co., Ltd.

ประเภทเครื่องจักรกล : เครื่องจักรกลอุตสาหกรรม

ผลการประเมิน : ผลการประเมินค่าเสียงตามมาตรฐาน

ผลการประเมินค่าเสียงตามมาตรฐานในการพิจารณา

Technical Management

Chontichak

Chonticha Subongkoch
Scientist (3)

Approved by

Supt S.

Supot Salameh
Section Head

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S:\Reportist_Air Noise rpt (10.51AM)



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Lot ID: 2540399
Date Received : May 23, 2025
Date Reported : May 29, 2025
Report Number: 3319907-1

Page 1 of 1

Sample Number	2540399-3				
Parameter	Noise (Leq 8 hrs.)				
Location	บริเวณ Gas Metering				
Measurement Date	May 22, 2025				
Measurement by	Annat Wongsaklien				
Time		Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))	
09:37 AM - 10:37 AM		65.7	85.7	64.7	
10:37 AM - 11:37 AM		65.1	70.8	64.5	
11:37 AM - 12:37 PM		64.7	80.5	63.7	
12:37 PM - 01:37 PM		64.0	66.9	63.4	
01:37 PM - 02:37 PM		64.2	68.7	63.6	
02:37 PM - 03:37 PM		64.7	67.2	64.4	
03:37 PM - 04:37 PM		65.1	70.3	64.8	
04:37 PM - 05:37 PM		65.0	70.0	64.7	

Leq Average 8 hrs. (dB(A)) 64.8
Lmax (dB(A)) 85.7
Standard (dB(A)) 85
Reference Method : ISO1996-1 and 1996-2
Standard : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.
ใช้มาตรฐานการวัดผลกระทบสิ่งแวดล้อมที่ระบุไว้ในรายงานผลกระทบสิ่งแวดล้อม
ในกรณีที่มีการร้องเรียนเกี่ยวกับผลกระทบสิ่งแวดล้อมในบริเวณที่วัด

Technical Management
Chonticha Subongkoch
Scientist (3)

Approved by
Supot. Salamteh
Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GT53

Lot ID: 2540399
Date Received : May 23, 2025
Date Reported : May 29, 2025
Report Number: 3319908-1

Page 1 of 1

Sample Number	2540399-4		
Parameter	Noise (Leq 8 hrs.)		
Location	บริเวณ Gas Turbine Accessories System (ใกล้ทางรถไฟ GTG 11 และ GTG12)		
Measurement Date	May 22, 2025		
Measurement by	Annat Wongsaklien		
Time			
09:33 AM - 10:33 AM	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
	78.5	90.0	77.6
10:33 AM - 11:33 AM	77.7	83.8	77.1
11:33 AM - 12:33 PM	76.9	82.7	76.3
12:33 PM - 01:33 PM	77.1	78.8	76.3
01:33 PM - 02:33 PM	77.8	79.1	77.2
02:33 PM - 03:33 PM	77.7	79.0	77.3
03:33 PM - 04:33 PM	77.6	78.7	77.3
04:33 PM - 05:33 PM	77.2	78.5	76.7

Leq Average 8 hrs. (dB(A)) 77.6
Lmax (dB(A)) 90.0
Standard (dB(A)) 85
Reference Method : ISO1996-1 and 1996-2
Standard : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.
ใช้มาตรฐานการวัดผลกระทบสิ่งแวดล้อมที่ระบุไว้ในรายงานผลกระทบสิ่งแวดล้อม
ในกรณีที่มีการร้องเรียนเกี่ยวกับผลกระทบสิ่งแวดล้อมในบริเวณที่วัด

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540399

Date Received : May 23, 2025

Date Reported : May 29, 2025

Report Number: 3319909-1

Page 1 of 1

Sample Number	2540399-5
Parameter	Noise (Leq 8 hrs.)
Location	บริเวณ Steam Turbine Generator
Measurement Date	May 22, 2025
Measurement by	Annat Wongsakhen
Time	
09:19 AM - 10:19 AM	77.2
10:19 AM - 11:19 AM	77.0
11:19 AM - 12:19 PM	77.6
12:19 PM - 01:19 PM	77.5
01:19 PM - 02:19 PM	77.2
02:19 PM - 03:19 PM	76.9
03:19 PM - 04:19 PM	77.1
04:19 PM - 05:19 PM	77.5
Leq Average 8 hrs. (dB(A))	77.4
Lmax (dB(A))	80.1
L90 (dB(A))	77.0
Standard (dB(A))	85
Reference Method : ISO1996-1 and 1996-2	
Standard : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.	
ประเภทการตรวจวัด : เครื่องวัดเสียงแบบเคลื่อนที่ (เคลื่อนที่ตามจุดตรวจวัดเสียง)	
ผลการตรวจวัด : ค่าเสียงเฉลี่ย 8 ชั่วโมง (Leq) อยู่ที่ 77.4 dB(A) ค่าเสียงสูงสุด (Lmax) อยู่ที่ 80.1 dB(A) ค่าเสียงต่ำสุด (L90) อยู่ที่ 77.0 dB(A) ค่าเสียงมาตรฐาน (Standard) อยู่ที่ 85 dB(A)	

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Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng, Rayong Thailand 21140

P/O : 4210402620

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540399

Date Received : May 23, 2025

Date Reported : May 29, 2025

Report Number: 3319910-1

Page 1 of 1

Sample Number	2540399-6
Parameter	Noise (Leq 8 hrs.)
Location	บริเวณ Steam Turbine Lube Oil Skid
Measurement Date	May 22, 2025
Measurement by	Annat Wongsakhen
Time	
09:28 AM - 10:28 AM	72.5
10:28 AM - 11:28 AM	72.4
11:28 AM - 12:28 PM	72.6
12:28 PM - 01:28 PM	71.9
01:28 PM - 02:28 PM	71.7
02:28 PM - 03:28 PM	72.3
03:28 PM - 04:28 PM	73.0
04:28 PM - 05:28 PM	73.1
Leq Average 8 hrs. (dB(A))	72.5
Lmax (dB(A))	76.1
L90 (dB(A))	72.0
Standard (dB(A))	85
Reference Method : ISO1996-1 and 1996-2	
Standard : Environmental Impact Assessment Report of Gulf TSS Co., Ltd.	
ประเภทการตรวจวัด : เครื่องวัดเสียงแบบเคลื่อนที่ (เคลื่อนที่ตามจุดตรวจวัดเสียง)	
ผลการตรวจวัด : ค่าเสียงเฉลี่ย 8 ชั่วโมง (Leq) อยู่ที่ 72.5 dB(A) ค่าเสียงสูงสุด (Lmax) อยู่ที่ 76.1 dB(A) ค่าเสียงต่ำสุด (L90) อยู่ที่ 72.0 dB(A) ค่าเสียงมาตรฐาน (Standard) อยู่ที่ 85 dB(A)	

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Scientist (3)

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Section Head

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ภาคผนวก ค-8

ความร้อนภายในสถานประกอบการ



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng,
Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512157
Date Received : Feb 28, 2025
Date Reported : Mar 04, 2025
Report Number: 3229116-1

Page 1 of 4

Sample Number	2512157-1
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)
Measurement Date	Feb 27, 2025
Measurement by	Chanon Booncheun
Location	บริเวณงาน 1 ชั้น (ใต้-อาคาร ฝั่งใต้)งาน : - ตาม :-)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
front Condenser Exhaust Unit	120	27.5	24.5	34.6	34.0
Average (WBGT)		27.5			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

Supt S.

Technical Management
Supot Salamteh
Section Head

Approved by

Wichan Choonharat
Wichan Choonharat
Assistant Manager



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng,
Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512157
Date Received : Feb 28, 2025
Date Reported : Mar 04, 2025
Report Number: 3229116-1

Page 2 of 4

Sample Number	2512157-2
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)
Measurement Date	Feb 27, 2025
Measurement by	Chanon Booncheun
Location	บริเวณงาน 1 ชั้น (ใต้-อาคาร ฝั่งใต้)งาน : - ตาม :-)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณหลังเครื่องจักร	120	28.2	24.9	36.2	35.6
Average (WBGT)		28.2			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

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Approved by

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Wichan Choonharat
Assistant Manager



Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng,
Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512157
Date Received : Feb 28, 2025
Date Reported : Mar 04, 2025
Report Number: 3229116-1

Page 3 of 4

Sample Number	2512157-3				
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)				
Measurement Date	Feb 27, 2025				
Measurement by	Chanon Booncheun				
Location	บริเวณโรงงาน 1 ซีกฟ้า (ด้าน-สนามกีฬา บริเวณโรงงาน : - แทน : -)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณ Generator	120	27.8	24.3	36.3	34.8
Average (WBGT)		27.8			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

Technical Management

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng,
Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512157
Date Received : Feb 28, 2025
Date Reported : Mar 04, 2025
Report Number: 3229116-1

Page 4 of 4

Sample Number	2512157-4				
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)				
Measurement Date	Feb 27, 2025				
Measurement by	Chanon Booncheun				
Location	บริเวณโรงงาน 1 ซีกฟ้า (ด้าน-สนามกีฬา บริเวณโรงงาน : - แทน : -)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณ Gas turbine	120	27.1	23.9	34.7	34.3
Average (WBGT)		27.1			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng,
Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512158
Date Received : May 23, 2025
Date Reported : May 29, 2025
Report Number: 3314990-1

Page 1 of 4

Sample Number	2512158-1
Parameter	Heat Stress (Sampling Time : 09:30 AM - 11:30 AM)
Measurement Date	May 22, 2025
Measurement by	Annat Wongsakhen
Location	บริเวณงาน 1 ชั้น (ใต้-บนอาคาร ก่อสร้าง : - นอก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณ Condenser Exhaust Unit	120	29.2	27.8	32.6	32.4
Average (WBGT)		29.2			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasil, Pluak Daeng,
Rayong Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512158
Date Received : May 23, 2025
Date Reported : May 29, 2025
Report Number: 3314990-1

Page 2 of 4

Sample Number	2512158-2
Parameter	Heat Stress (Sampling Time : 09:30 AM - 11:30 AM)
Measurement Date	May 22, 2025
Measurement by	Annat Wongsakhen
Location	บริเวณงาน 1 ชั้น (ใต้-บนอาคาร ก่อสร้าง : - นอก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณ Condenser Exhaust Unit	120	28.5	26.8	32.4	32.3
Average (WBGT)		28.5			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng,
Rayong, Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512158

Date Received : May 23, 2025
Date Reported : May 29, 2025
Report Number: 3314990-1

Page 3 of 4

Sample Number	2512158-3
Parameter	Heat Stress (Sampling Time : 09:30 AM - 11:30 AM)
Measurement Date	May 22, 2025
Measurement by	Amnat Wongsakhten
Location	บริเวณด้าน 1 หลัง (ค่า-อุณหภูมิ อุณหภูมิ : - แสง : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณ Generator	120	27.3	26.0	30.3	30.2
Average (WBGT)		27.3			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

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Analysis / Test Report

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Rayong, Thailand 21140
P/O : 4210402620
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512158

Date Received : May 23, 2025
Date Reported : May 29, 2025
Report Number: 3314990-1

Page 4 of 4

Sample Number	2512158-4
Parameter	Heat Stress (Sampling Time : 09:30 AM - 11:30 AM)
Measurement Date	May 22, 2025
Measurement by	Amnat Wongsakhten
Location	บริเวณด้าน 1 หลัง (ค่า-อุณหภูมิ อุณหภูมิ : - แสง : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณ Gas Turbine	120	27.7	26.7	30.2	30.0
Average (WBGT)		27.7			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

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ภาคผนวก ค-9

แสงสว่างภายในสถานประกอบการ



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2512159 (1)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (1)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3		Illuminance (Lux)	Spot	Average	Guideline Limit		Comment
						Spot	Average				Spot/Min	Average	
1	Spot : Administration Building : 1st Floor : ห้องประชุม	2512159 (1)-1	27-Feb-25	Day time	1	630	-	-	300-400	-	-	-	Pass
2	Spot : Administration Building : 1st Floor : ห้อง Admin. 1	2512159 (1)-2	27-Feb-25	Day time	1	425	-	-	400-500	-	-	-	Pass
3	Spot : Administration Building : 1st Floor : ห้อง Admin. 2	2512159 (1)-3	27-Feb-25	Day time	1	428	-	-	400-500	-	-	-	Pass
4	Spot : Administration Building : 1st Floor : ห้อง Operation Manager	2512159 (1)-4	27-Feb-25	Day time	1	497	-	-	400-500	-	-	-	Pass
5	Spot : Administration Building : 1st Floor : ห้อง EHS	2512159 (1)-5	27-Feb-25	Day time	1	745	-	-	400-500	-	-	-	Pass
6	Spot : Administration Building : 1st Floor : ห้อง EHS Manager	2512159 (1)-6	27-Feb-25	Day time	1	873	-	-	400-500	-	-	-	Pass
7	Spot : Administration Building : 1st Floor : ห้อง Admin. Manager	2512159 (1)-7	27-Feb-25	Day time	1	465	-	-	400-500	-	-	-	Pass
8	Spot : Administration Building : 1st Floor : ห้อง Plant Manager	2512159 (1)-8	27-Feb-25	Day time	1	428	-	-	400-500	-	-	-	Pass
9	Spot : Administration Building : 1st Floor : ห้อง IT	2512159 (1)-9	27-Feb-25	Day time	1	463	-	-	400-500	-	-	-	Pass
10	Spot : Administration Building : 1st Floor : ห้อง Admin. 1	2512159 (1)-10	27-Feb-25	Day time	1	437	-	-	400-500	-	-	-	Pass
11	Spot : Administration Building : 1st Floor : ห้อง Admin. 2	2512159 (1)-11	27-Feb-25	Day time	1	602	-	-	400-500	-	-	-	Pass
12	Area : Administration Building : 1st Floor : ทั่วอาคาร	2512159 (1)-12	27-Feb-25	Day time	1	481	-	-	447	50	100	-	Pass
		2512159 (1)-13	27-Feb-25	Day time	2	343	-	-	-	-	-	-	
		2512159 (1)-14	27-Feb-25	Day time	3	407	-	-	-	-	-	-	
		2512159 (1)-15	27-Feb-25	Day time	4	419	-	-	-	-	-	-	
		2512159 (1)-16	27-Feb-25	Day time	5	395	-	-	-	-	-	-	
		2512159 (1)-17	27-Feb-25	Day time	6	637	-	-	-	-	-	-	
13	Area : Administration Building : 1st Floor : ทั่วอาคาร	2512159 (1)-18	27-Feb-25	Day time	1	841	-	-	856	100	200	-	Pass
		2512159 (1)-19	27-Feb-25	Day time	2	870	-	-	-	-	-	-	

Technical Management : *Supt S*
Supot Salamteah
Section Head

Approved by : *Wichan Chonharat*
Wichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2512159 (1)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (1)-1

Page 2 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3		Illuminance (Lux)	Spot	Average	Guideline Limit		Comment
						Spot	Average				Spot/Min	Average	
15	Area : Administration Building : 1st Floor : ห้องประชุม	2512159 (1)-20	27-Feb-25	Day time	1	247	371	-	150	300	-	-	Pass
		2512159 (1)-21	27-Feb-25	Day time	2	371	-	-	-	-	-	-	
		2512159 (1)-22	27-Feb-25	Day time	3	352	-	-	-	-	-	-	
		2512159 (1)-23	27-Feb-25	Day time	4	376	-	-	-	-	-	-	
		2512159 (1)-24	27-Feb-25	Day time	5	335	-	-	-	-	-	-	
		2512159 (1)-25	27-Feb-25	Day time	6	267	-	-	-	-	-	-	
		2512159 (1)-26	27-Feb-25	Day time	7	366	-	-	-	-	-	-	
		2512159 (1)-27	27-Feb-25	Day time	8	409	-	-	-	-	-	-	
		2512159 (1)-28	27-Feb-25	Day time	9	419	-	-	-	-	-	-	
		2512159 (1)-29	27-Feb-25	Day time	10	470	-	-	-	-	-	-	
		2512159 (1)-30	27-Feb-25	Day time	11	461	-	-	-	-	-	-	
		2512159 (1)-31	27-Feb-25	Day time	12	384	-	-	-	-	-	-	
16	Area : Administration Building : 1st Floor : ห้อง Admin	2512159 (1)-32	27-Feb-25	Day time	1	327	547	-	50	100	-	-	Pass
		2512159 (1)-33	27-Feb-25	Day time	2	670	-	-	-	-	-	-	
		2512159 (1)-34	27-Feb-25	Day time	3	870	-	-	-	-	-	-	
		2512159 (1)-35	27-Feb-25	Day time	4	322	-	-	-	-	-	-	
17	Area : Administration Building : 1st Floor : ห้องประชุม	2512159 (1)-36	27-Feb-25	Day time	1	227	405	-	150	300	-	-	Pass
		2512159 (1)-37	27-Feb-25	Day time	2	658	-	-	-	-	-	-	
		2512159 (1)-38	27-Feb-25	Day time	3	413	-	-	-	-	-	-	
		2512159 (1)-39	27-Feb-25	Day time	4	323	-	-	-	-	-	-	

Measurement by : Chanon Booncheun

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017), dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management : *Supt S*
Supot Salamteah
Section Head

Approved by : *Wichan Chonharat*
Wichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512159 (2)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (2)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux)		Guideline Limit		Comment
						Spot	Average	Spot/Min	Average	
GTS3										
1	Area : CCR : Control Building : 1st Floor : Switchgear Room	2512159 (2)-1	27-Feb-25	Day time	1	950	543	100	200	Pass
		2512159 (2)-2	27-Feb-25	Day time	2	455				
		2512159 (2)-3	27-Feb-25	Day time	3	644				
		2512159 (2)-4	27-Feb-25	Day time	4	402				
		2512159 (2)-5	27-Feb-25	Day time	5	426				
		2512159 (2)-6	27-Feb-25	Day time	6	222				
		2512159 (2)-7	27-Feb-25	Day time	7	833				
		2512159 (2)-8	27-Feb-25	Day time	8	482				
		2512159 (2)-9	27-Feb-25	Day time	9	436				
		2512159 (2)-10	27-Feb-25	Day time	10	686				
		2512159 (2)-11	27-Feb-25	Day time	11	651				
		2512159 (2)-12	27-Feb-25	Day time	12	582				
		2512159 (2)-13	27-Feb-25	Day time	13	606				
		2512159 (2)-14	27-Feb-25	Day time	14	510				
		2512159 (2)-15	27-Feb-25	Day time	15	230				
		2512159 (2)-16	27-Feb-25	Day time	16	718				
		2512159 (2)-17	27-Feb-25	Day time	17	650				
		2512159 (2)-18	27-Feb-25	Day time	18	389				
		2512159 (2)-19	27-Feb-25	Night time	1	833	586	100	200	Pass
		2512159 (2)-20	27-Feb-25	Night time	2	832				
		2512159 (2)-21	27-Feb-25	Night time	3	639				
		2512159 (2)-22	27-Feb-25	Night time	4	452				
		2512159 (2)-23	27-Feb-25	Night time	5	522				
		2512159 (2)-24	27-Feb-25	Night time	6	577				
		2512159 (2)-25	27-Feb-25	Night time	7	531				
		2512159 (2)-26	27-Feb-25	Night time	8	404				
		2512159 (2)-27	27-Feb-25	Night time	9	497				
		2512159 (2)-28	27-Feb-25	Night time	10	479				
		2512159 (2)-29	27-Feb-25	Night time	11	631				
		2512159 (2)-30	27-Feb-25	Night time	12	689				
		2512159 (2)-31	27-Feb-25	Night time	13	660				
		2512159 (2)-32	27-Feb-25	Night time	14	373				
		2512159 (2)-33	27-Feb-25	Night time	15	613				
		2512159 (2)-34	27-Feb-25	Night time	16	669				
		2512159 (2)-35	27-Feb-25	Night time	17	501				
		2512159 (2)-36	27-Feb-25	Night time	18	737				

Technical Management
Supot Salameh
Section Head

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Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512159 (2)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (2)-1

Page 2 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux)		Guideline Limit		Comment
						Spot	Average	Spot/Min	Average	
						GTS3				
2	Area : CCR : Control Building : 1st Floor : โรงไฟฟ้า	2512159 (2)-37	27-Feb-25	Day time	1	406	412	50	100	Pass
		2512159 (2)-38	27-Feb-25	Day time	2	419				
		2512159 (2)-39	27-Feb-25	Night time	1	439	324	50	100	Pass
		2512159 (2)-40	27-Feb-25	Night time	2	208				
Measurement by : Chanon Boonchun										
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 38D dated February 21 B.E.2561 (2018)										

Technical Management
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Analysis / Test Report

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P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2512159 (3)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (3)-1

Page 1 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux) Spot	Average	Guideline Limit Spot/Min	Comment
1	Spot : CCR : Control Building : 3rd Floor : Control GTS3 No.1	2512159 (3)-1 2512159 (3)-2	27-Feb-25 27-Feb-25	Day time Night time	1 1	402 400	- -	400-500 400-500	Pass Pass
2	Spot : CCR : Control Building : 3rd Floor : Control GTS3 No.2	2512159 (3)-3 2512159 (3)-4	27-Feb-25 27-Feb-25	Day time Night time	1 1	407 444	- -	400-500 400-500	Pass Pass
3	Spot : CCR : Control Building : 3rd Floor : Control GTS4 No.1	2512159 (3)-5 2512159 (3)-6	27-Feb-25 27-Feb-25	Day time Night time	1 1	422 537	- -	400-500 400-500	Pass Pass
4	Spot : CCR : Control Building : 3rd Floor : Control GTS4 No.2	2512159 (3)-7 2512159 (3)-8	27-Feb-25 27-Feb-25	Day time Night time	1 1	441 502	- -	400-500 400-500	Pass Pass
5	Spot : CCR : Control Building : 3rd Floor : DCS	2512159 (3)-9 2512159 (3)-10	27-Feb-25 27-Feb-25	Day time Night time	1 1	436 511	- -	400-500 400-500	Pass Pass
6	Spot : CCR : Control Building : 3rd Floor : 166 Shift Leader	2512159 (3)-11 2512159 (3)-12	27-Feb-25 27-Feb-25	Day time Night time	1 1	323 349	- -	300-400 300-400	Pass Pass
7	Spot : CCR : Control Building : 3rd Floor : 166 Shift Leader	2512159 (3)-13 2512159 (3)-14	27-Feb-25 27-Feb-25	Day time Night time	1 1	527 554	- -	300-400 300-400	Pass Pass
8	Spot : CCR : Control Building : 3rd Floor : 166 Daytime Operation	2512159 (3)-15	27-Feb-25	Day time	1	451	-	400-500	Pass
9	Spot : CCR : Control Building : 3rd Floor : 166 Operation Manager	2512159 (3)-16	27-Feb-25	Day time	1	638	-	400-500	Pass
10	Spot : CCR : Control Building : 3rd Floor : 166 Permit	2512159 (3)-17 2512159 (3)-18	27-Feb-25 27-Feb-25	Day time Night time	1 1	570 543	- -	400-500 400-500	Pass Pass
11	Spot : CCR : Control Building : 3rd Floor : 166 Shift Leader Daytime	2512159 (3)-19 2512159 (3)-20	27-Feb-25 27-Feb-25	Day time Night time	1 1	402 416	- -	400-500 400-500	Pass Pass
12	Spot : CCR : Control Building : 3rd Floor : 166 Shift Leader GTS3	2512159 (3)-21 2512159 (3)-22	27-Feb-25 27-Feb-25	Day time Night time	1 1	500 497	- -	400-500 400-500	Pass Pass
13	Spot : CCR : Control Building : 3rd Floor : 166 Shift Leader GTS4	2512159 (3)-23 2512159 (3)-24	27-Feb-25 27-Feb-25	Day time Night time	1 1	521 577	- -	400-500 400-500	Pass Pass

Technical Management: Supot S. Supot Salanteh Section Head

Approved by: Wichan Choonharat Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2512159 (3)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (3)-1

Page 2 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux) Spot	Average	Guideline Limit Spot/Min	Comment
14	Area : CCR : Control Building : 3rd Floor : 166 Shift Leader	2512159 (3)-25 2512159 (3)-26 2512159 (3)-27 2512159 (3)-28 2512159 (3)-29 2512159 (3)-30 2512159 (3)-31 2512159 (3)-32 2512159 (3)-33 2512159 (3)-34	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Day time Day time Day time Night time Night time Night time Night time Night time	1 2 3 4 5 1 2 3 4 5	451 670 371 693 587 506 874 420 909 916	554	50 100	Pass
15	Area : CCR : Control Building : 3rd Floor : 166 Shift Leader	2512159 (3)-35 2512159 (3)-36 2512159 (3)-37 2512159 (3)-38	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Night time Night time	1 2 1 2	1,003 459 267 200	731 234	50 100	Pass Pass

Measurement by : Chanton Booncheun

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017), dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management: Supot S. Supot Salanteh Section Head

Approved by: Wichan Choonharat Assistant Manager

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluek Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2512159 (4)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (4)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3			Comment
						Spot	Illuminance (Lux) Average	Guideline Limit Spot/Min Average	
1	Area : Electrical Building : ชั้น 2 : Battery Room	2512159 (4)-1	27-Feb-25	Day time	1	345	339	100	Pass
		2512159 (4)-2	27-Feb-25	Day time	2	333			
		2512159 (4)-3	27-Feb-25	Night time	1	517	432	100	Pass
		2512159 (4)-4	27-Feb-25	Night time	2	346			
2	Area : Electrical Building : ชั้น 2 : Electrical Room	2512159 (4)-5	27-Feb-25	Day time	1	1,190	981	100	Pass
		2512159 (4)-6	27-Feb-25	Day time	2	680			
		2512159 (4)-7	27-Feb-25	Day time	3	950			
		2512159 (4)-8	27-Feb-25	Day time	4	430			
		2512159 (4)-9	27-Feb-25	Day time	5	830			
		2512159 (4)-10	27-Feb-25	Day time	6	880			
		2512159 (4)-11	27-Feb-25	Day time	7	1,120			
		2512159 (4)-12	27-Feb-25	Day time	8	1,110			
		2512159 (4)-13	27-Feb-25	Day time	9	560			
		2512159 (4)-14	27-Feb-25	Day time	10	350			
		2512159 (4)-15	27-Feb-25	Day time	11	670			
		2512159 (4)-16	27-Feb-25	Day time	12	1,090			
		2512159 (4)-17	27-Feb-25	Day time	13	1,070			
		2512159 (4)-18	27-Feb-25	Day time	14	1,300			
		2512159 (4)-19	27-Feb-25	Day time	15	1,020			
		2512159 (4)-20	27-Feb-25	Day time	16	980			
3	Area : Electrical Building : ชั้น 2 : พานดูดกลิ่น 1a	2512159 (4)-21	27-Feb-25	Day time	17	1,260			
		2512159 (4)-22	27-Feb-25	Day time	18	1,150			
		2512159 (4)-23	27-Feb-25	Night time	1	373			
		2512159 (4)-24	27-Feb-25	Night time	2	599	496	100	Pass
		2512159 (4)-25	27-Feb-25	Night time	3	465			
		2512159 (4)-26	27-Feb-25	Night time	4	457			
		2512159 (4)-27	27-Feb-25	Night time	5	571			
		2512159 (4)-28	27-Feb-25	Night time	6	452			
		2512159 (4)-29	27-Feb-25	Night time	7	306			
		2512159 (4)-30	27-Feb-25	Night time	8	411			
		2512159 (4)-31	27-Feb-25	Night time	9	580			
		2512159 (4)-32	27-Feb-25	Night time	10	577			
		2512159 (4)-33	27-Feb-25	Night time	11	323			
		2512159 (4)-34	27-Feb-25	Night time	12	359			
		2512159 (4)-35	27-Feb-25	Night time	13	407			
		2512159 (4)-36	27-Feb-25	Night time	14	398			
4	Area : Electrical Building : ชั้น 2 : พานดูดกลิ่น 1a	2512159 (4)-37	27-Feb-25	Night time	15	717			
		2512159 (4)-38	27-Feb-25	Night time	16	691			

Measurement by : Chanon Booncheun

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management

Supot Salameeh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluek Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2512159 (4)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (4)-1

Page 2 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3			Comment
						Spot	Illuminance (Lux) Average	Guideline Limit Spot/Min Average	
2	Area : Electrical Building : ชั้น 2 : Electrical Room	2512159 (4)-39	27-Feb-25	Night time	17	564			
		2512159 (4)-40	27-Feb-25	Night time	18	571			
3	Area : Electrical Building : ชั้น 1 : พานดูดกลิ่น 1a	2512159 (4)-41	27-Feb-25	Day time	1	13,900	10818	50	100
		2512159 (4)-42	27-Feb-25	Day time	2	7,735			
		2512159 (4)-43	27-Feb-25	Night time	1	935	530	50	100
		2512159 (4)-44	27-Feb-25	Night time	2	124			
4	Area : Electrical Building : ชั้น 2 : พานดูดกลิ่น 1a	2512159 (4)-45	27-Feb-25	Day time	1	523	376	50	100
		2512159 (4)-46	27-Feb-25	Day time	2	228			
		2512159 (4)-47	27-Feb-25	Night time	1	174	152	50	100
		2512159 (4)-48	27-Feb-25	Night time	2	131			

Measurement by : Chanon Booncheun

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management

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P/O :
Project Name : Monitoring EIA
Project Location: GT53

Lot ID: 2512159 (5)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (5)-1

Page 1 of 1

Lay out No.	Location	Reference Number	Date	Time	No.	GT53			Comment
						Spot	Illuminance (Lux) Average	Guideline Limit Spot/Min Average	
1	Spot : Electrical Building : อาคาร 3 : Switchgear	2512159 (5)-1 2512159 (5)-2	27-Feb-25 27-Feb-25	Day time Night time	1 1	425 458	- -	300-400 300-400	Pass Pass
2	Area : Electrical Building : อาคาร 3 : โรงจอดรถไฟฟ้า	2512159 (5)-3 2512159 (5)-4 2512159 (5)-5 2512159 (5)-6	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Night time Night time	1 2 1 2	316 158 303 152	237 228	50 50	Pass Pass

Measurement by : Chanon Booncheun
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management
Supot Salamech
Section Head

Approved by
Nichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GT53

Lot ID: 2512159 (6)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (6)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GT53			Comment
						Spot	Illuminance (Lux) Average	Guideline Limit Spot/Min Average	
1	Area : Switchyard Control Building Plan : GT53 : Battery Room	2512159 (6)-1 2512159 (6)-2 2512159 (6)-3 2512159 (6)-4	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Night time Night time	1 2 1 2	399 290 462 369	344 416	100 200	Pass Pass
2	Area : Switchyard Control Building Plan : GT53 : Substation GT53	2512159 (6)-5 2512159 (6)-6 2512159 (6)-7 2512159 (6)-8 2512159 (6)-9 2512159 (6)-10 2512159 (6)-11 2512159 (6)-12	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Day time Day time Night time Night time Night time Night time	1 2 3 4 1 2 3 4	752 544 1,035 953 528 888 510 874	821 700	100 200	Pass Pass
3	Spot : Switchyard Control Building Plan : GT53 : Switchgear	2512159 (6)-13 2512159 (6)-14	27-Feb-25 27-Feb-25	Day time Night time	1 1	457 416	- -	300-400 300-400	Pass Pass
4	Area : Switchyard Control Building Plan : GT53 : Switchyard Control Room	2512159 (6)-15 2512159 (6)-16 2512159 (6)-17 2512159 (6)-18 2512159 (6)-19 2512159 (6)-20 2512159 (6)-21 2512159 (6)-22	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Day time Day time Night time Night time Night time Night time	1 2 3 4 1 2 3 4	819 582 940 1,200 889 523 845 676	885 733	100 200	Pass Pass
5	Area : Switchyard Control Building Plan : GT54 : Battery Room	2512159 (6)-23 2512159 (6)-24 2512159 (6)-25 2512159 (6)-26	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Night time Night time	1 2 1 2	208 232 569 518	220 544	100 200	Pass Pass
6	Area : Switchyard Control Building Plan : GT54 : Substation GT54	2512159 (6)-27 2512159 (6)-28 2512159 (6)-29 2512159 (6)-30 2512159 (6)-31 2512159 (6)-32 2512159 (6)-33 2512159 (6)-34	27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25 27-Feb-25	Day time Day time Day time Day time Night time Night time Night time Night time	1 2 3 4 1 2 3 4	1,173 1,002 616 674 583 736 619 745	866 671	100 200	Pass Pass

Technical Management
Supot Salamech
Section Head

Approved by
Nichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512159 (6)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (6)-1

Page 2 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux)		Guideline Limit		Comment
						Spot	Average	Spot/Min	Average	
7	Spot : Switchyard Control Building Plan : GTS4 : Switchgear	2512159 (6)-35	27-Feb-25	Day time	1	323	-	300-400	-	Pass
		2512159 (6)-36	27-Feb-25	Night time	1	419	-	300-400	-	Pass
8	Area : Switchyard Control Building Plan : GTS4 : Switchyard Control Room	2512159 (6)-37	27-Feb-25	Day time	1	1,599	981	100	200	Pass
		2512159 (6)-38	27-Feb-25	Day time	2	942	-	-	-	-
		2512159 (6)-39	27-Feb-25	Day time	3	778	-	-	-	-
		2512159 (6)-40	27-Feb-25	Day time	4	605	-	-	-	-
		2512159 (6)-41	27-Feb-25	Night time	1	686	682	100	200	Pass
		2512159 (6)-42	27-Feb-25	Night time	2	838	-	-	-	-
		2512159 (6)-43	27-Feb-25	Night time	3	679	-	-	-	-
		2512159 (6)-44	27-Feb-25	Night time	4	524	-	-	-	-

Measurement by : Chanon Booncheun
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)



Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2512159 (7)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (7)-1

Page 1 of 1

Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux)		Guideline Limit		Comment
						Spot	Average	Spot/Min	Average	
1	Spot : Water Treatment Control Building : Fire Pump	2512159 (7)-1	27-Feb-25	Day time	1	6,460	-	300-400	-	Pass
		2512159 (7)-2	27-Feb-25	Day time	2	7,100	-	1000	-	-
		2512159 (7)-3	27-Feb-25	Day time	3	9,100	-	400	-	-
		2512159 (7)-4	27-Feb-25	Night time	1	314	-	300-400	-	Pass
2	Spot : Water Treatment Control Building : Laboratory 1 (Fume Hood)	2512159 (7)-5	27-Feb-25	Day time	1	520	-	400-500	-	Pass
		2512159 (7)-6	27-Feb-25	Night time	1	451	-	400-500	-	Pass
3	Spot : Water Treatment Control Building : Laboratory 2 (Water Table)	2512159 (7)-7	27-Feb-25	Day time	1	647	-	400-500	-	Pass
		2512159 (7)-8	27-Feb-25	Night time	1	669	-	400-500	-	Pass
4	Spot : Water Treatment Control Building : Office Laboratory	2512159 (7)-9	27-Feb-25	Day time	1	443	-	400-500	-	Pass
		2512159 (7)-10	27-Feb-25	Night time	1	563	-	400-500	-	Pass
5	Spot : Water Treatment Control Building : Water Treatment	2512159 (7)-11	27-Feb-25	Day time	1	932	-	300-400	-	Pass
		2512159 (7)-12	27-Feb-25	Night time	1	946	-	300-400	-	Pass

Measurement by : Chanon Booncheun
Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management

Supot S.
Supot Salameh
Section Head

Approved by

Wichan Chonharat
Wichan Chonharat
Assistant Manager

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Technical Management

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Supot Salameh
Section Head

Approved by

Wichan Chonharat
Wichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GT53

Lot ID: 2512159 (8)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (8)-1

Page 1 of 2

GT53						
Lay out No.	Location	Reference Number	Date	Time	No.	Comment
1	Spot : Workshop and Warehouse : 2nd Floor : โรงงานด้านซ้าย	2512159 (8)-1	27-Feb-25	Day time	1	348 - - 300-400 - - Pass
4	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 1	2512159 (8)-2	27-Feb-25	Day time	1	545 - - 400-500 - - Pass
5	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 2	2512159 (8)-3	27-Feb-25	Day time	1	723 - - 400-500 - - Pass
6	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 3	2512159 (8)-4	27-Feb-25	Day time	1	482 - - 400-500 - - Pass
7	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 4	2512159 (8)-5	27-Feb-25	Day time	1	477 - - 400-500 - - Pass
8	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 1	2512159 (8)-6	27-Feb-25	Day time	1	458 - - 400-500 - - Pass
9	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 2	2512159 (8)-7	27-Feb-25	Day time	1	416 - - 400-500 - - Pass
10	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 3	2512159 (8)-8	27-Feb-25	Day time	1	453 - - 400-500 - - Pass
11	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 4	2512159 (8)-9	27-Feb-25	Day time	1	417 - - 400-500 - - Pass
12	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 1	2512159 (8)-10	27-Feb-25	Day time	1	403 - - 400-500 - - Pass
13	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 2	2512159 (8)-11	27-Feb-25	Day time	1	422 - - 400-500 - - Pass
14	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 3	2512159 (8)-12	27-Feb-25	Day time	1	418 - - 400-500 - - Pass
15	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 4	2512159 (8)-13	27-Feb-25	Day time	1	442 - - 400-500 - - Pass
16	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM Manager	2512159 (8)-14	27-Feb-25	Day time	1	411 - - 400-500 - - Pass
17	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านซ้าย 2	2512159 (8)-15	27-Feb-25	Day time	1	328 345 50 100 Pass
		2512159 (8)-16	27-Feb-25	Day time	2	253
		2512159 (8)-17	27-Feb-25	Day time	3	455
18	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านซ้าย 2	2512159 (8)-18	27-Feb-25	Day time	1	100 101 50 100 Pass
		2512159 (8)-19	27-Feb-25	Day time	2	102

Technical Management *Supt S.* Supot Salantich Section Head

Approved by *Nichan Chuan* Wichan Choonharat Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GT53

Lot ID: 2512159 (8)
Date Received : Feb 28, 2025
Date Reported : Mar 06, 2025
Report Number: 2512159 (8)-1

Page 2 of 2

GT53						
Lay out No.	Location	Reference Number	Date	Time	No.	Comment
19	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านซ้าย 2	2512159 (8)-20	27-Feb-25	Day time	1	104 102 50 100 Pass
		2512159 (8)-21	27-Feb-25	Day time	2	100
20	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านซ้าย 1	2512159 (8)-22	27-Feb-25	Day time	1	328 322 100 200 Pass
		2512159 (8)-23	27-Feb-25	Day time	2	315
21	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านซ้าย	2512159 (8)-24	27-Feb-25	Day time	1	549 556 50 100 Pass
		2512159 (8)-25	27-Feb-25	Day time	2	562
22	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านขวา	2512159 (8)-26	27-Feb-25	Day time	1	727 968 150 300 Pass
		2512159 (8)-27	27-Feb-25	Day time	2	995
		2512159 (8)-28	27-Feb-25	Day time	3	602
		2512159 (8)-29	27-Feb-25	Day time	4	1,934
		2512159 (8)-30	27-Feb-25	Day time	5	711
		2512159 (8)-31	27-Feb-25	Day time	6	840
23	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้านขวา WH	2512159 (8)-32	27-Feb-25	Day time	1	1,241 1275 25 50 Pass
		2512159 (8)-33	27-Feb-25	Day time	2	1,309
24	Area : Workshop and Warehouse : 2nd Floor : Store	2512159 (8)-34	27-Feb-25	Day time	1	269 611 100 200 Pass
		2512159 (8)-35	27-Feb-25	Day time	2	363
		2512159 (8)-36	27-Feb-25	Day time	3	539
		2512159 (8)-37	27-Feb-25	Day time	4	342
		2512159 (8)-38	27-Feb-25	Day time	5	464
		2512159 (8)-39	27-Feb-25	Day time	6	882
		2512159 (8)-40	27-Feb-25	Day time	7	1,045
		2512159 (8)-41	27-Feb-25	Day time	8	571
		2512159 (8)-42	27-Feb-25	Day time	9	634
		2512159 (8)-43	27-Feb-25	Day time	10	772
		2512159 (8)-44	27-Feb-25	Day time	11	763
		2512159 (8)-45	27-Feb-25	Day time	12	666
		2512159 (8)-46	27-Feb-25	Day time	13	236
		2512159 (8)-47	27-Feb-25	Day time	14	1,023
		2512159 (8)-48	27-Feb-25	Day time	15	681
		2512159 (8)-49	27-Feb-25	Day time	16	529

Measurement by : Chanon Booncheun

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 35D dated February 21 B.E.2561 (2018)

Technical Management *Supt S.* Supot Salantich Section Head

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140

P/O :

P/O :

Project Name : Monitoring EIA

Report Number: 2512159 (9)-1

Lay out No.	Location	Reference Number	GTS3			Illuminance (Lux)	Guideline Limit		Comment
			Date	Time	No.		Spot	Average	
8	Spot : Workshop and Warehouse : Ground Floor : 1 st Calibration ห้องปฏิบัติการ	2512159 (9)-32	27-Feb-25	Day time	1	561	-	400-500	Pass
9	Area : Workshop and Warehouse : Ground Floor : ห้องปฏิบัติงานโรงงาน	2512159 (9)-33	27-Feb-25	Day time	1	630	707	150	Pass
		2512159 (9)-34	27-Feb-25	Day time	2	716		300	
		2512159 (9)-35	27-Feb-25	Day time	3	456			
		2512159 (9)-36	27-Feb-25	Day time	4	720			
		2512159 (9)-37	27-Feb-25	Day time	5	868			
		2512159 (9)-38	27-Feb-25	Day time	6	758			
		2512159 (9)-39	27-Feb-25	Day time	7	672			
		2512159 (9)-40	27-Feb-25	Day time	8	718			
		2512159 (9)-41	27-Feb-25	Day time	9	821			

Measurement by : Charon Booncheun

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management

Supot Salamteh
Section Head

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Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540410 (1)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (1)-1

Page 1 of 2

GTS3						
Lay out No.	Location	Reference Number	Date	Time	No.	Comment
1	Spot : Administration Building : 1st Floor : ห้องผู้บริหาร	2540410 (1)-1	22-May-25	Day time	1	752 - 300-400 - Pass
2	Spot : Administration Building : 1st Floor : ห้อง Admin. 1	2540410 (1)-2	22-May-25	Day time	1	407 - 400-500 - Pass
3	Spot : Administration Building : 1st Floor : ห้อง Admin. 2	2540410 (1)-3	22-May-25	Day time	1	631 - 400-500 - Pass
4	Spot : Administration Building : 1st Floor : ห้อง Operation Manager	2540410 (1)-4	22-May-25	Day time	1	510 - 400-500 - Pass
5	Spot : Administration Building : 1st Floor : ห้อง EHS	2540410 (1)-5	22-May-25	Day time	1	759 - 400-500 - Pass
6	Spot : Administration Building : 1st Floor : ห้อง EHS Manager	2540410 (1)-6	22-May-25	Day time	1	874 - 400-500 - Pass
7	Spot : Administration Building : 1st Floor : ห้อง Admin. Manager	2540410 (1)-7	22-May-25	Day time	1	470 - 400-500 - Pass
8	Spot : Administration Building : 1st Floor : ห้อง Plant Manager	2540410 (1)-8	22-May-25	Day time	1	476 - 400-500 - Pass
9	Spot : Administration Building : 1st Floor : ห้อง IT	2540410 (1)-9	22-May-25	Day time	1	402 - 400-500 - Pass
10	Spot : Administration Building : 1st Floor : ห้อง Test 1	2540410 (1)-10	22-May-25	Day time	1	507 - 400-500 - Pass
11	Spot : Administration Building : 1st Floor : ห้อง Test 2	2540410 (1)-11	22-May-25	Day time	1	566 - 400-500 - Pass
12	Area : Administration Building : 1st Floor : ทั่วทั้ง	2540410 (1)-12 2540410 (1)-13 2540410 (1)-14 2540410 (1)-15 2540410 (1)-16 2540410 (1)-17	22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25	Day time Day time Day time Day time Day time Day time	1 2 3 4 5 6	377 620 171 461 201 198 338 50 100 Pass
13	Area : Administration Building : 1st Floor : ทั่วทั้ง	2540410 (1)-18 2540410 (1)-19	22-May-25 22-May-25	Day time Day time	1 2	713 763 738 100 200 Pass

Technical Management

Supt S
Supot Salenteh
Section Head

Approved by

Nichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GTS3

Lot ID: 2540410 (1)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (1)-1

Page 2 of 2

GTS3						
Lay out No.	Location	Reference Number	Date	Time	No.	Comment
15	Area : Administration Building : 1st Floor : ทั่วทั้ง	2540410 (1)-20 2540410 (1)-21 2540410 (1)-22 2540410 (1)-23 2540410 (1)-24 2540410 (1)-25 2540410 (1)-26 2540410 (1)-27 2540410 (1)-28 2540410 (1)-29 2540410 (1)-30 2540410 (1)-31	22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25	Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time	1 2 3 4 5 6 7 8 9 10 11 12	397 401 325 316 344 303 275 321 418 423 654 608 367 50 100 Pass
16	Area : Administration Building : 1st Floor : ทั่วทั้ง	2540410 (1)-32 2540410 (1)-33 2540410 (1)-34 2540410 (1)-35	22-May-25 22-May-25 22-May-25 22-May-25	Day time Day time Day time Day time	1 2 3 4	561 217 269 421 332 150 300 Pass
17	Area : Administration Building : 1st Floor : ทั่วทั้ง	2540410 (1)-36 2540410 (1)-37 2540410 (1)-38 2540410 (1)-39	22-May-25 22-May-25 22-May-25 22-May-25	Day time Day time Day time Day time	1 2 3 4	411 303 312 304 332 150 300 Pass

Measurement by : Annarat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management

Supt S
Supot Salenteh
Section Head

Approved by

Nichan Chonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (2)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (2)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3			Comment
						Spot	Illuminance (Lux) Average	Guideline Limit Spot/Min	
1	Area : CCR : Control Building : 1st Floor : Switchgear Room	2540410 (2)-1	22-May-25	Day time	1	762	611	100	200
		2540410 (2)-2	22-May-25	Day time	2	549			Pass
		2540410 (2)-3	22-May-25	Day time	3	716			
		2540410 (2)-4	22-May-25	Day time	4	559			
		2540410 (2)-5	22-May-25	Day time	5	324			
		2540410 (2)-6	22-May-25	Day time	6	785			
		2540410 (2)-7	22-May-25	Day time	7	1,039			
		2540410 (2)-8	22-May-25	Day time	8	986			
		2540410 (2)-9	22-May-25	Day time	9	754			
		2540410 (2)-10	22-May-25	Day time	10	371			
		2540410 (2)-11	22-May-25	Day time	11	412			
		2540410 (2)-12	22-May-25	Day time	12	525			
		2540410 (2)-13	22-May-25	Day time	13	621			
		2540410 (2)-14	22-May-25	Day time	14	712			
		2540410 (2)-15	22-May-25	Day time	15	558			
		2540410 (2)-16	22-May-25	Day time	16	672			
		2540410 (2)-17	22-May-25	Day time	17	716			
		2540410 (2)-18	22-May-25	Day time	18	330			
		2540410 (2)-19	22-May-25	Night time	1	668			
		2540410 (2)-20	22-May-25	Night time	2	676	588	100	200
		2540410 (2)-21	22-May-25	Night time	3	742			Pass
		2540410 (2)-22	22-May-25	Night time	4	399			
		2540410 (2)-23	22-May-25	Night time	5	283			
		2540410 (2)-24	22-May-25	Night time	6	648			
		2540410 (2)-25	22-May-25	Night time	7	975			
		2540410 (2)-26	22-May-25	Night time	8	843			
		2540410 (2)-27	22-May-25	Night time	9	649			
		2540410 (2)-28	22-May-25	Night time	10	405			
		2540410 (2)-29	22-May-25	Night time	11	529			
		2540410 (2)-30	22-May-25	Night time	12	532			
		2540410 (2)-31	22-May-25	Night time	13	545			
		2540410 (2)-32	22-May-25	Night time	14	674			
		2540410 (2)-33	22-May-25	Night time	15	530			
		2540410 (2)-34	22-May-25	Night time	16	692			
		2540410 (2)-35	22-May-25	Night time	17	620			
		2540410 (2)-36	22-May-25	Night time	18	401			

Supot Salanteh
Section Head

Technical Management

Wichan Choonharat
Assistant Manager

Approved by

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (2)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (2)-1

Page 2 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3			Comment
						Spot	Illuminance (Lux) Average	Guideline Limit Spot/Min	
2	Area : CCR : Control Building : 1st Floor : Switchgear Room	2540410 (2)-37	22-May-25	Day time	1	658	500	50	100
		2540410 (2)-38	22-May-25	Day time	2	343			Pass
		2540410 (2)-39	22-May-25	Night time	1	432	448	50	100
		2540410 (2)-40	22-May-25	Night time	2	463			Pass

Measurement by : Amnat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 E.E.2561 (2018)

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Section Head

Technical Management

Wichan Choonharat
Assistant Manager

Approved by

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140

P/O :

Project Name : Monitoring EIA

Project Location: GTS3

Lot ID: 2540410 (3)

Date Received : May 24, 2025

Date Reported : May 29, 2025

Report Number: 2540410 (3)-1

Page 1 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux) Spot	Average	Guideline Limit Spot/Min	Average
1	Spot : CCR : Control Building : 3rd Floor : Control GTS3 No.1	2540410 (3)-1	22-May-25	Day time	1	432	-	400-500	-
		2540410 (3)-2	22-May-25	Night time	1	474	-	400-500	-
2	Spot : CCR : Control Building : 3rd Floor : Control GTS3 No.2	2540410 (3)-3	22-May-25	Day time	1	466	-	400-500	-
		2540410 (3)-4	22-May-25	Night time	1	446	-	400-500	-
3	Spot : CCR : Control Building : 3rd Floor : Control GTS4 No.1	2540410 (3)-5	22-May-25	Day time	1	565	-	400-500	-
		2540410 (3)-6	22-May-25	Night time	1	574	-	400-500	-
4	Spot : CCR : Control Building : 3rd Floor : Control GTS4 No.2	2540410 (3)-7	22-May-25	Day time	1	451	-	400-500	-
		2540410 (3)-8	22-May-25	Night time	1	535	-	400-500	-
5	Spot : CCR : Control Building : 3rd Floor : DCS	2540410 (3)-9	22-May-25	Day time	1	424	-	400-500	-
		2540410 (3)-10	22-May-25	Night time	1	562	-	400-500	-
6	Spot : CCR : Control Building : 3rd Floor : เสาเข็มฐานราก	2540410 (3)-11	22-May-25	Day time	1	407	-	300-400	-
		2540410 (3)-12	22-May-25	Night time	1	343	-	300-400	-
7	Spot : CCR : Control Building : 3rd Floor : เสาเข็มฐานราก (ชั้นใต้ดิน)	2540410 (3)-13	22-May-25	Day time	1	606	-	300-400	-
		2540410 (3)-14	22-May-25	Night time	1	593	-	300-400	-
8	Spot : CCR : Control Building : 3rd Floor : 1st Shift Operation	2540410 (3)-15	22-May-25	Day time	1	818	-	400-500	-
9	Spot : CCR : Control Building : 3rd Floor : 1st Operation Manager	2540410 (3)-16	22-May-25	Day time	1	706	-	400-500	-
10	Spot : CCR : Control Building : 3rd Floor : 1st Permit	2540410 (3)-17	22-May-25	Day time	1	654	-	400-500	-
		2540410 (3)-18	22-May-25	Night time	1	677	-	400-500	-
11	Spot : CCR : Control Building : 3rd Floor : 1st Shift Leader Daytime	2540410 (3)-19	22-May-25	Day time	1	430	-	400-500	-
		2540410 (3)-20	22-May-25	Night time	1	603	-	400-500	-
12	Spot : CCR : Control Building : 3rd Floor : 1st Shift Leader GTS3	2540410 (3)-21	22-May-25	Day time	1	584	-	400-500	-
		2540410 (3)-22	22-May-25	Night time	1	533	-	400-500	-
13	Spot : CCR : Control Building : 3rd Floor : 1st Shift Leader GTS4	2540410 (3)-23	22-May-25	Day time	1	601	-	400-500	-
		2540410 (3)-24	22-May-25	Night time	1	612	-	400-500	-

Supot Salamtech
Section Head

Technical Management

Approved by

Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140

P/O :

Project Name : Monitoring EIA

Project Location: GTS3

Lot ID: 2540410 (3)

Date Received : May 24, 2025

Date Reported : May 29, 2025

Report Number: 2540410 (3)-1

Page 2 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux) Spot	Average	Guideline Limit Spot/Min	Average
14	Area : CCR : Control Building : 3rd Floor : ภายนอก	2540410 (3)-25	22-May-25	Day time	1	457	473	50	100
		2540410 (3)-26	22-May-25	Day time	2	523			
		2540410 (3)-27	22-May-25	Day time	3	330			
		2540410 (3)-28	22-May-25	Day time	4	533			
		2540410 (3)-29	22-May-25	Day time	5	520			
		2540410 (3)-30	22-May-25	Night time	1	506	517	50	100
		2540410 (3)-31	22-May-25	Night time	2	533			
		2540410 (3)-32	22-May-25	Night time	3	406			
		2540410 (3)-33	22-May-25	Night time	4	402			
		2540410 (3)-34	22-May-25	Night time	5	737			
15	Area : CCR : Control Building : 3rd Floor : ภายนอก	2540410 (3)-35	22-May-25	Day time	1	570	498	50	100
		2540410 (3)-36	22-May-25	Day time	2	426			
		2540410 (3)-37	22-May-25	Night time	1	218	208	50	100
		2540410 (3)-38	22-May-25	Night time	2	199			

Measurement by : Arnat Wongsakken

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Supot Salamtech
Section Head

Technical Management

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Assistant Manager

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224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (4)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (4)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3		Illuminance (Lux)	Spot	Average	Guideline Limit	Comment
						Spot	Average					
1	Area : Electrical Building : ชั้น 2 : Battery Room	2540410 (4)-1	22-May-25	Day time	1	310	278	100	200		Pass	
		2540410 (4)-2	22-May-25	Day time	2	245						
		2540410 (4)-3	22-May-25	Night time	1	301	270	100	200		Pass	
		2540410 (4)-4	22-May-25	Night time	2	239						
2	Area : Electrical Building : ชั้น 2 : Electrical Room	2540410 (4)-5	22-May-25	Day time	1	618	574	100	200		Pass	
		2540410 (4)-6	22-May-25	Day time	2	432						
		2540410 (4)-7	22-May-25	Day time	3	387						
		2540410 (4)-8	22-May-25	Day time	4	1,175						
		2540410 (4)-9	22-May-25	Day time	5	324						
		2540410 (4)-10	22-May-25	Day time	6	588						
		2540410 (4)-11	22-May-25	Day time	7	833						
		2540410 (4)-12	22-May-25	Day time	8	904						
		2540410 (4)-13	22-May-25	Day time	9	437						
		2540410 (4)-14	22-May-25	Day time	10	263						
		2540410 (4)-15	22-May-25	Day time	11	421						
		2540410 (4)-16	22-May-25	Day time	12	552						
		2540410 (4)-17	22-May-25	Day time	13	523						
		2540410 (4)-18	22-May-25	Day time	14	612						
		2540410 (4)-19	22-May-25	Day time	15	415						
		2540410 (4)-20	22-May-25	Day time	16	489						
3	Area : Electrical Building : ชั้น 2 : ครัว	2540410 (4)-21	22-May-25	Day time	17	705						
		2540410 (4)-22	22-May-25	Day time	18	755						
		2540410 (4)-23	22-May-25	Night time	1	598	528	100	200		Pass	
		2540410 (4)-24	22-May-25	Night time	2	429						
		2540410 (4)-25	22-May-25	Night time	3	353						
		2540410 (4)-26	22-May-25	Night time	4	891						
		2540410 (4)-27	22-May-25	Night time	5	289						
		2540410 (4)-28	22-May-25	Night time	6	579						
		2540410 (4)-29	22-May-25	Night time	7	799						
		2540410 (4)-30	22-May-25	Night time	8	801						
		2540410 (4)-31	22-May-25	Night time	9	421						
		2540410 (4)-32	22-May-25	Night time	10	233						
		2540410 (4)-33	22-May-25	Night time	11	410						
		2540410 (4)-34	22-May-25	Night time	12	489						
		2540410 (4)-35	22-May-25	Night time	13	501						
		2540410 (4)-36	22-May-25	Night time	14	603						
4	Area : Electrical Building : ชั้น 2 : ครัว	2540410 (4)-37	22-May-25	Night time	15	407						
		2540410 (4)-38	22-May-25	Night time	16	409						

Measurement by : Annat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management

Supot Salanteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

Technical Management

Supot Salanteh
Section Head

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Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (4)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (4)-1

Page 2 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GTS3		Illuminance (Lux)	Spot	Average	Guideline Limit	Comment
						Spot	Average					
2	Area : Electrical Building : ชั้น 2 : Electrical Room	2540410 (4)-39	22-May-25	Night time	17	668						
		2540410 (4)-40	22-May-25	Night time	18	695						
3	Area : Electrical Building : ชั้น 1 : ครัว	2540410 (4)-41	22-May-25	Day time	1	23,704	16107	50	100		Pass	
		2540410 (4)-42	22-May-25	Day time	2	8,510						
		2540410 (4)-43	22-May-25	Night time	1	144	126	50	100		Pass	
		2540410 (4)-44	22-May-25	Night time	2	108						
4	Area : Electrical Building : ชั้น 2 : ครัว	2540410 (4)-45	22-May-25	Day time	1	201	190	50	100		Pass	
		2540410 (4)-46	22-May-25	Day time	2	180						
		2540410 (4)-47	22-May-25	Night time	1	194	186	50	100		Pass	
		2540410 (4)-48	22-May-25	Night time	2	178						

Measurement by : Annat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management

Supot Salanteh
Section Head

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Assistant Manager

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224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GT53

Lot ID: 2540410 (5)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (5)-1

Page 1 of 1

Lay out No.	Location	Reference Number	Date	Time	No.	GT53		Illuminance (Lux)	Spot	Guideline Limit		Comment
						Average	Spot/Min			Average		
1	Spot : Electrical Building : ชั้น 3 : Switchgear	2540410 (5)-1 2540410 (5)-2	22-May-25	Day time	1	638	-	300-400	-	300-400	-	Pass
			22-May-25	Night time	1	466	-	300-400	-	300-400	-	Pass
2	Area : Electrical Building : ชั้น 3 : ครัวครัว	2540410 (5)-3 2540410 (5)-4 2540410 (5)-5 2540410 (5)-6	22-May-25	Day time	1	260	342	50	100	100		Pass
			22-May-25	Day time	2	424						
			22-May-25	Night time	1	221	261	50	100	100		Pass
			22-May-25	Night time	2	301						

Measurement by : Annat Wongsakden

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Supot Salantith
Section Head

Technical Management

Approved by

Supot Salantith
Section Head

Wichan Choonharat
Assistant Manager

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224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasit, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location : GT53

Lot ID: 2540410 (6)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (6)-1

Page 1 of 2

Lay out No.	Location	Reference Number	Date	Time	No.	GT53		Illuminance (Lux)	Spot	Guideline Limit		Comment
						Average	Spot/Min			Average		
1	Area : Switchyard Control Building Plan : GT53 : Battery Room	2540410 (6)-1 2540410 (6)-2 2540410 (6)-3 2540410 (6)-4	22-May-25	Day time	1	291	320	100	200	200		Pass
			22-May-25	Day time	2	349						
			22-May-25	Night time	1	201	213	100	200	200		Pass
			22-May-25	Night time	2	225						
2	Area : Switchyard Control Building Plan : GT53 : Substation GT53	2540410 (6)-5 2540410 (6)-6 2540410 (6)-7 2540410 (6)-8 2540410 (6)-9 2540410 (6)-10 2540410 (6)-11 2540410 (6)-12	22-May-25	Day time	1	744	729	100	200	200		Pass
			22-May-25	Day time	2	551						
			22-May-25	Day time	3	904						
			22-May-25	Day time	4	716						
			22-May-25	Night time	1	703	666	100	200	200		Pass
			22-May-25	Night time	2	521						
			22-May-25	Night time	3	835						
			22-May-25	Night time	4	603						
3	Spot : Switchyard Control Building Plan : GT53 : Switchgear	2540410 (6)-13 2540410 (6)-14	22-May-25	Day time	1	456	-	300-400	-	300-400	-	Pass
			22-May-25	Night time	1	447	-	300-400	-	300-400	-	Pass
4	Area : Switchyard Control Building Plan : GT53 : Switchyard Control Room	2540410 (6)-15 2540410 (6)-16 2540410 (6)-17 2540410 (6)-18 2540410 (6)-19 2540410 (6)-20 2540410 (6)-21 2540410 (6)-22	22-May-25	Day time	1	790	750	100	200	200		Pass
			22-May-25	Day time	2	420						
			22-May-25	Day time	3	824						
			22-May-25	Day time	4	964						
			22-May-25	Night time	1	409	594	100	200	200		Pass
			22-May-25	Night time	2	411						
			22-May-25	Night time	3	725						
			22-May-25	Night time	4	833						
5	Area : Switchyard Control Building Plan : GT54 : Battery Room	2540410 (6)-23 2540410 (6)-24 2540410 (6)-25 2540410 (6)-26	22-May-25	Day time	1	380	385	100	200	200		Pass
			22-May-25	Day time	2	390						
			22-May-25	Night time	1	353	367	100	200	200		Pass
			22-May-25	Night time	2	381						
6	Area : Switchyard Control Building Plan : GT54 : Substation GT54	2540410 (6)-27 2540410 (6)-28 2540410 (6)-29 2540410 (6)-30 2540410 (6)-31 2540410 (6)-32 2540410 (6)-33 2540410 (6)-34	22-May-25	Day time	1	530	688	100	200	200		Pass
			22-May-25	Day time	2	641						
			22-May-25	Day time	3	829						
			22-May-25	Day time	4	751						
			22-May-25	Night time	1	504	589	100	200	200		Pass
			22-May-25	Night time	2	495						
			22-May-25	Night time	3	826						
			22-May-25	Night time	4	532						

Supot Salantith
Section Head

Technical Management

Approved by

Supot Salantith
Section Head

Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (6)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (6)-1

Page 2 of 2

Lay out No.	Location	Reference Number	GTS3			Illuminance (Lux)	Spot	No.	Time	Date	Comment
			Average	Spot/Min	Average						
7	Spot : Switchyard Control Building Plan : GTS4 : Switchgear	2540410 (6)-35	522	-	300-400	-	-	1	Day time	22-May-25	Pass
		2540410 (6)-36	510	-	300-400	-	-	1	Night time	22-May-25	Pass
8	Area : Switchyard Control Building Plan : GTS4 : Switchyard Control Room	2540410 (6)-37	845	708	100	200	Pass	1	Day time	22-May-25	Pass
		2540410 (6)-38	874					2	Day time	22-May-25	
		2540410 (6)-39	491					3	Day time	22-May-25	
		2540410 (6)-40	622					4	Day time	22-May-25	
		2540410 (6)-41	799	662	100	200	Pass	1	Night time	22-May-25	
		2540410 (6)-42	802					2	Night time	22-May-25	
		2540410 (6)-43	435					3	Night time	22-May-25	
		2540410 (6)-44	611					4	Night time	22-May-25	

Measurement by : Arnat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management
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Analysis / Test Report

Client : Gulf TS3 Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasi, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (7)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (7)-1

Page 1 of 1

Lay out No.	Location	Reference Number	GTS3			Illuminance (Lux)	Spot	No.	Time	Date	Comment
			Average	Spot/Min	Average						
1	Spot : Water Treatment Control Building : Fire Pump	2540410 (7)-1	8,390	-	300-400	-	-	1	Day time	22-May-25	Pass
		2540410 (7)-2	7,551	-	1000	-	-	2	Day time	22-May-25	
		2540410 (7)-3	7,660	-	400	-	-	3	Day time	22-May-25	
2	Spot : Water Treatment Control Building : Laboratory 1 (Fume Hood)	2540410 (7)-4	314	-	300-400	-	-	1	Night time	22-May-25	Pass
		2540410 (7)-5	570	-	400-500	-	-	1	Day time	22-May-25	Pass
		2540410 (7)-6	597	-	400-500	-	-	1	Night time	22-May-25	Pass
3	Spot : Water Treatment Control Building : Laboratory 2 (Water Table)	2540410 (7)-7	706	-	400-500	-	-	1	Day time	22-May-25	Pass
		2540410 (7)-8	593	-	400-500	-	-	1	Night time	22-May-25	Pass
		2540410 (7)-9	486	-	400-500	-	-	1	Day time	22-May-25	Pass
4	Spot : Water Treatment Control Building Office Laboratory	2540410 (7)-10	432	-	400-500	-	-	1	Night time	22-May-25	Pass
		2540410 (7)-11	724	-	300-400	-	-	1	Day time	22-May-25	Pass
5	Spot : Water Treatment Control Building Water Treatment	2540410 (7)-12	671	-	300-400	-	-	1	Night time	22-May-25	Pass
		2540410 (7)-13		-		-	-				

Measurement by : Arnat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management
Supot Salantich
Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.
224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasik, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (8)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (8)-1

Page 1 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Spot	Illuminance (Lux) Average	Spot/Min	Guideline Limit Average
1	Spot : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 1	2540410 (8)-1	22-May-25	Day time	1	305	-	300-400	-
4	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 1	2540410 (8)-2	22-May-25	Day time	1	465	-	400-500	-
5	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 2	2540410 (8)-3	22-May-25	Day time	1	430	-	400-500	-
6	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 3	2540410 (8)-4	22-May-25	Day time	1	420	-	400-500	-
7	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 4	2540410 (8)-5	22-May-25	Day time	1	437	-	400-500	-
8	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 1	2540410 (8)-6	22-May-25	Day time	1	428	-	400-500	-
9	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 2	2540410 (8)-7	22-May-25	Day time	1	451	-	400-500	-
10	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 3	2540410 (8)-8	22-May-25	Day time	1	466	-	400-500	-
11	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน ME 4	2540410 (8)-9	22-May-25	Day time	1	414	-	400-500	-
12	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 1	2540410 (8)-10	22-May-25	Day time	1	413	-	400-500	-
13	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 2	2540410 (8)-11	22-May-25	Day time	1	401	-	400-500	-
14	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 3	2540410 (8)-12	22-May-25	Day time	1	411	-	400-500	-
15	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM 4	2540410 (8)-13	22-May-25	Day time	1	424	-	400-500	-
16	Spot : Workshop and Warehouse : 2nd Floor : โรงงาน MM Manager	2540410 (8)-14	22-May-25	Day time	1	739	-	400-500	-
17	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 2	2540410 (8)-15 2540410 (8)-16 2540410 (8)-17	22-May-25 22-May-25 22-May-25	Day time Day time Day time	1 2 3	671 235 452	453	50	100
18	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 2	2540410 (8)-18 2540410 (8)-19	22-May-25 22-May-25	Day time Day time	1 2	117 303	210	50	100

Technical Management
Supt S
Supt Salameh
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224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Tasik, Pluak Daeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring EIA
Project Location: GTS3

Lot ID: 2540410 (8)
Date Received : May 24, 2025
Date Reported : May 29, 2025
Report Number: 2540410 (8)-1

Page 2 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Spot	Illuminance (Lux) Average	Spot/Min	Guideline Limit Average
19	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 2	2540410 (8)-20 2540410 (8)-21	22-May-25 22-May-25	Day time Day time	1 2	117 101	109	50	100
20	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 1	2540410 (8)-22 2540410 (8)-23	22-May-25 22-May-25	Day time Day time	1 2	361 331	346	100	200
21	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 1	2540410 (8)-24 2540410 (8)-25	22-May-25 22-May-25	Day time Day time	1 2	533 423	478	50	100
22	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน 1	2540410 (8)-26 2540410 (8)-27 2540410 (8)-28 2540410 (8)-29 2540410 (8)-30 2540410 (8)-31	22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25	Day time Day time Day time Day time Day time Day time	1 2 3 4 5 6	768 211 355 357 961 899	592	150	300
23	Area : Workshop and Warehouse : 2nd Floor : โรงงานด้าน W/H	2540410 (8)-32 2540410 (8)-33	22-May-25 22-May-25	Day time Day time	1 2	901 251	576	25	50
24	Area : Workshop and Warehouse : 2nd Floor : Store	2540410 (8)-34 2540410 (8)-35 2540410 (8)-36 2540410 (8)-37 2540410 (8)-38 2540410 (8)-39 2540410 (8)-40 2540410 (8)-41 2540410 (8)-42 2540410 (8)-43 2540410 (8)-44 2540410 (8)-45 2540410 (8)-46 2540410 (8)-47 2540410 (8)-48 2540410 (8)-49	22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25 22-May-25	Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time Day time	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	185 476 306 146 823 611 491 388 398 412 303 326 410 218 418 415	395	100	200

Measurement by : Arnat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 39D dated February 21 B.E.2561 (2018)

Technical Management
Supt S
Supt Salameh
Section Head

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Assistant Manager

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Task, Pluak Daeng, Rayong Thailand 21140

P/O :

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540410 (9)

Date Received : May 24, 2025

Date Reported : May 29, 2025

Report Number: 2540410 (9)-1

Page 1 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux) Spot	Average	Guideline Limit Spot/Min	Average
1	Area : Workshop and Warehouse : Ground Floor : Store ชั้น 1	2540410 (9)-1	22-May-25	Day time	1	1,024	810	100	200
		2540410 (9)-2	22-May-25	Day time	2	683			Pass
		2540410 (9)-3	22-May-25	Day time	3	925			
		2540410 (9)-4	22-May-25	Day time	4	785			
		2540410 (9)-5	22-May-25	Day time	5	578			
		2540410 (9)-6	22-May-25	Day time	6	424			
		2540410 (9)-7	22-May-25	Day time	7	1,090			
		2540410 (9)-8	22-May-25	Day time	8	636			
		2540410 (9)-9	22-May-25	Day time	9	1,039			
		2540410 (9)-10	22-May-25	Day time	10	1,056			
		2540410 (9)-11	22-May-25	Day time	11	1,006			
		2540410 (9)-12	22-May-25	Day time	12	425			
		2540410 (9)-13	22-May-25	Day time	13	689			
		2540410 (9)-14	22-May-25	Day time	14	781			
		2540410 (9)-15	22-May-25	Day time	15	898			
		2540410 (9)-16	22-May-25	Day time	16	913			
2	Area : Workshop and Warehouse : Ground Floor : Warehouse W/H	2540410 (9)-17	22-May-25	Day time	1	447	436	50	100
		2540410 (9)-18	22-May-25	Day time	2	426			Pass
3	Area : Workshop and Warehouse : Ground Floor : Warehouse W/H Twn	2540410 (9)-19	22-May-25	Day time	1	472	442	50	100
		2540410 (9)-20	22-May-25	Day time	2	411			Pass
4	Area : Workshop and Warehouse : Ground Floor : Warehouse W/H 1	2540410 (9)-21	22-May-25	Day time	1	241	166	50	100
		2540410 (9)-22	22-May-25	Day time	2	166			Pass
		2540410 (9)-23	22-May-25	Day time	3	110			
		2540410 (9)-24	22-May-25	Day time	4	132			
		2540410 (9)-25	22-May-25	Day time	5	141			
		2540410 (9)-26	22-May-25	Day time	6	207			
5	Area : Workshop and Warehouse : Ground Floor : Vao Todi Room (AC 1-3)	2540410 (9)-27	22-May-25	Day time	1	334	351	100	200
		2540410 (9)-28	22-May-25	Day time	2	337			
		2540410 (9)-29	22-May-25	Day time	3	383			
6	Spot : Workshop and Warehouse : Ground Floor : Vao W/H Office 1 TS4	2540410 (9)-30	22-May-25	Day time	1	401	-	400-500	-
									Pass
7	Spot : Workshop and Warehouse : Ground Floor : Vao W/H Office 2 TS3	2540410 (9)-31	22-May-25	Day time	1	423	-	400-500	-
									Pass

Technical Management
Supot Salameeh
Section Head

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Analysis / Test Report

Client : Gulf TSS Co., Ltd.

224 Moo 3, WHA Eastern Seaboard Industrial Estate 1, Task, Pluak Daeng, Rayong Thailand 21140

P/O :

Project Name : Monitoring EIA

Project Location : GTS3

Lot ID: 2540410 (9)

Date Received : May 24, 2025

Date Reported : May 29, 2025

Report Number: 2540410 (9)-1

Page 2 of 2

GTS3									
Lay out No.	Location	Reference Number	Date	Time	No.	Illuminance (Lux) Spot	Average	Guideline Limit Spot/Min	Average
8	Spot : Workshop and Warehouse : Ground Floor : Test Calibration Measurement การวัดค่าแสง	2540410 (9)-32	22-May-25	Day time	1	546	-	400-500	-
									Pass
9	Area : Workshop and Warehouse : Ground Floor : Warehouse W/H	2540410 (9)-33	22-May-25	Day time	1	942	858	150	300
		2540410 (9)-34	22-May-25	Day time	2	1,063			
		2540410 (9)-35	22-May-25	Day time	3	987			
		2540410 (9)-36	22-May-25	Day time	4	1,072			
		2540410 (9)-37	22-May-25	Day time	5	870			
		2540410 (9)-38	22-May-25	Day time	6	558			
		2540410 (9)-39	22-May-25	Day time	7	949			
		2540410 (9)-40	22-May-25	Day time	8	654			
		2540410 (9)-41	22-May-25	Day time	9	631			

Measurement by : Annat Wongsakhen

Guideline : Notification of Department of Labour Protection and Welfare, B.E.2560 (2017) dated November 27, B.E.2560 (2017), and published in the Royal Government Gazette, Vol.135, Part 390 dated February 21 B.E.2561 (2018)

Technical Management
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ภาคผนวก ค-10

แผนผังแสดงเส้นระดับเสียง (Noise Contour Map)



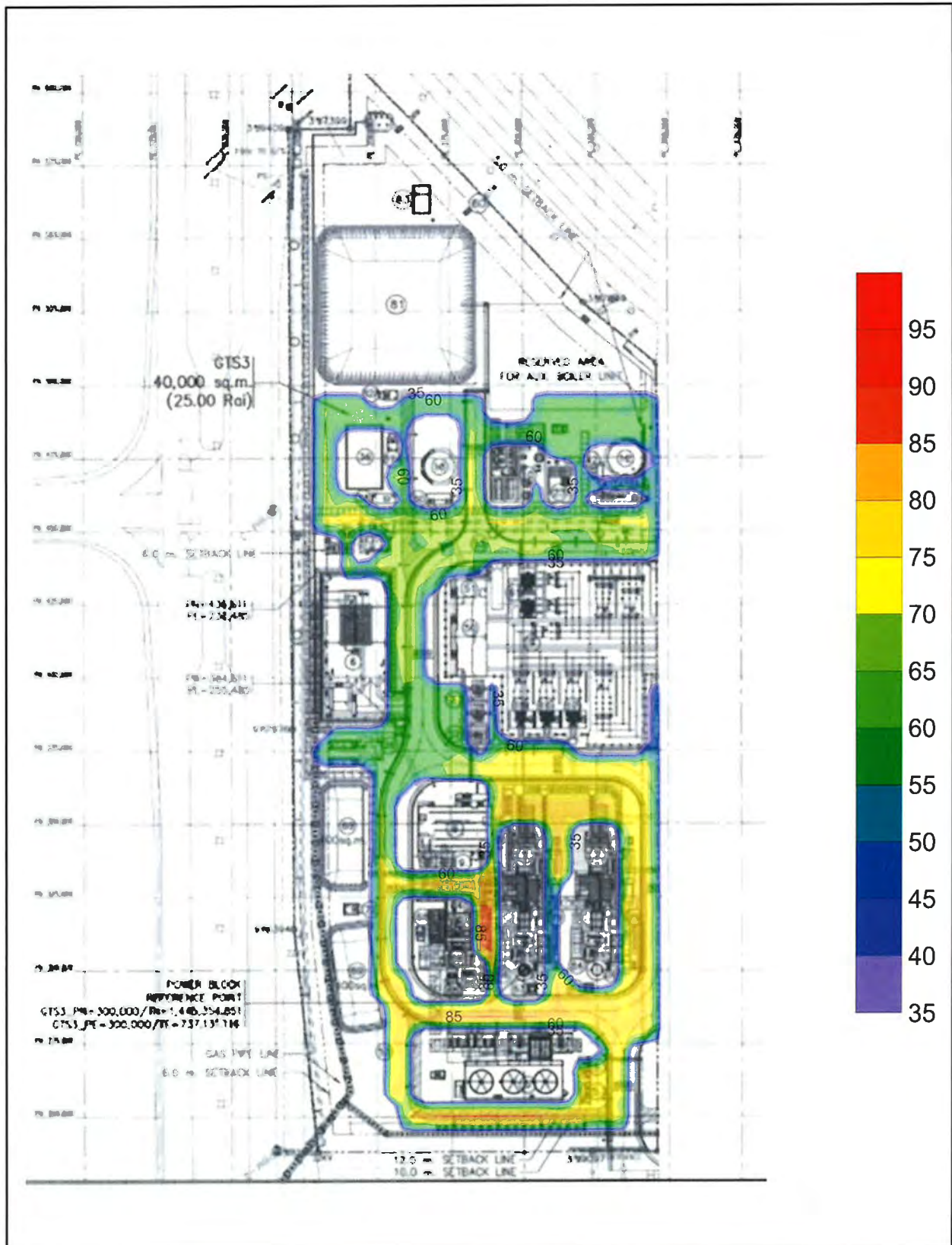
Noise Contour Map

Gulf TS3 Co., Ltd.

Reference Number : Lot 2480576-1

Measurement Date : Aug 14, 2024

บริเวณกระบวนการผลิตไฟฟ้าที่มีเสียงดัง



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Particulate Matter (PM ₁₀)	High Volume	BKK_F50383	-	-	On site Calibration
Ambient	Particulate Matter (PM ₁₀)	High Volume	BKK_F51061	-	-	On site Calibration
Ambient	Particulate Matter (PM ₁₀)	High Volume	RYG_F50184	-	-	On site Calibration
Ambient	Particulate Matter (PM ₁₀)	High Volume	BKK_F51177	-	-	On site Calibration
Ambient	Particulate Matter (PM ₁₀)	Digital Balance	RYG_EN0001	20-Feb-25	20-Feb-26	12
Ambient	Total Suspended Particulate	High Volume	BKK_F51375	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	BKK_F50371	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_F50176	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	BKK_F50366	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RYG_EN0001	20-Feb-25	20-Feb-26	12
Ambient	Nitrogen Dioxide	NO _x Analyzer	BKK_F50782	3-Jan-25	3-Jul-25	6
Ambient	Nitrogen Dioxide	NO _x Analyzer	RYG_F50261	4-Jan-25	4-Jul-25	6
Ambient	Nitrogen Dioxide	NO _x Analyzer	RYG_F50453	4-Jan-25	4-Jul-25	6
Ambient	Nitrogen Dioxide	NO _x Analyzer	BKK_F51088	3-Jan-25	3-Jul-25	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	BKK_F50781	3-Jan-25	3-Jul-25	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_F50257	4-Jan-25	4-Jul-25	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_F50452	4-Jan-25	4-Jul-25	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	BKK_F51087	3-Jan-25	3-Jul-25	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BKK_F50909	28-Jun-24	28-Dec-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BKK_F50974	7-Feb-25	28-Dec-25	12
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_F50650	7-Feb-25	7-Aug-26	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BKK_F50975	17-Jun-26	17-Jun-26	18
Stack	Total Suspended Particulate	Console Control Unit	BKK_F50468	10-Jan-25	10-Jul-25	6
Stack	Total Suspended Particulate	Console Control Unit	BKK_F50556	10-Jan-25	10-Jul-25	6
Stack	Total Suspended Particulate	Pilot Tube	BKK_F50551	30-Nov-24	1-Jun-25	6
Stack	Total Suspended Particulate	Probe	BKK_F50522	30-Nov-24	1-Jun-25	6
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_F50465	19-Feb-25	18-Feb-26	12
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_F50563	22-Jan-25	22-Jan-26	12
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	20-Feb-25	20-Feb-26	12
Stack (CEMS)	Oxides of Nitrogen	Analyzer, System calibration, Stand	-	-	-	-
Stack (CEMS)	Analyzer, System calibration, Stand	Analyzer, System calibration, Stand	-	-	-	-
Noise	Leq 24 hrs	Sound Calibrator	RYG_F50496	19-Mar-25	19-Mar-26	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_F50612	23-Dec-24	23-Dec-25	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_F50029	11-Jul-24	11-Jul-25	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_F50495	27-Jan-25	26-Jan-26	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_F50213	16-Jan-25	16-Jan-26	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_F50303	23-Aug-24	23-Aug-25	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_F50384	9-Oct-24	9-Oct-25	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_F50302	19-Sep-24	19-Sep-25	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_F50389	27-Jan-25	26-Jan-26	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_F50386	9-Oct-24	9-Oct-25	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_F50433	27-Jan-25	26-Jan-26	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_F50496	19-Mar-25	19-Mar-26	12
Noise	Leq 8 hrs	Sound Level Meter	NKH_F50130	9-Jul-24	9-Jul-25	12
Noise	Leq 8 hrs	Sound Level Meter	NKH_F50135	9-Jul-24	9-Jul-25	12
Noise	Leq 8 hrs	Sound Level Meter	NKH_F50004	9-May-25	9-May-26	12
Noise	Leq 8 hrs	Sound Level Meter	NKH_F50136	9-Jul-24	9-Jul-25	12
Noise	Leq 8 hrs	Sound Level Meter	NKH_F50002	9-May-25	9-May-26	12
Noise	Leq 8 hrs	Sound Level Meter	NKH_F50003	9-May-25	9-May-26	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50217	20-Dec-24	20-Dec-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50221	20-Dec-25	20-Dec-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50220	20-Dec-24	20-Dec-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50228	20-Dec-24	20-Dec-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50522	17-Mar-25	16-Mar-26	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50230	23-Dec-24	23-Dec-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50232	9-Apr-25	8-Apr-26	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50232	23-Dec-24	23-Dec-25	12
Illuminance	Illuminance	Lux Meter	RYG_F50471	14-Mar-24	13-Mar-25	12
Illuminance	Illuminance	Lux Meter	RYG_F50536	20-Nov-24	20-Nov-25	12



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Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Rayong Lab	Temperature	pH meter	RYG_F50550	30-Jul-24	29-Jul-25	12
Rayong Lab	pH at 25 °C	pH Meter	RYG_EN0152	14-Dec-23	14-Jun-25	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	20-Feb-25	20-Feb-26	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Total Dissolved Solids 180°C	Electronic Balance	RYG_EN0002	20-Feb-25	20-Feb-26	12
Rayong Lab	Total Dissolved Solids 180°C	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	20-Jan-25	20-Jul-26	18
Rayong Lab	BOD	Incubator	RYG_EN0154	1-Nov-24	1-May-26	18
Rayong Lab	BOD	Burette	RYG_EN0216	24-Sep-24	24-Sep-25	12
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	20-Feb-25	20-Feb-26	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0213	19-Mar-25	19-Mar-26	12
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	21-Mar-24	21-Sep-25	18
Rayong Lab	Dissolved Oxygen	Chamber (Cold Room)	RYG_EN0184	11-Jun-24	11-Dec-25	18
Rayong Lab	Color (at Original pH)	Spectrophotometer	RYG_EN0037	18-Mar-25	18-Sep-26	18
Rayong Lab	Color (at pH 7.0)	Spectrophotometer	RYG_EN0037	18-Mar-25	18-Sep-26	18
Rayong Lab	COO	Spectrophotometer	RYG_EN0037	18-Mar-25	18-Sep-26	18
Rayong Lab	Chloride	pH ISE Meter	RYG_EN0152	14-Dec-23	14-Jun-25	18
Rayong Lab	Cyanide	Spectrophotometer	RYG_EN0037	18-Mar-25	18-Sep-26	18
Rayong Lab	Formaldehyde	Spectrophotometer	RYG_EN0037	18-Mar-25	18-Sep-26	18
Rayong Lab	Phenol	Spectrophotometer	RYG_EN0037	18-Mar-25	18-Sep-26	18
Rayong Lab	Sulfide	Chamber (Cold Room)	RYG_EN0184	11-Jun-24	11-Dec-25	18
Rayong Lab	Fluoride	pH ISE Meter	RYG_EN0152	14-Dec-23	14-Jun-25	18
Rayong Lab	Total Kjeldahl Nitrogen	Block Digestion Unit	RYG_EN0188	11-Mar-24	11-Sep-25	18
Rayong Lab	Total Kjeldahl Nitrogen	pH Meter	RYG_EN0152	14-Dec-23	14-Jun-25	18
Rayong Lab	Dissolved Oxygen (on site)	DO Meter	RYG_F50601	20-Sep-24	20-Sep-25	12
Water Lab	Calcium	ICP-OES	BKK_EL0037	22-Sep-24	23-Mar-26	18
Water Lab	Calcium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Calcium	Chamber (Cooling Room)	BKK_EL0167	4-Jun-25	4-Dec-26	18
Water Lab	Magnesium	ICP-OES	BKK_EL0037	22-Sep-24	23-Mar-26	18
Water Lab	Magnesium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Magnesium	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Sodium	ICP-OES	BKK_EL0037	22-Sep-24	23-Mar-26	18
Water Lab	Sodium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Sodium	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	SAR	ICP-OES	BKK_EL0037	22-Sep-24	23-Mar-26	18
Water Lab	SAR	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	SAR	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Chlorite	Ion Chromatography	BKK_EN0069	12-Jan-24	12-Jul-25	18
Water Lab	Organochlorine Pesticide	GC MS/MS	BKK_EN0284	21-Nov-24	21-May-26	18
Water Lab	Anionic Surfactant	Spectrophotometer	BKK_EN0018	13-Sep-24	13-Sep-25	12
Water Lab	Anionic Surfactant	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Hexavalent Chromium	Spectrophotometer	BKK_EN0018	13-Sep-24	13-Sep-25	12
Water Lab	Silver	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Silver	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Silver	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Silver	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Silver	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Silver	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Barium	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Barium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Barium	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Lead	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Lead	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Lead	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Lead	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Lead	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Lead	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Manganese	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Manganese	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Manganese	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Copper	ICP-AES	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Copper	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Copper	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18



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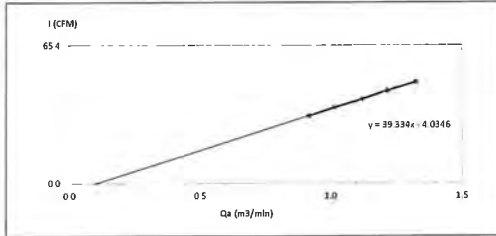
Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Water Lab	Nickel	CP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Nickel	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Nickel	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Arsenic	CP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Arsenic	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Arsenic	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Selenium	CP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Selenium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Selenium	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Cadmium	CP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Cadmium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Cadmium	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Zinc	CP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Zinc	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Zinc	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Trivalent Chromium	CP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Trivalent Chromium	Hot Block	BKK_EL0054	4-Mar-25	4-Sep-26	18
Water Lab	Trivalent Chromium	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Water Lab	Mercury	Mercury Analyzer	BKK_EL0128	6-Dec-24	6-Dec-25	12



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TSI Co., Ltd. Barometric Pressure (mm Hg) : 748.3
 Calibrate Location : โรงงานปูนซีเมนต์ Temperature (°C) : 32.2
 Calibrate Date : 2-May-25 High Volume ID : BKK-FS0387
 Calibration Sheet No. : C-020525-BKK-FS0383 High Volume Model : TE-5009X
 Calibrator ID : RYG-FS0205 High Volume S/N : 4787
 Calibrator Model : TE-5028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	1.8	0.919	32	Slope : 39.336 Intercept : -4.0346 Correlation Coefficient : 0.9998
2	2.2	1.014	36	
3	2.7	1.123	40	
4	3.2	1.218	44	
5	3.8	1.325	48	



Calibrated by : Mr. Nantawat Sarin
 RYG Field Services Scientist (1)

Approved by : Mr. Supot Salameth
 RYG-Field Services Section Head

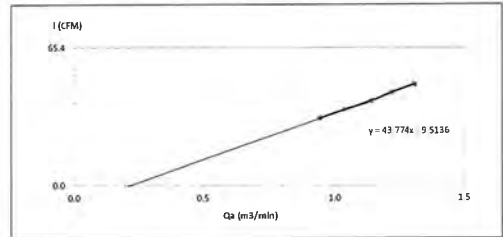
FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TSI Co., Ltd. Barometric Pressure (mm Hg) : 750.7
 Calibrate Location : โรงงานปูนซีเมนต์ Temperature (°C) : 34.1
 Calibrate Date : 2-May-25 High Volume ID : BKK-FS1061
 Calibration Sheet No. : C-020525-BKK-FS1061 High Volume Model : TE-5009X
 Calibrator ID : RYG-FS0205 High Volume S/N : 5504
 Calibrator Model : TE-5028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	1.9	0.945	32	Slope : 43.7737 Intercept : -9.5136 Correlation Coefficient : 0.9990
2	2.3	1.038	36	
3	2.8	1.143	40	
4	3.2	1.220	44	
5	3.7	1.310	48	



Calibrated by : Mr. Nantawat Sarin
 RYG Field Services Scientist (1)

Approved by : Mr. Supot Salameth
 RYG Field Services Section Head

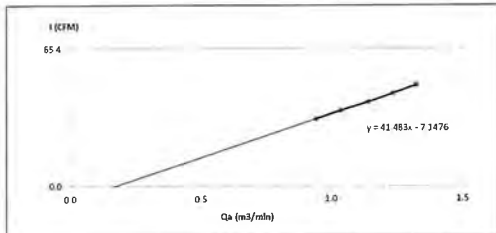
FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TSI Co., Ltd. Barometric Pressure (mm Hg) : 750.1
 Calibrate Location : โรงงานปูนซีเมนต์ Temperature (°C) : 32.9
 Calibrate Date : 2-May-25 High Volume ID : RYG-FS0184
 Calibration Sheet No. : C-020525-RYG-FS0184 High Volume Model : TE-5009X
 Calibrator ID : RYG-FS0205 High Volume S/N : 4792
 Calibrator Model : TE-5028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	1.9	0.944	32	Slope : 41.4827 Intercept : -7.1476 Correlation Coefficient : 0.9997
2	2.3	1.036	36	
3	2.8	1.141	40	
4	3.3	1.237	44	
5	3.8	1.325	48	



Calibrated by : Mr. Nantawat Sarin
 RYG Field Services Scientist (1)

Approved by : Mr. Supot Salameth
 RYG-Field Services Section Head

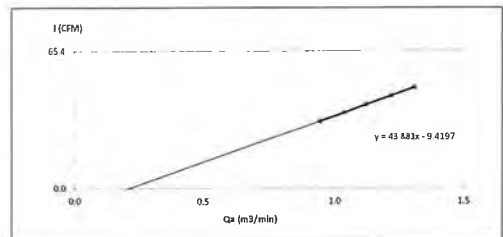
FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TSI Co., Ltd. Barometric Pressure (mm Hg) : 749.2
 Calibrate Location : โรงงานปูนซีเมนต์ Temperature (°C) : 33.0
 Calibrate Date : 2-May-25 High Volume ID : BKK-FS1377
 Calibration Sheet No. : C-020525-BKK-FS1377 High Volume Model : TE-5009X
 Calibrator ID : RYG-FS0205 High Volume S/N : 6262
 Calibrator Model : TE-5028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	1.9	0.945	32	Slope : 43.8813 Intercept : -9.4197 Correlation Coefficient : 0.9998
2	2.3	1.037	36	
3	2.7	1.122	40	
4	3.2	1.219	44	
5	3.7	1.309	48	



Calibrated by : Mr. Nantawat Sarin
 RYG Field Services Scientist (1)

Approved by : Mr. Supot Salameth
 RYG Field Services Section Head

FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



Accredited by

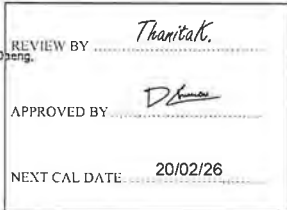
NSC-TISI-TIS 17025

Calibration 0426

Calibration certificate

Calibration Certificate No. 25BK.L0001

Object	Electronic non-automatic weighing instrument	This calibration certificate documents the traceability to national standards.
Manufacturer	Sartorius	Uncertainties of measurements are taken into account when only statements of compliance are made.
Type	LA130S-F	This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP-WI 03
Serial QM Ident. no.	25409664 RYG_EN0001	This certificate relate and apply this equipment only.
Customer	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)	
	616/10 Moo 5 T. Maenam Khu. A Pluak Daeng, Rayong 21140, Thailand	
Order no.	2230	
Number of pages	4	
Date of calibration	20 Feb 2025	



This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Date	06 Mar 2025	Approval of the Calibration Certificate	Person in charge
		Mr. Chonchai Inthana	Kachen Lalee

Sartorius (Thailand) Co., Ltd
129 Rama 9 Road, Huaykwang
10310 Bangkok

Verica®
Version 6.5

Page 1 | 4

Calibration certificate No.: 25BK.L0001

Calibration Certificate

Calibration object

Single range instrument

Model	LA130S-F
Serial Number	25409664
QM Ident. no Inventory no	RYG_EN0001 —

Maximum capacity (Max. load)	150 0000 g
Measured range	150 0000 g
Scale interval	0 0001 g

Place of calibration

Address	According to page 1
Department Cost center	Laboratory Department —
Building Floor	— 1st Floor.
Room	Balance Room
Maximum temperature variation at place of calibration	5 K

Calibration procedure

EURAMET cg-18, V4.0 - Guidelines on the Calibration of Non-Automatic Weighing Instruments

Test equipment

Test equipment type	Test equipment ID	Valid until
Thermometer	MHB-382SD s/nB011342 Traceable to SI unit through DKSH	21 Aug 2025
Test weight set OIML R111 E2	Certificate No M2308197S, E2(Traceable to SI unit through TCS)	23 Aug 2025

Calibration certificate No.: 25BK.L0001

Calibration Certificate

Adjustment Status

The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions

Date of calibration	20 Feb 2025
Temperature at place of calibration Temp. diff	24.5 °C 1.0 K
Twilight - T _{place}	
Measuring conditions	The installation site is suitable. The device was levelled. Balance was loaded up to Max before test.
Comments	Humidity 58.0 %RH

Measurement results | Measurement uncertainties

Repeatability	Eccentricity
Test load (nominal): 10 g 100 g	Test load (nominal): 50 g
1 10.0000 g 100.0000 g	Center 50.0000 g
2 9.9999 g 100.0000 g	Front left 50.0001 g
3 10.0000 g 99.9999 g	Back left 50.0000 g
4 10.0000 g 100.0000 g	Back right 49.9999 g
5 10.0000 g 99.9999 g	Front right 50.0001 g
6 9.9999 g 99.9999 g	
7 10.0000 g 100.0000 g	Maximum deviation from centric loading indication
8 10.0000 g 100.0000 g	(Δ _{load}) _{max} = 0.0001 g
9 10.0000 g 100.0000 g	
10 10.0000 g 100.0000 g	
s = 0.00004 g s = 0.00005 g	

Testload	Indication	Error	Expansion factor	Uncertainty	Uncertainty relative
L	I	E	k	U(E)	U _{rel} (E)
0.0100 g	0.0100 g	0.0000 g	2.00	0.00012 g	1.2 %
0.0500 g	0.0500 g	0.0000 g	2.00	0.00013 g	0.25 %
0.1000 g	0.1000 g	0.0000 g	2.00	0.00013 g	0.13 %
0.5000 g	0.5000 g	0.0000 g	2.00	0.00013 g	0.026 %
1.0000 g	1.0000 g	0.0000 g	2.00	0.00013 g	0.013 %
2.0000 g	2.0000 g	0.0000 g	2.00	0.00013 g	0.0065 %
5.0000 g	5.0000 g	0.0000 g	2.00	0.00013 g	0.0026 %
10.0000 g	10.0000 g	0.0000 g	2.00	0.00013 g	0.0013 %
20.0000 g	20.0000 g	0.0000 g	2.00	0.00014 g	0.00069 %
100.0000 g	100.0000 g	0.0000 g	2.00	0.00021 g	0.00021 %
150.0000 g	149.9999 g	-0.0001 g	2.00	0.00028 g	0.00019 %
Maximum error of indication		(E) _{max} = 0.0001 g			

U_{rel}(E) is the quotient of U(E) and test load L. The uncertainty of measurement U(E) is valid only if error E is considered. You will find reference notes on the uncertainty of measurement in use under Appendix to the calibration certificate. Interpretation of measurement results.
Reference note: The required expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the accompanying Expansion factor, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

End of calibration certificate

Interpretation of measurement results | Appendix to the calibration certificate

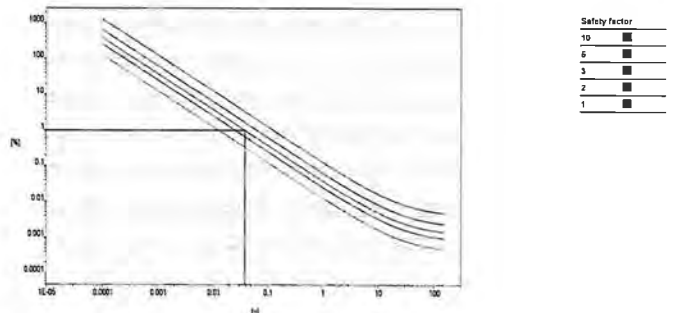
Uncertainty of measurement in use

Device adjusted before measurement	Yes
Temperature deviation considered	1.5 K (isoCAL active)
Temperature coefficient considered	1 · 10 ⁻⁴ /K
Uncertainty of the weighing result U ₉₅ (W)	U ₉₅ (W) = 0.00013 g + 3.96 · 10 ⁻⁴ · R

Reference note: The current uncertainty of measurement is calculated by entering of the reading R into this formula. In relation to this, there is no need for a correction of the indication error. The required expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied with an Expansion factor of 2, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

Indication in % from max. load	Net indication R	Uncertainty U ₉₅ (W)	Uncertainty relative U ₉₅ (W)/W
1 %	1.5000 g	0.00014 g	0.0091 %
25 %	37.5000 g	0.00028 g	0.00074 %
50 %	75.0000 g	0.00043 g	0.00057 %
75 %	112.5000 g	0.00058 g	0.00051 %
100 %	150.0000 g	0.00072 g	0.00048 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

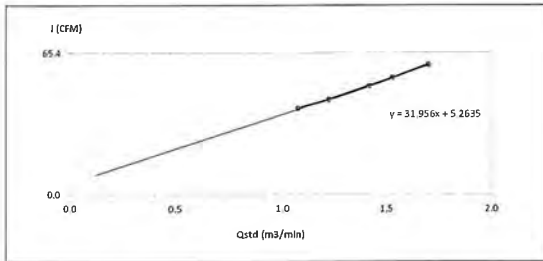
Process accuracy	1.00 %
Safety factor	3
Minimum sample weight	0.0380 g



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TS3 Co.,Ltd. Barometric Pressure (mm Hg) : 748.3
Calibrate Location : โรงเจียนแบบเครื่องวัดอากาศ Temperature (°C) : 32.2
Calibrate Date : 2-May-25 High Volume ID : BKK_FS1375
Calibration Sheet No. : C-020525-BKK_FS1375 High Volume Model : TE-5009X
Calibrator ID : RYG_FS0205 High Volume S/N : 6256
Calibrator Model : TE-5028A Calibrator Slope : 1.52567
Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.6	1.0724	40	Slope : 31.9557 Intercept : 5.2635 Correlation Coefficient : 0.9986
2	3.4	1.2211	44	
3	4.6	1.4145	50	
4	5.4	1.5295	54	
5	6.7	1.6996	60	



Calibrated by :

(Mr. Nantawat Sarin)
RYG Field Services Scientist (1)

Approved by :

(Mr. Supot Salamteb)
RYG-Field Services Section Head

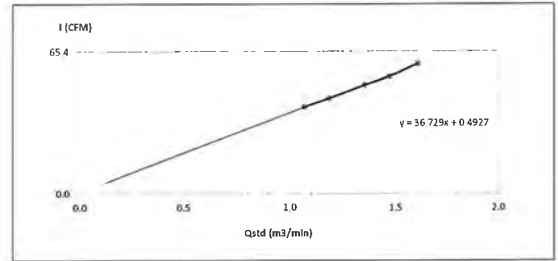
FORM NO : F 06 073 REVISION NO : 2 ISSUE DATE : 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TS3 Co.,Ltd. Barometric Pressure (mm Hg) : 750.7
Calibrate Location : โรงเจียนแบบเครื่องวัดอากาศ Temperature (°C) : 34.1
Calibrate Date : 2-May-25 High Volume ID : BKK_FS0371
Calibration Sheet No. : C-020525-BKK_FS0371 High Volume Model : G1051
Calibrator ID : RYG_FS0205 High Volume S/N : 1324
Calibrator Model : TE-5028A Calibrator Slope : 1.52567
Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.6	1.0708	40	Slope : 36.7291 Intercept : 0.4927 Correlation Coefficient : 0.9990
2	3.2	1.1840	44	
3	4.2	1.3512	50	
4	5.0	1.4710	54	
5	6.0	1.6080	60	



Calibrated by :

(Mr. Nantawat Sarin)
RYG Field Services Scientist (1)

Approved by :

(Mr. Supot Salamteb)
RYG-Field Services Section Head

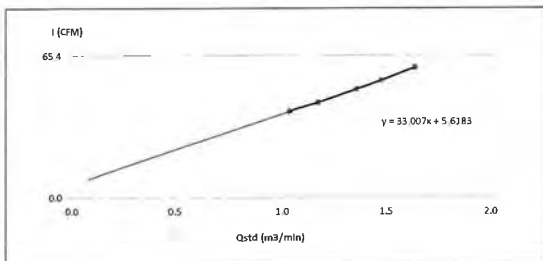
FORM NO : F 06 073 REVISION NO : 2 ISSUE DATE : 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TS3 Co.,Ltd. Barometric Pressure (mm Hg) : 750.1
Calibrate Location : โรงเจียนแบบเครื่องวัดอากาศ Temperature (°C) : 32.9
Calibrate Date : 2-May-25 High Volume ID : RYG_FS0176
Calibration Sheet No. : C-020525-RYG_FS0176 High Volume Model : TE-5170D
Calibrator ID : RYG_FS0205 High Volume S/N : 4802
Calibrator Model : TE-5028A Calibrator Slope : 1.52567
Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.4	1.0318	40	Slope : 33.0071 Intercept : 5.6183 Correlation Coefficient : 0.9992
2	3.1	1.1677	44	
3	4.2	1.3533	50	
4	5.0	1.4732	54	
5	6.2	1.6364	60	



Calibrated by :

(Mr. Nantawat Sarin)
RYG Field Services Scientist (1)

Approved by :

(Mr. Supot Salamteb)
RYG-Field Services Section Head

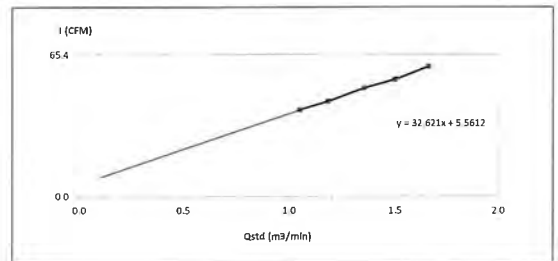
FORM NO : F 06 073 REVISION NO : 2 ISSUE DATE : 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : Gulf TS3 Co.,Ltd. Barometric Pressure (mm Hg) : 749.2
Calibrate Location : โรงเจียนแบบเครื่องวัดอากาศ Temperature (°C) : 33.0
Calibrate Date : 2-May-25 High Volume ID : BKK_FS0366
Calibration Sheet No. : C-020525-BKK_FS0366 High Volume Model : TE-5009X
Calibrator ID : RYG_FS0205 High Volume S/N : 4156
Calibrator Model : TE-5028A Calibrator Slope : 1.52567
Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.5	1.0516	40	Slope : 32.6206 Intercept : 5.5612 Correlation Coefficient : 0.9990
2	3.2	1.1849	44	
3	4.2	1.3523	50	
4	5.2	1.5006	54	
5	6.4	1.6608	60	



Calibrated by :

(Mr. Nantawat Sarin)
RYG Field Services Scientist (1)

Approved by :

(Mr. Supot Salamteb)
RYG-Field Services Section Head

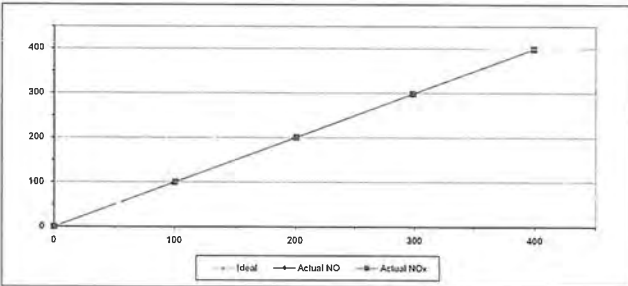
FORM NO : F 06 073 REVISION NO : 2 ISSUE DATE : 20/11/23



MULTIPOINT CALIBRATION REPORT

Calibration Date 3-Jan-25 Equipment Name NOx Analyzer
 Manufacturer HORIBA Model APNA-370
 Serial No. WPYQJMWWD Equipment ID BKK_FS0782
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 55.88 Cylinder No. GN0027222
 Cylinder Pressure (psl) 1800 Certified By Airgas Inc.
 Certified Date 9-Feb-22 Expired Date 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.60	0.60	0.60
2	200.00	199.70	-0.30	-0.15	201.10	1.10	0.55
3	300.00	298.70	-1.30	-0.43	298.50	-1.50	-0.50
4	400.00	398.70	-1.30	-0.33	399.10	-0.90	-0.22
AVERAGE (%)				-0.24			0.10



Calibrated By

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

Approved By

(Mr. Sarayuth Jittranoit)
Assistant General Manager

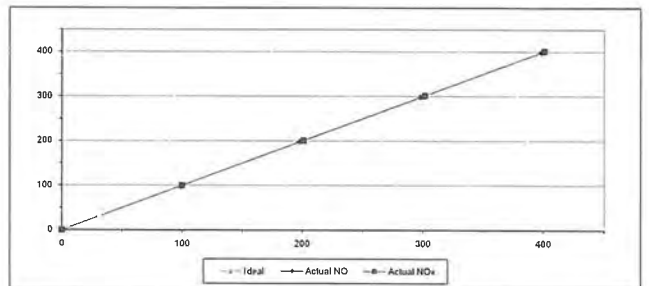
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-25 Equipment Name NOx Analyzer
 Manufacturer HORIBA Model APNA-370
 Serial No. SEEAW53E Equipment ID RYG_FS0261
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 55.88 Cylinder No. GN0027222
 Cylinder Pressure (psl) 1800 Certified By Airgas Inc.
 Certified Date 9-Feb-22 Expired Date 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.70	-1.30	-1.30	100.20	0.20	0.20
2	200.00	197.70	-2.30	-1.15	201.20	1.20	0.60
3	300.00	298.10	-1.90	-0.63	302.10	2.10	0.70
4	400.00	398.60	-1.40	-0.35	401.40	1.40	0.35
AVERAGE (%)				-0.67			0.39



Calibrated By

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

Approved By

(Mr. Sarayuth Jittranoit)
Assistant General Manager

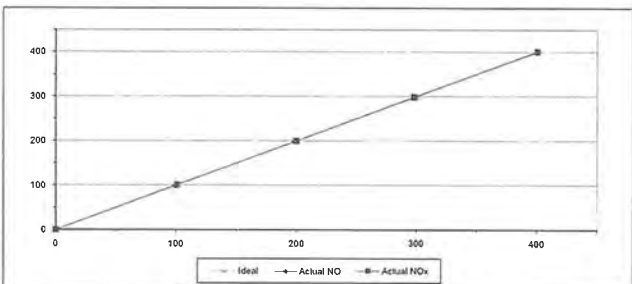
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-25 Equipment Name NOx Analyzer
 Manufacturer HORIBA Model APNA-370
 Serial No. AWXG87CR Equipment ID RYG_FS0453
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 55.88 Cylinder No. GN0027222
 Cylinder Pressure (psl) 1800 Certified By Airgas Inc.
 Certified Date 9-Feb-22 Expired Date 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	101.10	1.10	1.10
2	200.00	198.60	-1.40	-0.70	199.80	-0.20	-0.10
3	300.00	299.00	-1.00	-0.33	298.60	-1.40	-0.47
4	400.00	401.20	1.20	0.30	401.10	1.10	0.28
AVERAGE (%)				-0.21			0.18



Calibrated By

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

Approved By

(Mr. Sarayuth Jittranoit)
Assistant General Manager

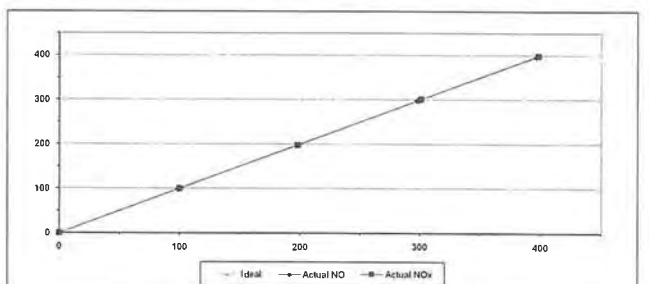
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 3-Jan-25 Equipment Name NOx Analyzer
 Manufacturer HORIBA Model APNA-370
 Serial No. PX13CWA0 Equipment ID BKK_FS1088
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 55.88 Cylinder No. GN0027222
 Cylinder Pressure (psl) 1800 Certified By Airgas Inc.
 Certified Date 9-Feb-22 Expired Date 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90	100.20	0.20	0.20
2	200.00	198.30	-1.70	-0.85	198.10	-1.90	-0.95
3	300.00	298.40	-1.60	-0.53	301.30	1.30	0.43
4	400.00	395.90	-3.10	-0.78	398.70	-1.30	-0.33
AVERAGE (%)				-0.59			-0.11



Calibrated By

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

Approved By

(Mr. Sarayuth Jittranoit)
Assistant General Manager

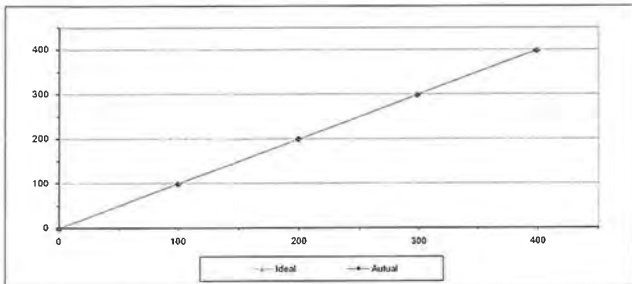
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	3-Jan-25	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	Y53SNSFB	Equipment ID	BKK_FS0761
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30
2	200.00	199.20	-0.80	-0.40
3	300.00	298.50	-1.50	-0.50
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.30



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)
Assistant General Manager

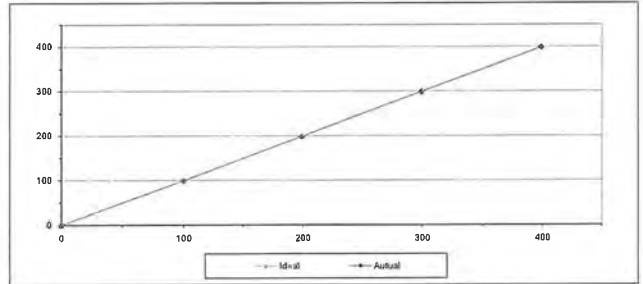
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-25	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	24PH0KNA	Equipment ID	RYG_FS0257
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.40	-0.60	-0.60
2	200.00	198.60	-1.40	-0.70
3	300.00	299.40	-0.60	-0.20
4	400.00	398.80	-1.20	-0.30
AVERAGE (%)				-0.34



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)
Assistant General Manager

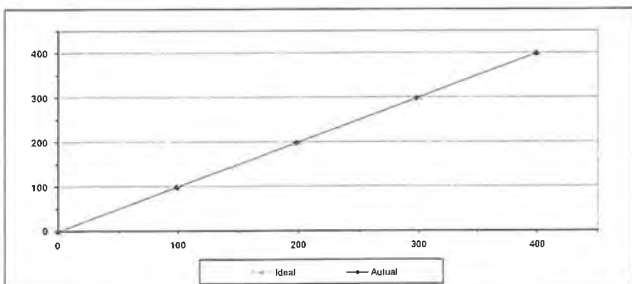
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-25	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	90U0XJ31	Equipment ID	RYG_FS0452
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.80	-1.20	-1.20
2	200.00	198.00	-2.00	-1.00
3	300.00	298.00	-2.00	-0.67
4	400.00	398.80	-1.20	-0.30
AVERAGE (%)				-0.61



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)
Assistant General Manager

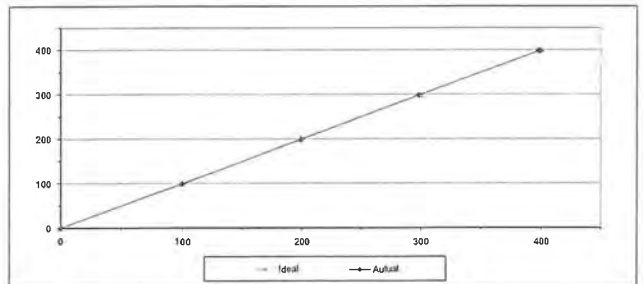
ALS Laboratory Group
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	3-Jan-25	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	XHV1S59F	Equipment ID	BKK_FS1067
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90
2	200.00	198.80	-1.20	-0.60
3	300.00	298.10	-1.90	-0.63
4	400.00	398.30	-1.70	-0.42
AVERAGE (%)				-0.49



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)
Assistant General Manager

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

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	Cup anemometer
MANUFACTURER	Novamys
MODEL/TYPE	Sensor: WS-02F Data logger: 200-WS-25L8
SERIAL NUMBER	Sensor: WS0-AS262 Data logger: AS262
ID NUMBER	NAC-F50909
CONDITION AS RECEIVED	Used item
CUSTOMER	ALS Laboratory group (Thailand) Co., Ltd. 104 Phatthananan 40, Phatthananan Rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE	10 Jun 2024
MEASUREMENT DATE	26 Jun 2024
ISSUE DATE	28 Jun 2024

ENVIRONMENTAL CONDITIONS:	
Ambient condition in the laboratory are as follow:	
Temperature	23.0 ± 3.0 °C
Relative Humidity	55.0 ± 15.0 %RH
Atmospheric Pressure	1010.1 ± 10 hPa

PLACE OF CALIBRATION	Full type wind tunnel of Jiranat Associates Co., Ltd.
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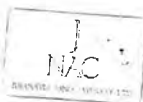
CALIBRATION CONDITIONS	Wind tunnel cross section area ¹ 900 cm ² Wind direction frontal area ² 100 cm ² Diameter of mounting pipe ³ 4 mm Blockage ratio of test object ⁴ 0.111 [-]
------------------------	--

Preconditioning	24 hours at ambient conditions
Measurement Condition	The average values during measurement are (24.2) °C, (43.0) %RH and (1007.3) hPa

TABULATION OF RESULTS:

The table on next page give the measured values

Calibrated by:
22 Mr. Sorapong Thairat
23 Mr. Jiraporn Jiraporn



Approved signature
Mr. Panyakorn Jiraporn
Calibration Department Manager

Remark:
¹ Projected cross section area of the tested object include mounting pipe
² Diameter of mounting pipe
³ Diameter of mounting pipe
⁴ Area [-]

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

MEASUREMENT RESULTS⁵

The Cup anemometer, Unit Under Calibration (UUC) was exercised at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from tip of the test section and the standard air velocity 5 m/s to 30 m/s was calculated by a static probe with precision differential pressure meter which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from tip of the test section. UUC was mounted on a round vertical tube of the lower plate at center of test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration interval of 3 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

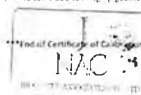
V _{ref} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V _{ref} (m/s)	Error (m/s)	U (k=2) (m/s)
1.015	24.10	24.15	0.9	-0.1	0.31
2.035	24.24	24.15	1.8	-0.2	0.31
3.031	24.34	24.15	2.9	-0.1	0.31
4.142	24.28	24.15	3.9	-0.2	0.31
4.98	24.10	24.15	5.0	0.0	0.31
6.04	24.16	24.15	6.1	0.0	0.31
7.05	24.10	24.15	7.1	0.0	0.31
7.98	24.30	24.15	8.1	0.1	0.31
9.05	24.12	24.15	9.1	0.0	0.31
9.98	24.12	24.15	10.2	0.2	0.31
11.03	24.20	24.15	11.1	0.1	0.31
11.99	24.10	24.15	12.2	0.2	0.31
13.01	24.14	24.15	13.2	0.2	0.31
14.06	24.10	24.15	14.2	0.2	0.31
15.06	24.20	24.15	15.2	0.2	0.31
15.95	24.10	24.15	16.3	0.3	0.31

Remark:
Calibration results are only valid for the tested conditions and environmental conditions during which calibration took place.
Velocity of standard
Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET UP



Calibration set up of the Cup anemometer in the wind tunnel of Jiranat Associates Co., Ltd. The Cup anemometer is shown may differ from the calibrated one. Remark: "U" = projection of the set up is not true to scale due to imaging geometry.



CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	Wind Direction Sensor
MANUFACTURER	Novamys
MODEL/TYPE	Sensor: WS-02F Data logger: 200-WS-25L8
SERIAL NUMBER	Sensor: WS0-AS262 Data logger: AS262
ID NUMBER	NAC-F50909
CONDITION AS RECEIVED	Used item
CUSTOMER	ALS Laboratory group (Thailand) Co., Ltd. 104 Phatthananan 40, Phatthananan Rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE	10 Jun 2024
MEASUREMENT DATE	26 Jun 2024
ISSUE DATE	28 Jun 2024

ENVIRONMENTAL CONDITIONS:	
Ambient condition in the laboratory are as follow:	
Temperature	23.0 ± 3.0 °C
Relative Humidity	55.0 ± 15.0 %RH
Atmospheric Pressure	1010.1 ± 10 hPa

PLACE OF CALIBRATION	Full type wind tunnel of Jiranat Associates Co., Ltd.
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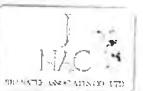
CALIBRATION CONDITION	Wind tunnel cross section area ¹ 500 cm ² Wind direction frontal area ² 329 cm ² Diameter of mounting pipe ³ 4 mm Blockage ratio of test object ⁴ 0.143 [-]
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Preconditioning	24 hours at ambient conditions
Measurement Condition	The average values during measurement are (23.9) °C, (53.3) %RH and (1007.3) hPa

TABULATION OF RESULTS:

The table on next page give the measured values

Calibrated by:
22 Mr. Sorapong Thairat
23 Mr. Jiraporn Jiraporn



Approved signature
Mr. Panyakorn Jiraporn
Calibration Department Manager

Remark:
¹ Projected cross section area of the tested object include mounting pipe
² Diameter of mounting pipe
³ Diameter of mounting pipe
⁴ Area [-]

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

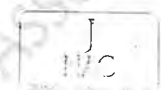
MEASUREMENT RESULTS⁵

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45 intervals = clockwise and counterclockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed m/s	D _{ref} Degree (°)	D _{ref} Degree (°)	Error Degree (°)	U (k=2) Degree (°)
45.000	41	-4	-4	0.80
90.000	87	-3	-3	0.80
135.000	132	-3	-3	0.80
180.000	181	1	1	0.80
225.000	228	3	3	0.80
270.000	275	5	5	0.80
315.000	320	5	5	0.80
360.000	359	-1	-1	0.80

Remark:
Calibration results are only valid for the tested conditions and environmental conditions during which calibration took place.
Direction of standard
Direction of Unit Under Calibration

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Certificate No. : CDT-107-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Data Logger with Temperature sensor
MANUFACTURER : Novolyne
MODEL/TYPE : 200-WS-25LB
SERIAL NUMBER : AS262
ID NUMBER : BKK_F50909
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd
104 Phatthanawan 40, Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 10 Jun 2024
MEASUREMENT DATE : 28 Jun 2024
ISSUE DATE : 28 Jun 2024

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:
The table on next page give the measured values

Calibration procedure:
The temperature calibration was done by In House calibration method in WH-CL 001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale was used was based on ITS-90.

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology, Thailand (NIMT) Certificate number TT-0047-24, Certify date number: LR-0101-23

Reference Used During Calibration:
Standard Temperature Probe
Model: STS 100 AS500, Serial No.: 057682 09,
Due date: 26 Mar 2025
Digital Temperature Indicator
Model: DTI 1000 AAV, Serial No.: 671407
Due date: 14 Sep 2024

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM Evaluation of measurement data - Guide to the expression of uncertainty in measurement.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 3: This equipment was connected with temperature sensor Model: HMP60 S/M: N0330785.
Dimension: Diameter 12 mm, Length 80 mm.

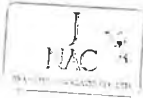
Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.054	19.6	-0.5	0.099
80	25.051	24.6	-0.5	0.099
80	30.046	29.7	-0.3	0.099
80	35.034	34.5	-0.5	0.099
80	40.042	39.5	-0.5	0.099

UUC*: Unit Under Calibration.

End of Certificate of Calibration



Calibrated by
☐ Mr. Somchai Thachalad
☐ Mr. Jiraporn Lertsomphol
☐ Mr. Ruangsak Poommit



Approved signature

Mr. Jiraporn Lertsomphol
Calibration Department Manager

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CERTIFICATE OF CALIBRATION

Certificate No. : CRT-019-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Relative humidity with data logger
MANUFACTURER : Novolyne
MODEL/TYPE : Data Logger 200-WS-25LB
SERIAL NUMBER : Sensor HMP60
Data Logger AS262
Sensor: N0330785
ID NUMBER : BKK_F50909
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd
104 Phatthanawan 40, Phatthanakan Rd., Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 10 Jun 2024
MEASUREMENT DATE : 28 Jun 2024
ISSUE DATE : 28 Jun 2024

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:
The table on next page give the measured values

Calibration procedure:
The Relative Humidity and Air Temperature calibration was done by In-House calibration method in WH-CL 005 and WH-CL 010 according to comparison method with Standard Certified Mirror Hygrometer with Temperature sensor and standard humidity generator chamber.

Traceability:
The measurements are traceable to the international system of units (SI) through National Institute of Metrology, Thailand (NIMT) Certificate number TH-0073-23 and through Jiranant Associate Co., Ltd. Certificate number: CDT-001-01.

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM Evaluation of measurement data - Guide to the expression of uncertainty in measurement.

Measurement Results

The results of calibration and associated measurement uncertainties are reported in the table below.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of relative humidity at 30 °C are reported in table below
Calibration Range: 20% RH to 80% RH

Air Temperature (°C)	Standard Reading (NRH)	UUC Reading (NRH)	Error (NRH)	Uncertainty (NRH)
29.80	59.63	59.6	-0.0	0.58
29.80	50.49	49.8	-0.6	0.58
29.82	81.68	80.9	-0.8	2.3

UUC*: Unit Under Calibration.

End of Certificate of Calibration



Calibrated by
☐ Mr. Somchai Thachalad
☐ Mr. Jiraporn Lertsomphol
☐ Mr. Ruangsak Poommit



Approved signature

Mr. Jiraporn Lertsomphol
Calibration Department Manager

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CERTIFICATE OF CALIBRATION

Certificate No. CG-036-57

Page 1 of 2 Pages

MEASUREMENT ITEM MODEL/TYPE

Digital barometer
: Novolyne
Sensor: 110 WS 250P
Data logger: 110 WS 25DL-D
Sensor: IP-A539
Data logger: AS439
NAC FS0974

SERIAL NUMBER ID NUMBER CONDITION AS RECEIVED CUSTOMER

Used item
: ALS Laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.
Khaeng Suan Luang, Khlong Suan Luang,
Bangkok 10250 Thailand

RECEIVED DATE MEASUREMENT DATE ISSUE DATE

: 26 Dec 2024
: 26 Dec 2024
: 27 Dec 2024

Calibration procedure:
The Digital barometer was calibrated against
Digital pressure calibration. The 110 WS 250P
was used as a calibration gauge.

Traceability:
The measurement results are traceable to
the international system of units (SI) through
the NIMT (National Metrology Institute of
Thailand) via Certificate number MP-0099-24

Uncertainty of Measurement:
The reported uncertainty of measurement is
based on the standard uncertainty multiplied
by a coverage factor $k=2$. With a normal
distribution corresponds to a coverage
probability of approximately 95%. The
standard uncertainty has been determined in
accordance with the GUM Evaluation of
measurement data - Guide to the expression
of uncertainty in measurement

CONDITION OF THIS RESULT OF CALIBRATION:

1. Reference Standard Instrument

Instrument

Absolute Pressure Transducer

CGP590

Serial No.

41001289

Certificate No.

IMP-0009-14

Due Date

27 Dec 2024

2. The UUC* was established in vertical orientation above reference standard instrument and center of UUC* was used as the reference level

3. Calibration conditions

4. Condition

Pressure transducer minimum

p_0 (100% full scale)

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Approved signature:

Mr. Panyo Boonraton
Calibration Department Manager

CERTIFICATE OF CALIBRATION

Certificate No. CTR-036-67

Page 1 of 2 Pages

MEASUREMENT RESULTS

: LI Without adjustment ☒ With adjustment

CALIBRATION IN THE RANGE OF : 500 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below

STD (mbar)	UUC* (mbar)	Error (mbar)	Uncertainty (k=2) (mbar)
950.00	950.00	0.0	0.37
950.00	970.0	0.3	0.37
950.00	990.0	0.1	0.37
1010.00	1000.0	0.1	0.37
1030.00	1029.1	1.0	0.37
1050.00	1048.5	1.5	0.37

Note: UUC* Unit Under Calibration

: To convert the result in report unit to Pa should be multiply by 100

End of certificate



63/14 16,67/35 36, Soi Petchkasem 7/1, Petchkasem Rd.,
Wathupha, Bangkok 10600 Thailand
Tel: (66) 02-8680812 Fax: (66) 02-8680860 www.jiranatee.com

CALIBRATION REPORT

Calibration Number: RG 04122024
Page 1 of 2 Pages

Measurement Item

Rain gauge with data logger

Manufacturer

Data logger: Novolyne
Rain gauge: Novolyne

Model/Type

Data logger: 110 WS 25DL-D
Rain gauge: 110 WS 25RG

Serial Number

Data logger: AS439
Rain gauge: RG AS439

ID NO

BPA_FS0974

Customer

ALS Laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd. Khaeng Suan Luang, Khlong Suan Luang,
Bangkok 10250 Thailand

Environmental Conditions:

The measurement was carried out in an ambient temperature of (25±3) °C and relative humidity of (50±15)%

Measurement Method:

The Rain gauge Unit Under Calibration (UUC) was calibrated by the known reference bottle with flow adjuster at low rate. UUC
rain rate was 0.1 mm/h every 20 seconds. The tipping number was determined by procedures below

1. Obtain rain gauge inlet area

Rain gauge inlet diameter is mm = Diameter/2 = R (radius)

Rain gauge area = πR^2 14 (UUC diameter = 20.5 cm UUC radius = 10.25 cm)

Rain gauge area = 330.1 cm²

2. Obtain theoretical correct rain gauge (number of tipping) using 330.1 cm² inlet area and 0.5 L of rain

A) 10,000 cm³ / 330.1 cm² inlet area = 30.29 rain gauge area = 1/30.29 of square meter

B) 30.29 * 0.5 L volume = 15.15 mm (mm of rain over 1 m² surface) 500 ml of rain volume on the rain

gauge area = 15.15 mm of rain

C) Number of tipping 15.15 / 0.25 mm = 61 tipings

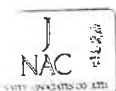
Note: Rain gauge is fully cleaned and leveling prior the calibration performed

Measurement Date

Dec 26, 2024

Issue Date

Dec 27, 2024



Approved signature:

Mr. Panyo Boonraton
Calibration Department Manager

Performed by

☐ Mr. Gornwit Thachad

☒ Miss Jitaporn Lertsompol

Continuation of Calibration of Calibration Number

Calibration Number: RG 04122024

Page 2 of 2 Pages

Result of Calibration ☒ Without Adjustment ☐ With Adjustment

The results of calibration are reported in table below

Quantity of H ₂ O (ml)	Determined Tipping	Tipping count	Acceptable Tipping count
500	61	60	59 - 63
500	61	61	59 - 63
500	61	61	59 - 63
500	61	61	59 - 63
500	61	60	59 - 63

Remark: The procedure is made to verify the correct reading of the Unit under Calibration rain gauge when a precise volume of
water falls into its cone. We suggest that the number of tipping should be within ±2% different from the tipping correct
range 59-63 tipping it means that the rain gauge meets the manufacturer acceptable limit

End of calibration report



CERTIFICATE OF CALIBRATION

Certificate No. : CDT-046-68

Page 1 of 2 Pages

MEASUREMENT ITEM

MANUFACTURER : Novolyte
MODEL/TYPE : 110-WS-25DL-D
SERIAL NUMBER : A5988
ID NUMBER : RYG_FS0650
CONDITION AS-RECEIVED
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan Rd., Phatthanakan Rd.,
Khwang Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

RECEIVED DATE : 17 Jan 2025
MEASUREMENT DATE : 07 Feb 2025
ISSUE DATE : 07 Feb 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values

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

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0047-14, Certificate number: 0112-24

Reference Used During Calibration:

1. Standard Temperature Probe
Model: STS-100-A500, Serial No.: 667682-09,
Due date: 26 Mar 2025
2. Digital Temperature Indicator
Model: DTI-1000-A MK II, Serial No.: 673407-00591 Due date: 21 Oct 2025

Uncertainty of Measurement:

The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM "Evaluation of measurement data - Guide to the expression of uncertainty in measurement"

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with temperature sensor Model: HMP50 S/N: V1920215.
Dimension: Diameter 12 mm, Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.080	19.8	-0.3	0.099
80	25.061	24.8	-0.3	0.099
80	30.043	29.7	-0.3	0.099
80	35.040	34.7	-0.3	0.099
80	40.021	39.7	-0.3	0.099

UUC*: Unli Under Calibration

End of Certificate of Calibration



Calibrated by:
Mr. Sorawit Thachalad
Miss Jiraporn Lertsamphol
Miss Ruangsri Phoommit



Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

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CERTIFICATE OF CALIBRATION

Certificate No. : CRT-006-68

Page 1 of 2 Pages

MEASUREMENT ITEM

MANUFACTURER : Novolyte
MODEL/TYPE : Data Logger: 110-WS-25DL-D
Sensor: HMP60
SERIAL NUMBER : Data Logger: A5988
Sensor: V1920215
ID NUMBER : RYG_FS0650
CONDITION AS-RECEIVED
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan Rd., Phatthanakan Rd., Khwang Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 17 Jan 2025
MEASUREMENT DATE : 07 Feb 2025
ISSUE DATE : 07 Feb 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values

Calibration procedure:
The Relative humidity and Air Temperature calibration was done by in-house calibration method as WI-CL-009 and WI-CL-010 according to comparison method with Standard, Child Mirror hygrometer with Temperature sensor and standard Humidity generator chamber.

Traceability:
The measurements are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0146-24 and Jiranatee Associates Co., Ltd. Certificate number: CRT-026-16

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM "Evaluation of measurement data - Guide to the expression of uncertainty in measurement"

Measurement Results:

The results of calibration and associated measurement uncertainties are reported in the table below.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Table 2: The results of calibration of relative humidity at 30 °C are reported in table below
Calibration Range: 20%RH to 80%RH

Air Temperature (°C)	Standard Reading (%RH)	UUC Reading (%RH)	Error (%RH)	Uncertainty (%RH)
29.29	20.53	22.0	1.5	0.28
29.23	52.54	54.8	2.3	0.1
29.25	84.48	87.9	3.4	2.1

UUC*: Unli Under Calibration

End of Certificate of Calibration



Calibrated by:
Mr. Sorawit Thachalad
Miss Jiraporn Lertsamphol
Miss Ruangsri Phoommit



Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

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CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novalyne
MODEL/TYPE : Sensor WS 02F
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: WSD-AS543
Data logger: AS543
ID NUMBER : BKK_F50975
CONDITION AS RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 04 Dec 2024
MEASUREMENT DATE : 17 Dec 2024
ISSUE DATE : 19 Dec 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 35.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

PLACE OF CALIBRATION : Effel type wind tunnel of Iranate Associates Co., Ltd

CALIBRATION CONDITION : Wind tunnel cross section area : 900 cm²
Wind direction (upwind) : 129 cm²
Diameter of mounting pipe : 129 mm
Blockage ratio of test object : 0.143 [-]

Preconditioning : 24 hours at ambient conditions
Measurement Condition : The average values during measurement are 24.7 °C, (55.7) %RH and (1004.9) hPa

TABULATION OF RESULTS:
The table on next page give the measured values

Calibrated by:
Mr. Somchai Thirakiatad
12 yrs of experience in calibration



Approved signature:
Mr. Somchai Thirakiatad
Calibration Department Manager

Remarks:
* During every section step of the wind tunnel
* Proportion mass section area of the test object include mounting pipe
* Dimension of mounting pipe
* Ratio 1/10

Calibration procedure:
The wind direction sensor was calibrated against a Standard Rotary Encoder, model: DMTS P43, with an absolute angle scale of 0.01° type wind tunnel with 304 cm² area and 129 cm² diameter. The wind direction sensor was calibrated against the wind energy generation system, model: 17.1 Power performance measurement of electricity generating wind turbine. Model: 17.1 was used as a reference.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standard, and in evaluation of the international system of units (SI) through the GUM (General Uncertainty in Measurement of Thailand) in Certificate number DA 0077-24

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined by using the GUM (General Uncertainty in Measurement of Thailand) in the expression of uncertainty by Iranate Associates Co., Ltd.

Page 2 of 2 Pages

MEASUREMENT RESULTS

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45 intervals in clockwise and counter-clockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed	D ⁺ _{meas}	D ⁻ _{meas}	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
5.00	45.000	42	-3	0.80
	90.000	87	-3	0.80
	135.000	131	-2	0.80
	180.000	181	1	0.80
	225.000	227	2	0.80
	270.000	273	3	0.80
	315.000	318	3	0.80
	360.000	359	-1	0.80

Remarks:
* Calibration results only valid for the stated circumstances and environmental conditions during which calibration took place
* Direction of Standard
* Direction of Wind Tunnel Calibration



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CERTIFICATE OF CALIBRATION

Certificate No. : CDT-212-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Data Logger with Temperature sensor
MANUFACTURER : Novalyne
MODEL/TYPE : 110-WS-25DL-D
SERIAL NUMBER : AS543
ID NUMBER : BKK_F50975
CONDITION AS RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 04 Dec 2024
MEASUREMENT DATE : 17 Dec 2024
ISSUE DATE : 19 Dec 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 35.0 %RH

NOTED: The certificate is valid only to the item calibrated on date and place of calibration

TABULATION OF RESULTS:
The table on next page give the measured values

Calibration procedure:
The temperature calibration was done by the known comparison method in the standard of temperature measurement and standard temperature probe. The temperature scale was based on ITS-90

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Technology (NIST) in the United States of America. Certificate number: 17-0017-24. Certificate number: 17-0017-24

Reference Used During Calibration:
Standard Temperature Probe
Model: STS-100-AS50, Serial No.: 157682-06,
Due date: 26 Mar 2025
Digital Temperature Sensor
Model: DS-1050-A, Serial No.: 671467,
Due date: 21 Oct 2025

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM (General Uncertainty in Measurement of Thailand) in the expression of uncertainty by Iranate Associates Co., Ltd.

Calibrated by:
Mr. Somchai Thirakiatad
12 yrs of experience in calibration



Approved signature:
Mr. Somchai Thirakiatad
Calibration Department Manager

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Continuation of Certificate of Calibration Number CDT-212-67

Page 2 of 2 Pages

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Functions:

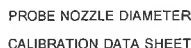
Table 1: This equipment was connected with temperature sensor Model: HM1605/N: R1131111
Dimension: Diameter: 12 mm, Length: 80 mm

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.068	19.8	0.3	0.009
80	25.063	24.8	0.3	0.009
80	30.065	29.7	0.4	0.009
80	35.065	34.7	0.4	0.009
80	40.034	39.5	0.5	0.009

UUC: Uncertainty of Calibration

End of Certificate of Calibration



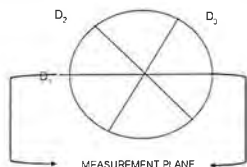


Calibration Date :		20 Jan 25		Nozzle Set ID :		BKK_FS0474	
Calibration Sheet No :		C-100125-BKK_FS0474		Vernier Caliper ID :		BKK_FS1123	

Nozzle ID #	Nozzle Diameter (cm)			Hi - Lo	$(D_1 - D_2) / 3$
	D_1	D_2	D_3	ΔD	D_{avg}
1	0.305	0.300	0.305	0.005	0.303
2	0.455	0.455	0.455	0.000	0.455
3	0.540	0.545	0.535	0.010	0.540
4	0.604	0.602	0.601	0.003	0.602
5	0.760	0.765	0.770	0.010	0.765
6	0.935	0.945	0.935	0.010	0.938
7	1.095	1.098	1.092	0.005	1.095
8	1.260	1.260	1.260	0.000	1.260
9	1.605	1.600	1.610	0.010	1.605

Where

- D_1, D_2, D_3 There different nozzle diameters at 60 degrees to each other, each measured (in nearest 0.025 mm)
- ΔD Maximum distance between any two diameters, must be ≤ 0.100 mm
- D_{avg} $(D_1 + D_2 + D_3) / 3$



Calibrated by : _____
(Mr. Warawut Pubpa)
RYG Field Services Scientist (3)

Approved by _____
(Mr Naitthapol Jiengwareewong)
RYG Field Services Specialist (1)

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Barometric Pressure (mmHg) :	756.2
Relative Humidity (%) :	37.9
Temperature (C°) :	28.1
Reference Dry Gas Meter Data	
Reference Dry Gas Meter ID :	BKKFS1122
Serial No.	A2003240
Correction Factor (Y)	1.0000
Next Calibration Date	25-Feb-26

Calibration of Date	:	10-Jan-25
Next Cal Date	:	10-Jul-25
Console Control Meter Data		
Calibration No.	:	C-102125-BKK_F50556
Dry Gas Meter ID	:	BKK_F50556
Serial No.	:	1606041
Model No.	:	XC-572-V

[illegible]

Ratio of reading of reference to dry gas meter tolerance for individual values, ± 0.02 from average

On-line pressure differential flow equates to 21.24 in of air @ 25°C and 760 mm of mercury. mmH₂O, tolerance for individual values \pm 5.08 from average.

Procedure; 40 CFR 60 APP A METH , SEC 5 3 & 7

Approved by
Nattapon Jengwarawong
(Mr Nattapol Jengwarawong)
KYG Field Service Specialist(1)

Calibrated by _____

(Mr. Warren Pullos)
RYG Field Service Society(3)


RECEIVED FIRST MONDAY 2 11:41 PM '87



Calibration Date :	10 Jan 25	Ambient Temperature (°C)	28.1
Calibration sheet No. :	C-100125-BKK_FS0557	Relative Humidity (%) :	37.9
Digital Temperature ID :	BKK_FS0557	Reference Temperature ID	RYG_FS0681
Serial No. :	1606041	Serial No. :	201090014918
Model :	XC-872-V	Model :	Digicon-CC-VT-M5
		Next Calibrate :	13 May 25

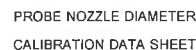
Location	Reference Temperature °C	Digital Temperature °C	Error	MPE	Pass / Fail
Stack	0	0	0	±3	Pass
	25	24	-1	±3	Pass
	50	49	-1	±3	Pass
	100	99	-1	±3	Pass
	150	149	-1	±3	Pass
	200	199	-1	±3	Pass
	250	249	-1	±3	Pass
	300	299	-1	±3	Pass
	500	499	-1	±3	Pass
	Probe	100	99	-1	±3
120		119	-1	±3	Pass
140		139	-1	±3	Pass
Oven	100	99	-1	±3	Pass
	120	119	-1	±3	Pass
	140	139	-1	±3	Pass
Filter	100	100	0	±3	Pass
	120	120	0	±3	Pass
	140	141	1	±3	Pass
Exit	0	0	0	±3	Pass
	10	10	0	±3	Pass
	20	20	0	±3	Pass
Meter	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
AUX	0	0	0	±3	Pass
	25	24	-1	±3	Pass
	50	49	-1	±3	Pass

MPE : (Maximum permissible error of measurement) ค่าความผิดพลาดสูงสุดของการวัดที่ยอมรับได้

Calibrated by 
Mr. Warawut Pabpa
RYG Field Service Scientist (3)

Approved by: Nattapon Jangwareewong
Mr.Nattapon Jangwareewong
RYG Field Service Specialist (1)

FORM NO. F 06-027 REVISION NO. 2 ISSUE DATE 9 Feb 23



Calibration Date : 10 Jan 25		Nozzle Set ID : BKK_FS0562	
Calibration Sheet No : C-100125-BKK_FS0562		Vendor Caliper ID : BKK_FS1123	

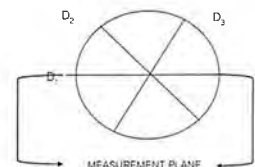
Nozzle ID #	Nozzle Diameter (cm)			H - Lo	$(D_1 - D_2 - D_3) / 3$
	D ₁	D ₂	D ₃	ΔD	D _{avg}
1	0.300	0.300	0.305	0.005	0.302
2	0.485	0.475	0.485	0.010	0.482
3	0.530	0.535	0.530	0.005	0.532
4	0.625	0.630	0.630	0.005	0.628
5	0.760	0.760	0.765	0.005	0.762
6	0.975	0.980	0.980	0.005	0.978
7	1.085	1.085	1.081	0.004	1.084
8	1.275	1.275	1.275	0.000	1.275
9	1.605	1.610	1.615	0.010	1.610

Where :

D_1, D_2, D_3 = Three different nozzle diameters at 60 degrees to each other, each measured the nearest 0.025 mm

ΔD = Maximum distance between any two diameters, must be ≤ 0.100 mm

D_{avg} = $(D_1 + D_2 + D_3) / 3$



Calibrated by _____
(Mr. Warawul Pubpa)
RYG Field Service Scientist (3)

Approved by : Mr Naitthapol Jengwareewong
(Mr Naitthapol Jengwareewong)
RYG Field Service Specialist (1)

01/08/2011 11:00:00 AM 01/08/2011 11:00:00 AM 01/08/2011 11:00:00 AM



Type S Pitot Tube Calibration

Date Calibration 30-Nov-24 Due Date 1-Jun-25
Pitot ID BKK_FS0551 Inclinator ID BKK_FS1131
Pitot SN - Vernier ID BKK_FS1405

Parameter	Value	Allowable Range	Check
α_1	2.4	$-10^\circ < \alpha_1 < +10^\circ$	OK
α_2	-3.1	$-10^\circ < \alpha_2 < +10^\circ$	OK
β_1	-0.4	$-5^\circ < \beta_1 < +5^\circ$	OK
β_2	9.3	$-5^\circ < \beta_2 < +5^\circ$	OK
γ	1.3	-	-
θ	1.4	-	-
$Z = A \tan \gamma$	0.020	$Z \leq 0.125''$	OK
$W = A \tan \theta$	0.021	$W \leq 0.031''$	OK
Dt	0.375	$0.188'' \text{ to } 0.375''$	OK
A/2Dt	1.160	$1.05 \leq PA/Dt \leq 1.5$	OK
A	0.87	$2.1Dt \leq A \leq 3Dt$	OK

Certify that pitot tube/porbe meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification fact of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by:
(Mr. Prasert Surakhan)
Enviro Field Services Scientist (3)

Approved By:
(Mr. Samart Roo-ngan)
Enviro Field Services Specialist (1)

FORM NO.: F 06-124 REVISION NO.: 0 ISSUE DATE: 25/12/23



Type S Pitot Tube Calibration

Date Calibration 30-Nov-24 Due Date 1-Jun-25
Pitot ID BKK_FS0552 Inclinator ID BKK_FS1131
Pitot SN - Vernier ID BKK_FS1405

Parameter	Value	Allowable Range	Check
α_1	2.2	$-10^\circ < \alpha_1 < +10^\circ$	OK
α_2	3	$-10^\circ < \alpha_2 < +10^\circ$	OK
β_1	-1.2	$-5^\circ < \beta_1 < +5^\circ$	OK
β_2	2.3	$-5^\circ < \beta_2 < +5^\circ$	OK
γ	1.4	-	-
θ	1.2	-	-
$Z = A \tan \gamma$	0.022	$Z \leq 0.125''$	OK
$W = A \tan \theta$	0.018	$W \leq 0.031''$	OK
Dt	0.375	$0.188'' \text{ to } 0.375''$	OK
A/2Dt	1.173	$1.05 \leq PA/Dt \leq 1.5$	OK
A	0.88	$2.1Dt \leq A \leq 3Dt$	OK

Certify that pitot tube/porbe meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification fact of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by:
(Mr. Prasert Surakhan)
Enviro Field Services Scientist (3)

Approved By:
(Mr. Samart Roo-ngan)
Enviro Field Services Specialist (1)

FORM NO.: F 06-124 REVISION NO.: 0 ISSUE DATE: 25/12/23



Calibration Certificate



Certificate No.: G 680111
Date of Issue : 19-Feb-25

Instrument description : Flue Gas Analyser
Instrument model : Testo 340
Control unit serial no. : -
Instrument serial no. : 62150585
ID no. or control no. : RYG_FS0465
Manufacturer : Testo SE & Co. KGaA
Probe description : -
Probe model : -
Probe serial no. : -
Customer name : ALS LABORATORY GROUP (THAILAND) CO., LTD.
Customer address : 104 Phatthanakan 40, Phatthanakan Road, Khwaeng Phatthanakan, Khet Suan Luang, Bangkok, 10250 Thailand

Total pages of certificate : 2 Pages
Receiving no. : L-250514
Receiving date : 18-Feb-25
Parameter of calibration : Gas Calibration (Oxygen 2.50, 9.984, 21.02 %vol, Carbon Monoxide 80.45, 302, 1007 ppm, Nitric Oxide 30.0, 151.8, 322.5 ppm, Sulphur Dioxide 50.36, 100.7, 600.8 ppm)
Condition of UUC : Used
Ambient condition : All of the Measurement were carried out the stabilized laboratory
Temperature : $23 \pm 0.5^\circ\text{C}$
Humidity : $55 \pm 15\%$ RH

Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210

Calibration procedure no : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

This certificate is applied only to items under test Environmental condition.

This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal are not valid and The results relate only to the items tested/calibrated.

This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 19-Feb-25

Mr. Kwanchel Khamkhoung
Calibration Technician

Mrs. Nongluck Wongsattae
Technical Manager



Calibration Certificate



Certificate No.: G 680111

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O ₂) 2.50 % Vol	2412/23	Linde	27-Aug-27
Oxygen (O ₂) 9.984 % Vol	CG-0113-24	Nimt	01-Aug-29
Oxygen (O ₂) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.45 ppm	CG-0132-24	Nimt	10-Sep-29
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1007 ppm	1870/24	Linde	17-Jun-26
Nitric Oxide (NO) 30.0 ppm	CG-0065-24	Nimt	06-May-28
Nitric Oxide (NO) 151.8 ppm	0404/25	Linde	09-Feb-27
Nitric Oxide (NO) 322.5 ppm	1974/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 100.7 ppm	2662/24	Linde	25-Aug-26
Sulphur Dioxide (SO ₂) 600.8 ppm	2003/23	Linde	17-Jul-25

Measured room conditions

Temperature : 22.9 °C Humidity : 66.4 %RH Pressure : 1010.8 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 700 ml/min Gas pressure : 1014.5 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O ₂ (%Vol)	2.50	2.44	-0.06	0.15
O ₂ (%Vol)	9.984	9.91	-0.074	0.20
O ₂ (%Vol)	21.02	21.13	0.11	0.30
CO (ppm)	80.45	81	0.55	3.0
CO (ppm)	302	301	-1	6.0
CO (ppm)	1007	1005	-2	12
NO (ppm)	30.0	32	2.0	8.0
NO (ppm)	151.8	154	2.2	8.0
NO (ppm)	322.5	323	0.5	12
SO ₂ (ppm)	50.36	49	-1.36	6.0
SO ₂ (ppm)	100.7	101	0.3	6.0
SO ₂ (ppm)	600.8	603	2.2	13

Remark : 1 cmol/mol = 1 %vol 1 μmol/mol = 1 ppm.

End of Report



Certificate No: G 680048
Date of issue : 27-Jan-25

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350 New
Instrument serial no. : 62985047/1121
Control unit serial no. : 03580098/1121
ID no. or control no. : RYG_F50563
Manufacturer : Testo SE & Co. KGaA
Probe description :
Probe model :
Probe serial no. :
Customer name : ALS LABORATORY GROUP (THAILAND) CO., LTD.
Customer address : 104 Phatthanakan 40, Phatthanakan Road, Khwaeng Phatthanakan, Khet Suan Luang, Bangkok, 10250 Thailand
Total pages of certificate : 2 Pages
Receiving no. : L-250179
Receiving date : 22-Jan-25
Parameter of calibration : Gas Calibration (Oxygen 2.50, 9.984, 21.02 %vol, Carbon Monoxide 80.45, 302, 1007 ppm)
Nitrogen Dioxide 30.68, 81.8, 201.9 ppm, Nitric Oxide 30.0, 151.5, 322.5 ppm, Sulphur Dioxide 50.36, 100.7, 600.8 ppm)
Condition of UUC : Used
Ambient condition : All of the Measurement were carried out in the stabilized laboratory
Temperature : 23 ± 5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakki, Bangkok 10210
Calibration procedure no : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

REVIEW BY :
APPROVED BY :
NEXT CAL DATE : 22/01/2026

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. This certificate is applied only to item under test Environmental condition. This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated. This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 22-Jan-25

Mr. Kwanchai Khamsoung
Calibration Technician

Mrs. Nongluck Wongsettee
Technical Manager

FM-CL-09-C Rev 8

Page 1 of 2

Issued Date 26/02/16

Entech Industrial Solution Co., Ltd.

17/121 Soi Ngamwongwan 47, Yaek 48, Toongsonghong, Lakki, Bangkok 10210 THAILAND, Tel: 0-2776-8888, Calibration@entech.co.th, Tax ID: 010539035591, www.entech.co.th



Certificate No.: G 680048

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O ₂) 2.50 % Vol	2412/23	Linde	27-Aug-27
Oxygen (O ₂) 9.984 % Vol	CG-0132-24	Nmt	01-Aug-29
Oxygen (O ₂) 21.02 % Vol	CG-0041-22	Nmt	10-Feb-27
Carbon monoxide (CO) 80.45 ppm	CG-0132-24	Nmt	10-Sep-29
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1007 ppm	1870/24	Linde	17-Jun-26
Nitrogen Dioxide (NO ₂) 30.68 ppm	2832/24	Linde	08-Sep-26
Nitrogen Dioxide (NO ₂) 81.8 ppm	2330/24	Linde	01-Aug-26
Nitrogen Dioxide (NO ₂) 201.9 ppm	1975/23	Linde	17-Jul-25
Nitric Oxide (NO) 30.0 ppm	CG-0065-24	Nmt	06-May-26
Nitric Oxide (NO) 151.5 ppm	0161/23	Linde	22-Jun-25
Nitric Oxide (NO) 322.5 ppm	1974/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 100.7 ppm	2662/24	Linde	25-Aug-26
Sulphur Dioxide (SO ₂) 600.8 ppm	2003/23	Linde	17-Jul-25

Measured room conditions

Temperature : 22.6 °C Humidity : 64.8 %RH Pressure : 1012.7 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,300 ml/min Gas pressure : 1016.3 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O ₂ (%Vol)	2.50	2.47	-0.03	0.15
O ₂ (%Vol)	9.984	9.92	-0.064	0.20
O ₂ (%Vol)	21.02	21.12	0.10	0.30
CO (ppm)	80.45	82	1.55	3.0
CO (ppm)	302	305	3	6.0
CO (ppm)	1007	1011	4	12
NO ₂ (ppm)	30.68	28.8	-1.88	8.0
NO ₂ (ppm)	81.8	79.9	-1.9	8.0
NO ₂ (ppm)	201.9	199.7	-2.2	12
NO (ppm)	30.0	31	1.0	8.0
NO (ppm)	151.5	153	1.5	8.0
NO (ppm)	322.5	324	1.5	12
SO ₂ (ppm)	50.36	51	0.64	6.0
SO ₂ (ppm)	100.7	102	1.3	6.0
SO ₂ (ppm)	600.8	605	4.2	13

Remark : 1 mol/mol = 1 %vol, 1 µmol/mol = 1 ppm

End of Report

FM-CL-09-C Rev 8

Page 2 of 2

Issued Date 26/02/16

Entech Industrial Solution Co., Ltd.

17/121 Soi Ngamwongwan 47, Yaek 48, Toongsonghong, Lakki, Bangkok 10210 THAILAND, Tel: 0-2776-8888, Calibration@entech.co.th, Tax ID: 010539035591, www.entech.co.th

SARTORIUS



Accredited by

NSC-TISI-TIS 17025

Calibration 0426

Calibration certificate

Calibration Certificate No. 25BKL0003

Object	Electronic non-automatic weighing instrument	This calibration certificate documents the traceability to national standards
Manufacturer	Sartorius	Uncertainties of measurements are taken into account when only statements of compliance are made
Type	MSU224S-100-DU	This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP WI 08
Serial QM Ident. no.	31709552 RYG_EN0003	This certificate relate and apply this equipment only
Customer	ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)	
	616/110 Moo 5 T.Maenam Khu, A Pluak Daeng, Rayong 21140, Thailand	
Order no.	2230	
Number of pages	4	
Date of calibration	20 Feb 2025	

REVIEW BY :
APPROVED BY :
NEXT CAL DATE : 20/02/26

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Date 06 Mar 2025 Approval of the Calibration Certificate

Person in charge

Mr. Chonchai Inthana

Kachen

Kachen Lalae

Calibration certificate No.: 25BKL0003

Calibration Certificate

Calibration object

Single range instrument

Model : MSU224S-100-DU
Serial Number : 31709552
QM Ident. no | Inventory no : RYG_EN0003 | —

Maximum capacity (Max load) : 220 0000 g

Measured range : 220 0000 g

Scale interval : 0.0001 g

Place of calibration

Address : According to page 1
Department | Cost center : Laboratory Department. | —
Building | Floor : — | 1st Floor.
Room : Balance Room
Maximum temperature variation at place of calibration : 5 K

Calibration procedure

EURAMET cg-18, V4.0 - Guidelines on the Calibration of Non-Automatic Weighing Instruments

Test equipment

Test equipment type	Test equipment ID	Valid until
Thermometer	MHB-382SD s/nB011342 Traceable to SI unit through DKSH	21 Aug 2025
Test weight set OIML R111 E2	Certificate No M2308197S, E2 (Traceable to SI unit through TCS)	23 Aug 2025

Adjustment Status

The measuring device was internally adjusted before the calibration

Environmental and measuring conditions

Date of calibration 20 Feb 2025
Temperature at place of calibration | Temp. diff. 24.7 °C | 0.3 K
Weights - 7 place

Measuring conditions

The installation site is suitable. The device was levelled. Balance was loaded up to Max before test
Humidity 62.3 %RH.

Comments

Measurement results | Measurement uncertainties

Repeatability		Eccentricity	
Test load (nominal): 10 g 200 g		Test load (nominal): 100 g	
1	10.0000 g 200.0000 g	Center	100.0000 g
2	10.0000 g 200.0001 g	Front left	100.0000 g
3	9.9999 g 200.0000 g	Back left	100.0001 g
4	10.0000 g 200.0000 g	Back right	99.9999 g
5	10.0000 g 200.0001 g	Front right	99.9999 g
6	9.9999 g 200.0000 g	Maximum deviation from centric loading indication	
7	10.0000 g 200.0000 g	Δecc max = 0.0001 g	
8	10.0000 g 200.0000 g		
9	10.0000 g 200.0001 g		
10	10.0000 g 200.0001 g		
s = 0.00004 g s = 0.00005 g			

Error of indication

Testload	Indication	Error	Expansion factor	Uncertainty	Uncertainty relative
L	I	E	k	U(E)	Urel(E)
0.0100 g	0.0100 g	0.0000 g	2.00	0.00012 g	1.2 %
0.1000 g	0.1000 g	0.0000 g	2.00	0.00013 g	0.13 %
0.5000 g	0.5000 g	0.0000 g	2.00	0.00013 g	0.026 %
1.0000 g	1.0000 g	0.0000 g	2.00	0.00013 g	0.013 %
5.0000 g	5.0000 g	0.0000 g	2.00	0.00013 g	0.0026 %
10.0000 g	10.0000 g	0.0000 g	2.00	0.00013 g	0.0013 %
20.0000 g	20.0000 g	0.0000 g	2.00	0.00014 g	0.00068 %
50.0000 g	50.0000 g	0.0000 g	2.00	0.00015 g	0.00029 %
100.0000 g	100.0001 g	0.0001 g	2.00	0.00018 g	0.00018 %
200.0000 g	200.0000 g	0.0000 g	2.00	0.00028 g	0.00014 %
220.0000 g	220.0000 g	0.0000 g	2.00	0.00032 g	0.00015 %
Maximum error of indication		E max = 0.0001 g			

Urel(E) is the quotient of U(E) and test load L. The uncertainty of measurement U(E) is valid only if error E is considered. You will find reference notes on the uncertainty of measurement in use under 'Appendix to the calibration certificate | Interpretation of measurement results'.
Reference note: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the documented expansion factor, determined in accordance with the European Calibration Guideline EURAMET cg-18, V9.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

End of calibration certificate

Sartorius (Thailand) Co., Ltd
129 Rama 9 Road, Huaykwang
10310 Bangkok

Verical®
Version 5.5

Page 3 | 4

Uncertainty of measurement in use

Device adjusted before measurement

Yes

Temperature deviation considered

1.5 K (isoCAL active)

Temperature coefficient considered

1 · 10⁻⁴ /K

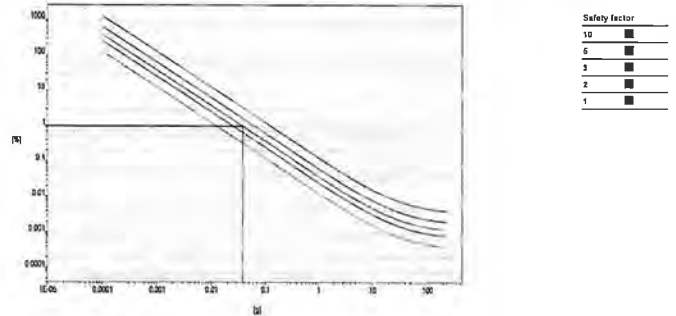
Uncertainty of the weighing result U₉₅(W)

U₉₅(W) = 0.00013 g + 3.42 · 10⁻⁴ · R

Reference note: The current uncertainty of measurement is calculated by entering of the reading R into this formula. In relation to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied with an expansion factor of 2, determined in accordance with the European Calibration Guideline EURAMET cg-18, V9.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

Indication in % from max load	Net indication R	Uncertainty U ₉₅ (W)	Uncertainty relative U ₉₅ (W)/rel
1 %	2.2000 g	0.00014 g	0.0063 %
25 %	55.0000 g	0.00033 g	0.00059 %
50 %	110.0000 g	0.00051 g	0.00046 %
75 %	165.0000 g	0.00069 g	0.00042 %
100 %	220.0000 g	0.00088 g	0.00040 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

Process accuracy 1.00 %
Safety factor 3
Minimum sample weight 0.0380 g

Sartorius (Thailand) Co., Ltd
129 Rama 9 Road, Huaykwang
10310 Bangkok

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Version 5.5

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ANALYZER CALIBRATION DATA

Lot No 2540386-1

Client : Gulf TS3 Co., Ltd. Location : Jalee HRSG 11
Date : 08 May 25 Test Operator : Sakitt P.

O₂ ANALYZER
Model : HORIBA PG-350 Serial No. : TDBAROKP
Span (%) : 25

Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.09	0.20
Low-Level Gas	8.00	8.12	0.24
Span Gas	16.02	16.17	0.28

NO_x ANALYZER
Model : TELEDYNE API T200H Serial No. : 482
Span (ppm) : 100

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.29	0.18
Low-Level Gas	56.17	56.67	0.20
Span Gas	82.39	82.99	0.20

SO₂ ANALYZER
Model : TELEDYNE API 100EH Serial No. : 437
Span (ppm) : 100

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.01
Low-Level Gas	55.51	55.57	0.03
Span Gas	78.75	78.83	0.05

CO ANALYZER
Model : HORIBA PG-350 Serial No. : VKNVUGU9
Span (ppm) : 100

Cylinder value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.10	0.08
Low-Level Gas	54.24	54.09	0.10
Span Gas	79.48	79.16	0.20

Calibrated by

Sakitt P.

(Mr. Sakitt Phalsanphit)

Environmental Field Scientist (4)



SYSTEM CALIBRATION BIAS AND DRIFT DATA

Lot No 2540386-1

Client : Gulf TS3 Co., Ltd. Location : Jalee HRSG 11
Date : 08 May 25 Test Operator : Sakitt P.

O₂ ANALYZER
Cylinder Conc. (%) : 16.02 Span (%) : 25

O ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.10	0.10	0.05	0.20	0.20
Upscale Gas	16.17	0.00	16.10	0.28	0.28

NO_x ANALYZER
Cylinder Conc. (ppm) : 82.39 Span (ppm) : 100

NO _x Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.30	0.30	0.20	0.10	0.10
Upscale Gas	82.99	0.00	82.78	0.20	0.20

SO₂ ANALYZER
Cylinder Conc. (ppm) : 78.75 Span (ppm) : 100

SO ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.03	0.03	0.02	0.01	0.01
Upscale Gas	78.83	0.00	78.78	0.05	0.05

CO ANALYZER
Cylinder Conc. (ppm) : 79.48 Span (ppm) : 100

CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	-0.10	-0.10	0.00	0.08	0.08
Upscale Gas	79.16	0.00	79.36	0.20	0.20

Calibrated by

Sakitt P.

(Mr. Sakitt Phalsanphit)

Environmental Field Scientist (4)



EMISSION TEST RESULT

Client	Gulf TSS Co., Ltd.	Run #	1
Date	08 May 25	Location	Udax HRSG 11
Start Time	10:40	Test Operator	Sakitt P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Finish Time	11:00
NO _x /O ₂ Analyzer Model	TELEDYNE API T200H	Serial No.	482
CO/CO ₂ Analyzer Model	HORIBA PG-350	Serial No.	VKNVUGU9

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
10:40	13.81	3.83	17.09	0.88	3.52	
10:41	13.87	3.78	17.29	0.89	1.89	
10:42	13.80	3.76	16.67	0.89	1.71	
10:43	13.93	3.75	15.18	0.88	1.71	
10:44	13.93	3.75	15.44	0.87	1.89	
10:45	13.93	3.75	15.29	0.87	2.02	
10:46	13.93	3.76	15.17	0.87	1.89	
10:47	13.92	3.76	15.18	0.88	1.89	
10:48	13.92	3.76	15.23	0.88	1.89	
10:49	13.92	3.76	15.40	0.87	1.89	
10:50	13.92	3.75	15.64	0.88	1.90	
10:51	13.94	3.75	15.81	0.86	1.76	
10:52	13.92	3.76	15.40	0.85	1.90	
10:53	13.90	3.78	15.25	0.86	1.60	
10:54	13.89	3.78	15.55	0.86	2.22	
10:55	13.91	3.75	15.78	0.86	1.90	
10:56	13.94	3.75	15.76	0.84	2.02	
10:57	13.92	3.76	15.45	0.84	1.58	
10:58	13.91	3.76	15.28	0.85	1.60	
10:59	13.92	3.76	15.39	0.84	1.60	
11:00	13.92	3.75	15.43	0.83	1.60	
Average	13.91	3.76	15.67	0.88	1.88	

Sakitt P.

(Mr. Sakitt Phaisanphit)

Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client	Gulf TSS Co., Ltd.	Run #	2
Date	08 May 25	Location	Udax HRSG 11
Start Time	11:01	Test Operator	Sakitt P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Finish Time	11:21
NO _x /O ₂ Analyzer Model	TELEDYNE API T200H	Serial No.	437
CO/CO ₂ Analyzer Model	HORIBA PG-350	Serial No.	VKNVUGU9

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:01	13.82	3.76	15.45	0.83	1.58	
11:02	13.40	3.77	15.44	0.82	1.76	
11:03	13.19	3.77	15.97	0.83	1.76	
11:04	13.87	3.80	16.25	0.82	1.44	
11:05	13.84	3.79	16.37	0.88	1.77	
11:06	13.88	3.76	16.57	0.88	1.77	
11:07	13.92	3.76	16.08	0.88	1.77	
11:08	13.91	3.77	15.65	0.87	1.77	
11:09	13.18	3.77	15.84	0.86	1.77	
11:10	13.88	3.77	16.27	0.86	1.77	
11:11	13.92	3.75	16.40	0.71	1.32	
11:12	13.93	3.74	16.12	0.70	1.58	
11:13	13.94	3.74	15.82	0.69	1.77	
11:14	13.93	3.75	15.59	0.69	1.19	
11:15	13.91	3.76	15.72	0.69	1.77	
11:16	13.89	3.76	15.95	0.70	2.09	
11:17	13.88	3.70	16.22	0.68	1.14	
11:18	13.15	3.85	16.40	0.69	1.64	
11:19	13.84	3.80	16.63	0.69	1.06	
11:20	13.80	3.81	16.94	0.70	1.51	
11:21	13.79	3.82	17.29	0.69	1.57	
Average	13.88	3.77	16.16	0.85	1.64	

Sakitt P.

(Mr. Sakitt Phaisanphit)

Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client	Gulf TSS Co., Ltd.	Run #	3
Date	08 May 25	Location	Udax HRSG 11
Start Time	11:22	Test Operator	Sakitt P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Finish Time	11:42
NO _x /O ₂ Analyzer Model	TELEDYNE API T200H	Serial No.	437
CO/CO ₂ Analyzer Model	HORIBA PG-350	Serial No.	VKNVUGU9

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:22	13.82	3.78	17.56	0.70	1.64	
11:23	13.85	3.78	17.30	0.69	1.51	
11:24	13.84	3.78	16.95	0.68	1.71	
11:25	13.88	3.77	16.78	0.69	1.83	
11:26	13.88	3.76	16.52	0.69	1.83	
11:27	13.85	3.76	16.36	0.70	1.83	
11:28	13.79	3.84	16.34	0.71	1.97	
11:29	13.80	3.81	17.70	0.60	1.71	
11:30	13.82	3.81	17.81	0.59	1.71	
11:31	13.92	3.81	17.62	0.60	1.14	
11:32	13.82	3.81	17.53	0.61	1.39	
11:33	13.86	3.78	17.03	0.60	1.58	
11:34	13.86	3.78	17.05	0.60	0.64	
11:35	13.89	3.76	16.97	0.60	1.65	
11:36	13.87	3.77	16.09	0.60	1.52	
11:37	13.82	3.83	16.19	0.60	1.71	
11:38	13.76	3.83	17.32	0.61	1.59	
11:39	13.78	3.82	17.85	0.60	1.04	
11:40	13.79	3.81	17.79	0.60	1.72	
11:41	13.81	3.78	17.66	0.65	1.52	
11:42	13.88	3.76	16.88	0.65	1.52	
Average	13.82	3.79	17.11	0.64	1.62	

Sakitt P.

(Mr. Sakitt Phaisanphit)

Environmental Field Scientist (4)

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ANALYZER CALIBRATION DATA

Lot No. 2540389-1

Client	Gulf TSS Co., Ltd.	Location	Udax HRSG 12
Date	08 May 25	Test Operator	Apisit S.
O ₂ ANALYZER Model	TELEDYNE API 200EH	Serial No.	735
Span (%)	25		

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.05	0.20
Low-Level Gas	8.19	8.11	8.17	0.24
Span Gas	16.07	16.04	16.10	0.24

NO _x ANALYZER Model	TELEDYNE API 200EH	Serial No.	735
Span (ppm)	100		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.08	0.08
Low-Level Gas	55.91	56.20	56.10	0.10
Span Gas	82.91	82.60	81.70	0.90

SO ₂ ANALYZER Model	TELEDYNE API 100EH	Serial No.	410
Span (ppm)	100		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.00	0.00
Low-Level Gas	56.78	56.20	56.10	0.10
Span Gas	79.18	79.80	79.20	0.60

CO ANALYZER Model	TELEDYNE API 300EM	Serial No.	425
Span (ppm)	100		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.80	0.80
Low-Level Gas	55.70	56.00	57.00	1.00
Span Gas	76.74	80.00	81.00	1.00

Calibrated by

Apisit S.

(Mr. Apisit Singha)

Environmental Field Scientist (4)

FORMAQ F-06-002 REVISION NO. 4 ISSUE DATE 18/01/24

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Lot No 2540388-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client Gulf T33 Co., Ltd. Location Udaa HRSG 12
Date 08 May 25 Test Operator Aplett S.O₂ ANALYZER : 16.07 Span (%) : 25
Cylinder Conc. (%)

	O ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.00	0.07	0.28	0.04	0.16	0.12
Upscale Gas	18.04	16.00	0.16	15.87	0.16	0.52

NO₂ ANALYZER : 82.51 Span (ppm) : 100
Cylinder Conc. (ppm)

	NO ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.00	0.00	0.00	0.00	0.00	0.00
Upscale Gas	82.60	82.00	0.60	81.70	0.90	0.30

SO₂ ANALYZER : 79.79 Span (ppm) : 100
Cylinder Conc. (ppm)

	SO ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.00	0.00	0.00	0.01	0.01	0.01
Upscale Gas	79.80	79.20	0.60	79.30	0.50	0.10

CO ANALYZER : 79.74 Span (ppm) : 100
Cylinder Conc. (ppm)

	CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.00	0.00	0.00	0.00	0.00	0.00
Upscale Gas	80.00	80.00	0.00	79.00	1.00	1.00

Calibrated by

(Mr. Aplett Singha)

Environmental Field Scientist (4)

FORM NO F 06-063 REVISION NO 1 ISSUE DATE 18/01/24

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EMISSION TEST RESULT

Client Gulf T33 Co., Ltd. Run # 1
Date 08 May 25 Location Udaa HRSG 12
Start Time 10:40 Test Operator Aplett S.
SO₂ Analyzer Model TELEDYNE API 100EH Finish Time 11:20
NO_x/O₂ Analyzer Model TELEDYNE API 200EH Serial No. 410
CO/CO₂ Analyzer Model TELEDYNE API 300EH Serial No. 735
Serial No. 425

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
10:40	14.18	3.98	14.21	1.03	1.59	
10:41	14.20	3.98	14.13	1.03	1.53	
10:42	14.24	3.95	13.78	1.02	1.51	
10:43	14.28	3.94	13.54	1.01	1.49	
10:44	14.28	3.91	13.28	1.02	1.60	
10:45	14.27	3.91	13.06	0.99	1.31	
10:46	14.63	3.95	13.07	1.04	1.25	
10:47	14.78	3.91	13.12	1.02	0.98	
10:48	14.28	3.95	13.15	0.99	0.18	
10:49	14.25	3.94	13.30	1.01	0.81	
10:50	14.25	3.93	13.68	0.98	1.18	
10:51	14.29	3.95	13.98	0.98	1.37	
10:52	14.29	3.94	13.38	0.98	1.37	
10:53	14.25	3.94	13.29	0.95	1.23	
10:54	14.21	3.97	13.79	0.97	1.00	
10:55	14.24	4.00	14.09	0.92	0.95	
10:56	14.28	3.94	14.04	0.91	0.72	
10:57	14.29	3.90	13.43	0.92	0.87	
10:58	14.27	3.93	13.43	0.92	0.76	
10:59	14.28	3.94	13.53	0.90	0.73	
11:00	14.29	3.91	13.58	0.92	1.06	
Average	14.30	3.94	13.56	0.98	1.12	

(Mr. Aplett Singha)

Environmental Field Scientist (4)

FORM NO F 06-060 REVISION NO 1 ISSUE DATE 18/01/24

ALS Laboratory Group



EMISSION TEST RESULT

Client Gulf T33 Co., Ltd. Run # 2
Date 08 May 25 Location Udaa HRSG 12
Start Time 11:01 Test Operator Aplett S.
SO₂ Analyzer Model TELEDYNE API 100EH Serial No. 410
NO_x/O₂ Analyzer Model TELEDYNE API 200EH Serial No. 735
CO/CO₂ Analyzer Model TELEDYNE API 300EH Serial No. 425

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:01	14.59	3.95	13.67	0.93	0.67	
11:02	14.22	3.97	14.02	0.90	1.09	
11:03	14.21	3.98	14.54	0.89	1.18	
11:04	14.17	4.03	14.06	0.93	1.12	
11:05	14.18	4.01	14.75	0.89	1.12	
11:06	14.25	3.97	14.75	0.88	1.07	
11:07	14.27	3.94	14.18	0.89	1.05	
11:08	14.21	3.99	10.95	0.87	1.00	
11:09	14.22	3.93	14.29	0.85	1.09	
11:10	14.22	3.96	14.65	0.87	1.18	
11:11	14.27	3.91	14.53	0.86	0.92	
11:12	14.28	3.91	14.31	0.85	0.93	
11:13	14.20	3.94	14.01	0.84	0.97	
11:14	14.27	3.92	13.16	0.81	0.97	
11:15	14.25	3.94	13.45	0.82	0.97	
11:16	14.22	3.94	14.38	0.84	0.91	
11:17	14.20	3.96	14.16	0.84	0.97	
11:18	14.18	4.00	14.61	0.80	0.90	
11:19	14.19	4.03	15.03	0.82	0.89	
11:20	14.18	4.01	15.04	0.80	0.90	
11:21	14.18	4.01	15.00	0.79	0.77	
Average	14.24	3.97	14.40	0.88	1.09	

(Mr. Aplett Singha)

Environmental Field Scientist (4)

FORM NO F 06-060 REVISION NO 1 ISSUE DATE 18/01/24

ALS Laboratory Group



EMISSION TEST RESULT

Client Gulf T33 Co., Ltd. Run # 3
Date 08 May 25 Location Udaa HRSG 12
Start Time 11:22 Test Operator Aplett S.
SO₂ Analyzer Model TELEDYNE API 100EH Serial No. 410
NO_x/O₂ Analyzer Model TELEDYNE API 200EH Serial No. 735
CO/CO₂ Analyzer Model TELEDYNE API 300EH Serial No. 425

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:22	14.20	3.97	15.06	0.79	0.91	
11:23	14.19	3.99	14.46	0.79	0.98	
11:24	14.18	3.98	14.18	0.77	0.75	
11:25	14.23	3.95	14.92	0.78	0.80	
11:26	14.22	3.97	14.66	0.79	0.98	
11:27	14.17	4.01	14.76	0.75	0.70	
11:28	14.18	3.97	15.09	0.73	0.79	
11:29	14.18	3.99	15.11	0.76	0.65	
11:30	14.20	3.97	15.09	0.77	0.72	
11:31	14.19	3.99	14.98	0.76	0.60	
11:32	14.18	3.97	14.68	0.78	1.34	
11:33	14.54	3.97	15.07	0.79	0.94	
11:34	14.21	3.95	15.08	0.78	0.98	
11:35	14.25	3.93	14.70	0.75	0.82	
11:36	14.23	3.95	14.36	0.77	0.68	
11:37	14.14	3.98	14.82	0.76	1.03	
11:38	14.16	4.00	15.40	0.77	0.98	
11:39	14.19	3.99	15.52	0.75	0.76	
11:40	14.20	3.98	15.16	0.76	0.43	
11:41	14.21	3.98	15.09	0.76	0.28	
11:42	14.28	3.99	14.64	0.76	0.43	
Average	14.22	3.97	14.97	0.77	0.76	

(Mr. Aplett Singha)

Environmental Field Scientist (4)

FORM NO F 06-060 REVISION NO 1 ISSUE DATE 18/01/24

ALS Laboratory Group

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE
(THAILAND) LTD
Part Number: E04NI99E3HA0066
Cylinder Number: GN0027210
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402340012-1
Cylinder Volume: 247.2 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 680
Certification Date: Feb 11, 2022

Expiration Date: Feb 11, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 820R-12-031, 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 in mole/mole basis unless otherwise noted.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	82.39 PPM	G1	+/- 1.0% NIST Traceable	02/04/2022, 02/11/2022
CARBON MONOXIDE	80.00 PPM	79.48 PPM	G1	+/- 0.6% NIST Traceable	02/04/2022, 02/11/2022
NITRIC OXIDE	80.00 PPM	82.38 PPM	G1	+/- 1.0% NIST Traceable	02/04/2022, 02/11/2022
SULFUR DIOXIDE	80.00 PPM	78.75 PPM	G1	+/- 0.9% NIST Traceable	02/04/2022, 02/11/2022
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09010212	KAL004777	98.48 PPM CARBON MONOXIDE/NITROGEN	+/- 0.5%	Oct 15, 2024
NTRM	200610-15	C0733106	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 05, 2026
NTRM	200610-04	C0733426	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 05, 2026
GMIS	124206889139	C0323707	4.097 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Sep 03, 2024
NTRM	11010419	KAL004813	99.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 26, 2023

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicoret i550 FTIR AUP2010245 CO	FTIR	Feb 03, 2022
Nicoret i550 FTIR AUP2010245 NO	FTIR	Feb 10, 2022
Nicoret i550 FTIR AUP2010245 NO2	FTIR	Jan 27, 2022
Nicoret i550 FTIR AUP2010245 SO2	FTIR	Jan 20, 2022

Triad Data Available Upon Request
NOTES: Gross Weight: 48.5 Kg
Net Weight: 8.1 Kg



CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE
(THAILAND) LTD
Part Number: E04NI99E3HA0066
Cylinder Number: GN0027216
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402340012-1
Cylinder Volume: 247.2 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 680
Certification Date: Feb 09, 2022

Expiration Date: Feb 09, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 820R-12-031, 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 in mole/mole basis unless otherwise noted.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	55.91 PPM	G1	+/- 1.5% NIST Traceable	02/02/2022, 02/09/2022
CARBON MONOXIDE	55.00 PPM	55.29 PPM	G1	+/- 0.5% NIST Traceable	02/02/2022
NITRIC OXIDE	55.00 PPM	55.91 PPM	G1	+/- 0.5% NIST Traceable	02/02/2022, 02/09/2022
SULFUR DIOXIDE	55.00 PPM	56.28 PPM	G1	+/- 0.8% NIST Traceable	02/02/2022, 02/09/2022
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09010212	KAL004777	98.48 PPM CARBON MONOXIDE/NITROGEN	+/- 0.5%	Oct 15, 2024
NTRM	200610-15	C0733106	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 05, 2026
GMIS	124206889139	C0323707	4.097 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Sep 03, 2024
NTRM	11010419	KAL004813	99.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 26, 2023

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicoret i550 FTIR AUP2010245 CO	FTIR	Jan 06, 2022
Nicoret i550 FTIR AUP2010245 NO	FTIR	Jan 12, 2022
Nicoret i550 FTIR AUP2010245 NO2	FTIR	Jan 27, 2022
Nicoret i550 FTIR AUP2010245 SO2	FTIR	Jan 20, 2022

Triad Data Available Upon Request
NOTES: Gross Weight: 49.4 Kg
Net Weight: 8.4 Kg



Michael A. Fisher
Approved for Release

Page 1 of 160-402340012-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E3HA0066
Cylinder Number: ND11223
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12021
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402138464-1
Cylinder Volume: 247.2 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 680
Certification Date: Jul 15, 2021

Expiration Date: Jul 15, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 820R-12-031, 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 in mole/mole basis unless otherwise noted.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	56.17 PPM	G1	+/- 1.4% NIST Traceable	07/06/2021, 07/15/2021
CARBON MONOXIDE	55.00 PPM	54.34 PPM	G1	+/- 0.5% NIST Traceable	07/06/2021
NITRIC OXIDE	55.00 PPM	56.17 PPM	G1	+/- 1.5% NIST Traceable	07/06/2021, 07/15/2021
SULFUR DIOXIDE	55.00 PPM	55.51 PPM	G1	+/- 1.1% NIST Traceable	07/06/2021, 07/15/2021
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11010139	KAL004536	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 04, 2022
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	200610-00	C0733426	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 05, 2026
GMIS	124206889	C0323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	16010224	KAL003638	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicoret i550 FTIR AUP2010245 CO	FTIR	Jun 24, 2021
Nicoret i550 FTIR AUP2010245 NO	FTIR	Jul 01, 2021
Nicoret i550 FTIR AUP2010245 NO2	FTIR	Jun 30, 2021
Nicoret i550 FTIR AUP2010245 SO2	FTIR	Jul 07, 2021

Triad Data Available Upon Request
NOTES:
Gross Weight: 47.9 Kg
Net Weight: 7.8 Kg



Michael A. Fisher
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Page 1 of 160-402138464-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E3HA0002
Cylinder Number: ND11222
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12021
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402138465-1
Cylinder Volume: 247.2 Cubic Feet
Cylinder Pressure: 2215 PSIG
Valve Outlet: 680
Certification Date: Jul 15, 2021

Expiration Date: Jul 15, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 820R-12-031, 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 in mole/mole basis unless otherwise noted.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	50.00 PPM	52.51 PPM	G1	+/- 1.4% NIST Traceable	07/06/2021, 07/15/2021
CARBON MONOXIDE	50.00 PPM	79.74 PPM	G1	+/- 0.5% NIST Traceable	07/06/2021
NITRIC OXIDE	50.00 PPM	52.51 PPM	G1	+/- 1.4% NIST Traceable	07/06/2021, 07/15/2021
SULFUR DIOXIDE	50.00 PPM	79.78 PPM	G1	+/- 1.0% NIST Traceable	07/06/2021, 07/15/2021
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11010139	KAL004536	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 04, 2022
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	200610-00	C0733426	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 05, 2026
GMIS	124206889	C0323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	16010224	KAL003638	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicoret i550 FTIR AUP2010245 CO	FTIR	Jun 24, 2021
Nicoret i550 FTIR AUP2010245 NO	FTIR	Jul 01, 2021
Nicoret i550 FTIR AUP2010245 NO2	FTIR	Jun 30, 2021
Nicoret i550 FTIR AUP2010245 SO2	FTIR	Jul 07, 2021

Triad Data Available Upon Request
NOTES:
Gross Weight: 48.0 Kg
Net Weight: 7.8 Kg



Michael A. Fisher
Approved for Release

Page 1 of 160-402138465-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02N192E3HA0000 Reference Number: 82-401018725-1
Cylinder Number: ND60018 Cylinder Volume: 248.4 CF
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2214 PSIG
PGVP Number: B52017 Valve Outlet: 590
Gas Code: O2,BALN Certification Date: Oct 23, 2017

Expiration Date: Oct 23, 2026

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800R-12531, 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 volumetric basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	8.000 %	8.003 %	G1	+/- 0.4% NIST Traceable	10/23/2017
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRMatus	0900230	CC02537	1.961 % OXYGEN/NITROGEN	+/- 0.3%	Nov 01, 2018
ANALYTICAL EQUIPMENT					
Instrument/Make/Model			Analytical Principle	Last Multipoint Calibration	
Heraeus MPA S1C-O2-71MMJ041			Paramagnetic	Sep 26, 2017	

Triad Data Available Upon Request

NOTES:

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol. Document EPA-800R-12531, using the assay procedures and measurement methods in the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2000 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 2000.02

[Signature]
Approved for Release

Page 1 of 82-401018725-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD
Part Number: E02N192E3HA0001 Reference Number: 160-402340010-1
Cylinder Number: GN0027197 Cylinder Volume: 248.8 CF
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2214 PSIG
PGVP Number: A12022 Valve Outlet: 590
Gas Code: O2,BALN Certification Date: Feb 02, 2022

Expiration Date: Feb 02, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800R-12531, 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 volumetric basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	16.00 %	16.02 %	G1	+/- 0.4% NIST Traceable	02/02/2022
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09010230	K025228	23.20 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2022
ANALYTICAL EQUIPMENT					
Instrument/Make/Model			Analytical Principle	Last Multipoint Calibration	
SIEMENS OXYMAT 6 - N1-W5-951 - 02			PARAMAGNETIC	Jan 27, 2022	

Triad Data Available Upon Request

NOTES: Gross Weight: 48.6 Kg

Net Weight: 8.2 Kg



[Signature]
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Page 1 of 160-402340010-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD
Part Number: E02N192E3HA0001 Reference Number: 160-402630555-1
Cylinder Number: GN0029535 Cylinder Volume: 250.0 CF
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2214 PSIG
PGVP Number: A12022 Valve Outlet: 590
Gas Code: O2,BALN Certification Date: Sep 05, 2023

Expiration Date: Sep 05, 2031

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800R-12531, 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 volumetric basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	16.00 %	16.07 %	G1	+/- 0.4% NIST Traceable	09/05/2023
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09010230	K025228	23.20 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2022
ANALYTICAL EQUIPMENT					
Instrument/Make/Model			Analytical Principle	Last Multipoint Calibration	
SIEMENS OXYMAT 6 - N1-W5-951 - 02			PARAMAGNETIC	Aug 31, 2023	

Triad Data Available Upon Request

NOTES: Gross Weight: 50.0 Kg

Net Weight: 6.4 Kg



[Signature]
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Page 1 of 1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02N192E3HA0000 Reference Number: 160-401948144-1
Cylinder Number: GN0025086 Cylinder Volume: 248.4 CF
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2214 PSIG
PGVP Number: A12020 Valve Outlet: 590
Gas Code: O2,BALN Certification Date: Nov 11, 2020

Expiration Date: Nov 11, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800R-12531, 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 volumetric basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	8.000 %	8.186 %	G1	+/- 0.3% NIST Traceable	11/11/20
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10010602	1036055	9.967 % OXYGEN/NITROGEN	+/- 0.3%	Apr 19, 2022
ANALYTICAL EQUIPMENT					
Instrument/Make/Model			Analytical Principle	Last Multipoint Calibration	
SIEMENS OXYMAT 5 - N1-W5-951 - 02			PARAMAGNETIC	Oct 26, 2020	

Triad Data Available Upon Request

NOTES:

Gross Weight: 48.1 Kg

Net Weight: 8.2 Kg



[Signature]
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Page 1 of 160-401948144-1

Certificate of Calibration

Customer

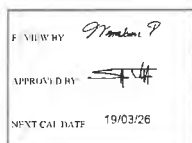
Name : ALS Laboratory Group Thailand Co., Ltd. Certificate No : 25-AC1-042
Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Request No : Req-2025-0604
Bangkok 10250

Unit Under Calibration Details

Measurement item : Acoustic Calibrator Class : 1
Manufacturer : RION Range : 94 dB / 1000 Hz
Model : NC-75 Instrument Status : Used
Serial Number : 35002736
ID : RYG-FS0496

Calibration Environment and Details

Temperature : (23 ± 2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ± 10.0 hPa)
Received Date : 6 March 2025
Calibration Date : 19 March 2025
Location of Calibration : LAB 1 Acoustic
Calibration Procedure : In-house method CIP-AC1-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators





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

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

Note

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

Calibrated By : 
Mr. Noppakorn Uanang
Service Calibration Engineer

Approved By : 
Mr. Pait Mahavorn
Calibration Engineer Supervisor
Issue Date : 19 March 2025

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

FM 708 ACT-02 Rev 03 Issue date 5/6/24

Certificate No : 25-AC1-042

Request No : Req-2025-0604

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	94.06	0.06	-	-	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		Adjustment		Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
	Measured (%)	Measured (%)	Measured (%)	Measured (%)			
94 dB / 1000 Hz	0.98	-	-	-	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 B: 6002:30:1 Class 1

The estimates in results exclude the calibration pressure correction.

The calibration results exclude the microphone volume correction.

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

FM 708 ACT-02 Rev 03 Issue date 5/6/24

Certificate No : 25-AC1-042

Request No : Req-2025-0604

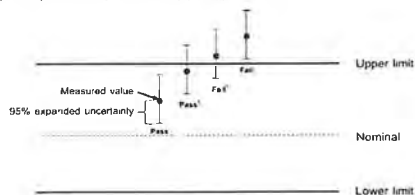
Decision Rule for Statements of Conformity

The standard decision rule employed for the statements of conformity in each calibration result will be applied using IEC 60942:2019, Guidelines on the Reporting of Compliance with Specification as follows: **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

SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

451-451/1 Sithiporn Road, Bangburi, Rangsit, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com

Cert. No. : ACL24418

Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623387 / 198634 / 26415
ID No.: RYG_FS0612

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

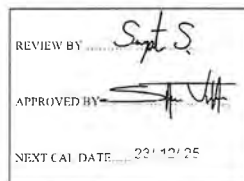
Received Date : 12 DECEMBER 2024
Calibration Date : 23 - 24 DECEMBER 2024
Date of Issue : 26 DECEMBER 2024

Calibrated by :

Nathakorn Pisuipaisan

Approved by :


(Thanakul Petchurai)



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

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

FM 708 ACT-02 Rev 03 Issue date 5/6/24

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

45/-45/1 Sirinthorn Road, Bangbunru, Bangkok, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL24418
Job No. : VC68AC0051
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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 weightings 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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

45/-45/1 Sirinthorn Road, Bangbunru, Bangkok, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL24418
Job No. : VC68AC0051
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)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Weighting (dB)
A-weight	11.6
C-weight	18.0
Flat	24.0

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.5	0.5	±1.5
1000	0.2	0.2	0.2	±1.0
8000	-0.7	-0.6	-0.6	±5.0

T. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

45/-45/1 Sirinthorn Road, Bangbunru, Bangkok, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL24418
Job No. : VC68AC0051
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

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CALIBRATION LABORATORY

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Cert. No. : ACL24418
Job No. : VC68AC0051
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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

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Cert. No. : ACL24418
Job No. : VC68AC0051
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	53.9	-0.1	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	33.9	-0.1	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.1	0.1	± 1.1

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Cert. No. : ACL24418
Job No. : VC68AC0051
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	± 1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	± 1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	± 1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	± 1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	± 1.0

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	± 3.0
One	133.4	133.3	0.1	± 3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

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Cert. No. : ACL24228
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 00734223 / 169439 / 72460
ID No. : RYG FS0029

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHUWAENG PHATTANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %
Received Date : 10 JULY 2024
Calibration Date : 11 JULY 2024
Date of Issue : 15 JULY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchur
(Thanakul Petchurai)

REVIEW BY	Manakorn P.
APPROVED BY	T. Petchur
NEXT CAL DATE	11/12/25

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

Cert. No. : ACL24228
Job No. : VC67AC0127
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EI-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

- 3.1 National Institute of Metrology (Thailand)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL24228
Job No. : VC67AC0127
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	-	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

T. Petch

Cert. No. : ACL24228
Job No. : VC67AC0127
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)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Weighting (dB)
A-weight	9.9
C-weight	16.7
Flat	22.4

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.4	±1.5
1000	-0.1	-0.1	-0.1	±1.0
8000	-1.7	-1.6	-1.6	±5.0

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Cert. No. : ACL24228
Job No. : VC67AC0127
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	0.0	0.0	-0.1	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

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Cert. No. : ACL24228
Job No. : VC67AC0127
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	137.1	0.1	± 1.1
136.0	136.1	0.1	± 1.1
135.0	135.1	0.1	± 1.1
134.0	134.1	0.1	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.1	0.1	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.1	0.1	± 1.1
109.0	109.1	0.1	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.1	0.1	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

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Cert. No. : ACL24228
Job No. : VC67AC0127
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, 1 peak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	± 3.0
One	136.4	135.3	-1.1	± 3.0

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

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Cert. No. : ACL24228
Job No. : VC67AC0127
Pages : 8 of 8

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petchur

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Cert. No. : ACL25110
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00900074 / 188467 / 01736
ID No.: RYG_FS0495

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location : +
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %
Received Date : 14 JANUARY 2025
Calibration Date : 27-29 JANUARY 2025
Date of Issue : 30 JANUARY 2025

Calibrated by :

Nathakorn Pisulpaisan

Approved by :

T. Petchur
(Thanakul Petchurai)

REVIEW BY: *Spt S*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 29/01/2026

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Calibration Procedure : CP-AC-01

Cert. No. : ACL25110
Job No. : VC68AC0064
Pages : 2 of 8**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 item 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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MA1-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

Summary of Measurement Result :

Parameter	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

T. Pich.

T. Pich.

Cert. No. : ACL25110
Job No. : VC68AC0064
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)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal noise

Measured Value (dB)
14.6

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

Frequency Weighting	Weighting (dB)
A-weight	12.0
C-weight	17.7
Flat	23.2

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	+1.5
1000	0.0	0.0	0.0	±1.0
8000	0.3	0.3	0.3	±5.0

T. Pich.

Cert. No. : ACL25110
Job No. : VC68AC0064
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

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Cert. No. : ACL25110
Job No. : VC68AC0064
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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.1	0.1	±1.1
109.0	109.0	0.0	±1.1
104.0	104.1	0.1	±1.1
99.0	99.1	0.1	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.1	0.1	±1.1
28.0	28.1	0.1	±1.1
27.0	27.1	0.1	±1.1
26.0	26.2	0.2	±1.1
25.0	25.2	0.2	±1.1

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

r. Peth

Cert. No. : ACL25110
Job No. : VC68AC0064
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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.1	0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	116.9	-0.1	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

r. Peth

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
710/00113 NONG STENAKORN 11 TAMBON BANGKALAI
AMPHUR BANG PHU ISANMI PRAKAN PROVINCE 10540 THAILAND
TEL : 0800-2116-5861 FAX : 0800-2116-7140INNOVATIVE
where better the business starts

Certificate of Calibration

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Certificate No : 25-ACT-010

Request No : Req-2025-0091

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : RION
Model : NC-74
Serial Number : 34178121
ID : RYG FS0213

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 : 15 January 2025
Calibration Date : 16 January 2025
Location of Calibration : LAB 1 Acoustic
Calibration Procedure : In-house method CIP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

REVIEW BY	
APPROVED BY	
SIG. CAL. DATE	16/01/26

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	IEI	12 June 2025
TID Multimeter	2015	1047765	NIMT	16 January 2025

Traceability : This certificate provides traceability of measurement to recognized national standard, and to the realization of the international system of units (SI).

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pachi Mahavorn
Calibration Engineer Supervisor
Issue Date : 16 January 2025

Certificate No : 25-ACT-010

Request No : Req-2025-0091

Sound pressure level

Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (\pm dB)	Acceptance limit Class 1 (\pm dB)	Result
	Measured	Deviated value	Measured	Deviated value			
94 dB / 1000 Hz	94.11	0.11	-	-	0.13	0.25	Pass

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (\pm %)	Acceptance limit Class 1 (\pm %)	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	Adjustment	Uncertainty (\pm %)	Acceptance limit Class 1 (\pm %)	Result
	Measured (%)	Measured (%)			
94 dB / 1000 Hz	1.21	-	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 I

* The calibration results exclude the calibrator pressure correction

* The calibration results exclude the microphone volume correction

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

FM-708-ACT-02 Rev 03 issue date 5/6/24

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

45/1 Sirinthorn Road, Bangbunma, Bangkok, 10700 Thailand
Tel : +66 2432 8331 Email : calibration@sithiporn.com

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Cert. No. : ACL24260

Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No : 00472130 / 169816 / 72464
ID No. : RYG-PS0303

Condition As Found : GOOD

Customer : A/S LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHUWAENG PHATTHANAKAN, KHUET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 09 AUGUST 2024
Calibration Date : 23 AUGUST 2024
Date of Issue : 26 AUGUST 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchuraj
(Thianakul Petchuraj)

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

Certificate No : 25-ACT-010

Request No : Req-2025-0091

Decision Rule for Statements of Conformity

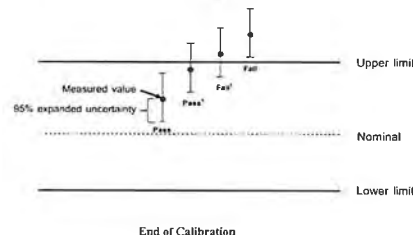
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC G8:09/2019, Guidelines on the Reporting of Compliance with Specifications as following Fig. and statements

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

Pass¹ - The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit

Fail¹ - 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



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

FM-708-ACT-02 Rev 03 issue date 5/6/24

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Cert. No. : ACL24260

Job No. : YC67AC0140

Pages : 2 of 8

Calibration Procedure : CP-AC-01

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 test 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-0009-24	05-11-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand)

3.2 Thailand Institute of Scientific and Technological Research (TISTR)

T. Petchuraj



Cert. No. : ACL24260
Job No. : VC67AC0140
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

T. Petch



Cert. No. : ACL24260
Job No. : VC67AC0140
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)	93.9	0.0	+0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.5000003

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

Frequency Weighting	Weighting (dB)
A - weight	7.8
C - weight	14.8
Flat	20.5

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	1.3	1.4	1.4	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	-4.1	-4.0	-4.0	± 5.0

T. Petch



Cert. No. : ACL24260
Job No. : VC67AC0140
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz:

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	± 2.0
125	0.0	0.0	0.0	± 1.5
250	0.0	0.0	0.0	± 1.5
500	0.0	0.0	-0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
2000	0.0	0.0	0.0	± 2.0
4000	0.0	0.0	0.0	± 3.0
8000	0.0	0.1	0.1	± 5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

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Cert. No. : ACL24260
Job No. : VC67AC0140
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	135.9	-0.1	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	132.9	-0.1	± 1.1
132.0	131.9	-0.1	± 1.1
131.0	130.9	-0.1	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.0	0.0	± 1.1

T. Petch

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Cert. No. : ACL24260
Job No. : VC67AC0140
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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.1	0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	7	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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Cert. No. : ACL24260
Job No. : VC67AC0140
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petchurai

T. Petchurai

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

45F-45F/1 Sirinthorn Road, Bangna-Nu Road, Bangkok 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24305
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00873109 / 171842 / 73485
ID No.: RYG_FS0384

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHUET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 23 SEPTEMBER 2024
Calibration Date : 09 OCTOBER 2024
Date of Issue : 09 OCTOBER 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanakul Petchurai)

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CALIBRATION LABORATORY

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Tel : +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24305
Job No. : VC67AC0140
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60034273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (ISTR).

T. Petchurai

Cert. No. : ACL24305
Job No. : VC67AC0164
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-weight	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

T. Petch

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Job No. : VC67AC0164
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Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.1

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

Frequency Weighting	Weighting (dB)
A-weight	13.1
C-weight	19.8
Flat	25.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.5	0.5	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-1.4	-1.3	-1.3	±5.0

T. Petch

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Job No. : VC67AC0164
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.1	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.2

T. Petch

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Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.1	0.1	±1.1
27.0	27.2	0.2	±1.1
26.0	26.2	0.2	±1.1
25.0	25.2	0.2	±1.1

T. Petch

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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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	30.0	30.1	0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 : -5.0
	2	8	117.0	117.0	0.0	1.0 : -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 : -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 : -5.0
	2	8	108.0	108.0	0.0	1.0 : -2.5
	200	800	128.0	128.1	0.1	±1.0

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Job No. : VC67AC0164
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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.2	-0.2	±3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petch

T. Petch

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Pages : 1 of 8

Calibration Certificate

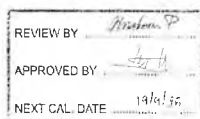
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NII-24
Serial No. : 00472127 / 169440 / 72461
ID No. : RYG_FSU302

Condition As Found : GOOD

Customer : AIS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHAI THANAKAN 40, PHAI THANAKAN ROAD,
KJWALONG PHAI THANAKAN, KHET SAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 04 SEPTEMBER 2024
Calibration Date : 19 SEPTEMBER 2024
Date of Issue : 20 SEPTEMBER 2024



Calibrated by : Natiakorn Pisutpaisan

Approved by :

T. Petch
(Thanakul Peichurai)

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

Cert. No. : ACL24283
Job No. : VC67AC0148
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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	CI-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EELBP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EELBP 20/0267	15-FEB-25
Digital Multimeter	33461A	MY60024273	EELBP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

- 3.1 National Institute of Metrology (Thailand)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petch

Summary of Measurement Result :

Parameter	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

T. Petch

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.5

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

Frequency Weighting	Weighting (dB)
A - weight	12.0
C - weight	18.2
Flat	24.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.2	0.2	±1.5
1000	-0.2	-0.2	-0.2	±1.0
8000	+1.2	+1.1	+1.1	±5.0

T. Petch

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.1	0.1	0.0	±1.5
250	0.1	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±2.0
4000	0.0	0.1	0.1	±3.0
8000	0.1	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long - term stability

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

T. Petch

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.1	0.1	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	33.9	-0.1	±1.1
30.0	29.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
28.0	27.9	-0.1	±1.1
27.0	26.9	-0.1	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.9	-0.1	±1.1

T. Petch

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Job No. : VC67AC0148
Pages : 7 of 8

R. 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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	30.0	30.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	116.9	-0.1	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	107.9	-0.1	1.5 ; -5.0
	200	800	127.6	127.5	-0.1	±1.0
	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
SEL	2	8	108.0	107.9	-0.1	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

Cert. No. : ACL24283
Job No. : VC67AC0148
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.8	-0.6	±3.0

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

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.7	89.7	0.0	±1.5

12. High level stability

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

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

End of Calibration Certificate

Cert. No. : ACL25101
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Pre-amplifier NH-24
Serial No.: 01173610 / 143485 / 22619
ID No.: RYG_FS0389

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 14 JANUARY 2025
Calibration Date : 27-29 JANUARY 2025
Date of Issue : 30 JANUARY 2025

REVIEW BY	<i>[Signature]</i>
APPROVED BY	<i>[Signature]</i>
NINT CAL DATE	26 / 01 / 2025

Calibrated by : Nathakorn Pisutpaissan

Approved by : *[Signature]*
(Thanakul Petchurai)

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

Cert. No. : ACL25101
Job No. : VC68AC0064
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	FF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

Cert. No. : ACL25101
Job No. : VC68AC0064
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

T. Reth.

Cert. No. : ACL25101
Job No. : VC68AC0064
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Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
18.8

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

Frequency Weighting	Weighting (dB)
A-weight	16.3
C-weight	22.1
Flat	28.0

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.4	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	-0.2	-0.2	-0.2	± 5.0

T. Reth.

Cert. No. : ACL25101
Job No. : VC68AC0064
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.1	0.0	± 2.0
125	0.0	0.1	0.0	± 1.5
250	0.0	0.0	0.0	± 1.5
500	0.0	0.1	0.0	± 1.5
1000	0.0	0.0	0.0	± 1.0
2000	0.0	0.1	0.1	± 2.0
4000	0.0	0.1	0.0	± 3.0
8000	0.0	0.1	0.1	± 5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long-term stability

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

T. Reth.

Cert. No. : ACL25101
Job No. : VC68AC0064
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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	26.0	0.0	± 1.1
25.0	24.9	-0.1	± 1.1

T. Reth.

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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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

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

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

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

11. Overload indication

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

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.1	137.0	0.1	±0.3

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

End of Calibration Certificate

*T. Petchur**T. Petchur*SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY451-451/1 Sirinthorn Road Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2123 9331 Email : calibration@sithiporn.comSITHIPORN
associatesCert. No. : ACL24307
Pages : 1 of 8

Calibration Certificate

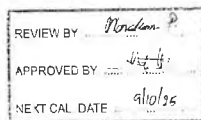
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier N11-24
Serial No. : 01073423 / 169513 / 73684
ID No. : RYG FS0386

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTIYANAKAN 40, PHATTIYANAKAN ROAD,
KHAENG PHATTIYANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 23 SEPTEMBER 2024
Calibration Date : 09 OCTOBER 2024
Date of Issue : 09 OCTOBER 2024



Calibrated by : Naitakorn Pisutpaisan

Approved by :

T. Petchur
(Thanakul Petchurai)

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

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY451-451/1 Sirinthorn Road Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2123 9331 Email : calibration@sithiporn.comSITHIPORN
associatesCert. No. : ACL24307
Job No. : VC67AC0164
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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 test 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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53230104	EEL BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0005-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

T. Petchur



Cert. No. : ACL24307
Job No. : VC67AC0164
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

T. Petch.



Cert. No. : ACL24307
Job No. : VC67AC0164
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)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.7

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

Frequency Weighting	Weighting (dB)
A-weight	14.8
C-weight	21.2
Flat	26.6

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.3	0.4	0.4	±5.0

T. Petch.



Cert. No. : ACL24307
Job No. : VC67AC0164
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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
Lsq	94.0	94.0	0.0	±0.1

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

T. Petch.



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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.1	0.1	±1.1
30.0	30.0	0.0	±1.1
29.0	29.1	0.1	±1.1
28.0	28.1	0.1	±1.1
27.0	27.2	0.2	±1.1
26.0	26.2	0.2	±1.1
25.0	25.3	0.3	±1.1

T. Petch.

Cert. No. : ACL24307
Job No. : VC67AC0164
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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	30.0	29.9	-0.1	±1.1

9. Tone burst response

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

T. Petch

Cert. No. : ACL24307
Job No. : VC67AC0164
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.3	-0.1	±3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petch

Cert. No. : ACL25103
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Pre-amplifier N11-24
Serial No.: 00296516 / 180412 / 88182
ID No.: RYG_FS0433

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 14 JANUARY 2025
Calibration Date : 27-29 JANUARY 2025
Date of Issue : 30 JANUARY 2025

REVIEW BY: *S. P. S.*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 26/01/2026

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petch*
(Thanakul Petchurai)

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

Cert. No. : ACL25103
Job No. : VC68AC0064
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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-0009-24	05-FEB-25
Waveform Generator	33511B	MY53202742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL_BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL_BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL_BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petch

Cert. No. : ACL25103
Job No. : VC68AC0064
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

Z. Petch

Cert. No. : ACL25103
Job No. : VC68AC0064
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)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

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

Frequency Weighting	Weighting (dB)
A - weight	10.8
C - weight	17.3
Flat	22.9

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	±1.5
1000	0.0	0.0	0.0	±1.0
8000	1.0	1.0	1.0	±5.0

Z. Petch

Cert. No. : ACL25103
Job No. : VC68AC0064
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

Z. Petch

Cert. No. : ACL25103
Job No. : VC68AC0064
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	132.9	-0.1	± 1.1
132.0	131.9	-0.1	± 1.1
131.0	130.9	-0.1	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.8	-0.2	± 1.1

Z. Petch

Cert. No. : ACL25103
Job No. : VC68AC0064
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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

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

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petchurai

T. Petchurai

SITHIPORN ASSOCIATES CO., LTD.
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associatesCert. No. : ACL24219
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No. : 00531294 / 23043 / 32970
ID No. : NKH_FS0130

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PHATTANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 02 JULY 2024
Calibration Date : 09-10 JULY 2024
Date of Issue : 12 JULY 2024

REVIEW BY	<i>Nathakorn P.</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL DATE	9/15/25

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thnakul Petchurai)

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other than in full, except with the prior written approval of the head of Calibration Laboratory

Cert. No. : ACL24219
Job No. : VC67AC0118
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EI-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EI-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

T. Petchurai

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

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)
14.4

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

Frequency Weighting	Weighting (dB)
A - weight	9.9
C - weight	14.6
Flat	20.2

3. Acoustical signal tests of frequency weightings

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

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

T. Petch

T. Petch

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	0.0	0.0	-0.1	±1.0
250	0.0	0.0	-0.1	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	+1.5, -2.5
16000	0.0	-1.2	-1.2	+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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	±0.1

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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±0.8
136.0	136.1	0.1	±0.8
135.0	135.1	0.1	±0.8
134.0	134.1	0.1	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.1	0.1	±0.8
124.0	124.0	0.0	±0.8
119.0	119.1	0.1	±0.8
114.0	114.1	0.1	±0.8
109.0	109.1	0.1	±0.8
104.0	104.1	0.1	±0.8
99.0	99.1	0.1	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	24.9	-0.1	±0.8

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Job No. : VC67AC0118
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8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, 1b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Finst	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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
One	136.4	136.2	-0.2	±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

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11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petchurui

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Cert. No. : ACL24224
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No. : 00531299 / 23224 / 32975
ID No. : NKH 1 S0135

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHEJ SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 02 JULY 2024
Calibration Date : 09-10 JULY 2024
Date of Issue : 12 JULY 2024

REVIEW BY: *Nathakorn P.*
APPROVED BY: *T. Petchurui*
NEXT CAL DATE: 01/01/25

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchurui*
(Thanakul Petchurui)

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Cert. No. : ACL24224
Job No. : VC67AC0118
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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	11-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	ELL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	ELL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	ELL.BP 22/0267	15-FEB-25
Programmable Attenuator	MA1-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

T. Petchurui

Cert. No. : ACL24224
Job No. : VC67AC0118
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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

T. Petch

Cert. No. : ACL24224
Job No. : VC67AC0118
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Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.8

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

Frequency Weighting	Weighting (dB)
A-weight	9.9
C-weight	14.9
Flat	20.5

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	± 1.0
1000	0.0	0.0	0.0	± 0.7
8000	0.5	0.6	0.6	-1.5, +2.5

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Cert. No. : ACL24224
Job No. : VC67AC0118
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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	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	-1.5, +2.5
16000	0.0	-1.2	-1.2	+2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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
1eq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	± 0.1

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Cert. No. : ACL24224
Job No. : VC67AC0118
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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.1	0.1	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.1	0.1	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	25.0	0.0	±0.8

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Cert. No. : ACL24224
Job No. : VC67AC0118
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Th (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
	0.25	1	99.0	98.9	-0.1	1.0 : -3.0
SEL	2	8	108.0	108.0	0.0	1.0 : -1.5
	200	800	128.0	128.1	0.1	±0.5

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
One	136.4	135.4	-1.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	132.9	-0.1	±1.0
Positive half cycle	135.4	135.1	-0.3	±1.0
Negative half cycle	135.4	135.1	-0.3	±1.0

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Cert. No. : ACL25187
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00371917 / 169101 / 72247
ID No.: NKH_FS0004

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PIATTHANAKAN 40, PIATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 23 APRIL 2025
Calibration Date : 09 MAY 2025
Date of Issue : 13 MAY 2025

REVIEW BY: *Nathakorn P.*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 09/05/26

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petch*
(Thanakul Petchurai)

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SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

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Cert. No. : ACL24224
Job No. : VC67AC0118
Pages : 8 of 8

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petch

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Cert. No. : ACL25187
Job No. : VC68AC0092
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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	EP-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EP-0012-25	11-FEB-26
Digital Multimeter	34461A	MY60024273	CA20251201A	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EP-0006-25	11-FEB-26
Condenser Microphone	4180	2977990	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 (EII).

T. Petch

Cert. No. : ACL25187
Job No. : VC68AC0092
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

T. Petch

Cert. No. : ACL25187
Job No. : VC68AC0092
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)	93.9	0.0	+0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Weighting (dB)
A - weight	11.6
C - weight	17.9
Flat	23.6

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.2	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.8	0.9	0.9	± 5.0

T. Petch

Cert. No. : ACL25187
Job No. : VC68AC0092
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	± 2.0
125	0.0	0.0	-0.1	± 1.5
250	0.0	-0.1	-0.1	± 1.5
500	0.0	0.0	-0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
2000	0.0	0.0	0.0	± 2.0
4000	0.0	0.0	0.0	± 3.0
8000	0.0	0.0	0.1	± 5.0

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
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
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Imp	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits
A - weight	94.0	94.0	0.0	± 0.3

T. Petch

Cert. No. : ACL25187
Job No. : VC68AC0092
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	132.9	-0.1	± 1.1
132.0	131.9	-0.1	± 1.1
131.0	130.9	-0.1	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

T. Petch

Cert. No. : ACL25187
Job No. : VC68AC0092
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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	99.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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CALIBRATION LABORATORY451/451/16 Srinthorn Road, Bangbunmu, Bangkok, 10720 Thailand
Tel : +66 2433 8131 Email : calib@sitphorn.comSITHIPORN
ASSOCIATES

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NI-25
Serial No. : 00531300 / 23231 / 32976
ID No. : NKH FS0136

Condition As Found : GOOD

Customer : AIS 1 LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 4U, PHATTANAKAN ROAD,
KHUANG PHATTANAKAN, KHE 1 SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 02 JULY 2024
Calibration Date : 09-10 JULY 2024
Date of Issue : 12 JULY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchu
(Thunakul Petchurai)

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Cert. No. : ACL25187
Job No. : VC68AC0092
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

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CALIBRATION LABORATORY451/451/16 Srinthorn Road, Bangbunmu, Bangkok, 10720 Thailand
Tel : +66 2433 8131 Email : calib@sitphorn.comSITHIPORN
ASSOCIATESCert. No. : ACL24225
Job No. : VC67AC0118
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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.	Certi. No.	Due Date
Waveform Generator	33210A	MY48017076	E1-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	E1-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL BP 22/0267	15-FEB-25
Programmable Attenuator	MAI-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Cert. No. : ACL24225
Job No. : VC67AC0118
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

T. Petch

Cert. No. : ACL24225
Job No. : VC67AC0118
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)
13.8

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

Frequency Weighting	Weighting (dB)
A-weight	10.8
C-weight	14.8
Flat	20.5

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	±1.0
1000	0.1	0.1	0.0	±0.7
8000	0.1	0.2	0.2	-1.5, -2.5

T. Petch

Cert. No. : ACL24225
Job No. : VC67AC0118
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	0.0	0.0	0.0	±1.0
250	0.0	0.0	-0.1	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.1	-1.5, -2.5
16000	0.0	-1.2	-1.2	-2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.1

T. Petch

Cert. No. : ACL24225
Job No. : VC67AC0118
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	137.1	0.1	±0.8
136.0	136.1	0.1	±0.8
135.0	135.1	0.1	±0.8
134.0	134.1	0.1	±0.8
133.0	133.1	0.1	±0.8
132.0	132.1	0.1	±0.8
131.0	131.0	0.0	±0.8
129.0	129.1	0.1	±0.8
124.0	124.0	0.0	±0.8
119.0	119.1	0.1	±0.8
114.0	114.1	0.1	±0.8
109.0	109.1	0.1	±0.8
104.0	104.1	0.1	±0.8
99.0	99.1	0.1	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8
28.0	27.9	-0.1	±0.8
27.0	27.0	0.0	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

T. Petch

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Cert. No. : ACL24225
Job No. : VC67AC0118
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Th (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
	200	800	128.0	128.0	0.0	±0.5

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
One	136.4	136.4	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	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

T. Petch

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Cert. No. : ACL24225
Job No. : VC67AC0118
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	±0.1
89.7	89.6	±1.5

12. High level stability

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

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

End of Calibration Certificate

T. Petch

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CALIBRATION LABORATORY

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Tel : +66 2433 8331 Email : calibration@sithiporn.com

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Cert. No. : ACL25185
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00371915 / 169104 / 72249
ID No.: NKH_FS0002

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 23 APRIL 2025
Calibration Date : 09 MAY 2025
Date of Issue : 13 MAY 2025

REVIEW BY: *Thanakul P.*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 09/05/26

Calibrated by : Thanakorn Pisutpaisan

Approved by : *T. Petch*
(Thanakul Petchurai)

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

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CALIBRATION LABORATORY

Cert. No. : ACL25185
Job No. : VC68AC0092
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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 Acoustic 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-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).

T. Petch

Cert. No. : ACL25185
Job No. : VC68AC0092
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

T. Petch

Cert. No. : ACL25185
Job No. : VC68AC0092
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)	93.9	0.0	+0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

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

Frequency Weighting	Weighting (dB)
A - weight	11.6
C - weight	17.5
Flat	23.4

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.6	0.7	0.7	± 5.0

T. Petch

Cert. No. : ACL25185
Job No. : VC68AC0092
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

T. Petch

Cert. No. : ACL25185
Job No. : VC68AC0092
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	33.9	-0.1	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

T. Petch

Cert. No. : ACL25185
Job No. : VC68AC0092
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	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

T. Petchu

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY458-459/1 Srinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiporn.comSITHIPORN
associatesCert. No. : ACL25186
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00371916 / 169103 / 72248
ID No.: NKH_FS0003

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHUWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 23 APRIL 2025
Calibration Date : 09 MAY 2025
Date of Issue : 13 MAY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchu
(Thanakul Petchum)

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

Cert. No. : ACL25185
Job No. : VC68AC0092
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petchu

Cert. No. : ACL25186
Job No. : VC68AC0092
Pages : 2 of 8

Calibration Procedure : CP-AC-01

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	EL-40011-25	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-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).

T. Petchu

Cert. No. : ACL25186
Job No. : VC68AC0092
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	0.75
12. High level stability	0.1	0.1

T. Petch.

Cert. No. : ACL25186
Job No. : VC68AC0092
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)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

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

Frequency Weighting	Weighting (dB)
A - weight	11.6
C - weight	17.5
Flat	23.2

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.2	0.2	± 1.5
1000	0.0	0.0	0.1	± 1.0
8000	0.8	0.9	0.9	± 5.0

T. Petch.

Cert. No. : ACL25186
Job No. : VC68AC0092
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
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
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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits
A - weight	94.0	94.0	0.0	± 0.3

T. Petch.

Cert. No. : ACL25186
Job No. : VC68AC0092
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

T. Petch.

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-218-67

Page 2 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 15006716
ID NUMBER : RYG_F50221
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (thailand) Co., Ltd.
104 Phatthanakan Rd., Phatthanakan Rd.,
Khwang Suan Luang, Khel Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 11 Dec 2024
MEASUREMENT DATE : 20 Dec 2024
ISSUE DATE : 23 Dec 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:
The temperature calibration was done by
in-house calibration method as per ISO 17025
according to requirements. The used standards
are: 1. Temperature probe, 2. Wet bulb standard
temperature probe. The temperature scale was
based on ITS-90.

Traceability:
The measurement results are traceable to the
International System of Units (SI) through
National Institute of Metrology (NIM) (NIST)
Certificate number: 17-0347-24, Certificate
number: FR 0113-24

Reference Used During Calibration:
1. Standard Temperature Probe
Model: NIS 100-6500, Serial No. 65165/07,
Due date: 26 Mar 2025
2. Digital Temperature Indicator
Model: DIT 1003 A, Serial No. 029407,
Due date: 21 Oct 2022

Uncertainty of Measurement:
The reported uncertainty of measurement is
based on the standard uncertainty multiplied by a
coverage factor k=2, which for a normal
distribution corresponds to a coverage
probability of approximately 95%. The standard
uncertainty has been determined by an internal
validation of measurement data
based on the expression of uncertainty in
measurement.

REVIEW BY: *Spt S*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 20 Dec 2025

Calibrated by:
Mr. Spt S. Thirachai
Spt S. Thirachai
Mr. Spt S. Thirachai



Approved signatory:

Mr. Spt S. Thirachai
Calibration Department Manager

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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 70 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 38009587.
Dimension: Diameter 3.3 mm, Length 170 mm

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.055	20.1	0.0	0.059
80	25.061	25.1	0.0	0.059
80	30.063	30.1	0.0	0.059
80	35.065	35.0	0.0	0.059
80	40.067	40.0	0.0	0.059

Table 2: This equipment was connected with Glub thermometer probe Model: TP3276.2, S/N: 15015967.
Dimension: Diameter 3.3 mm, Length 205 mm

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.056	20.0	-0.1	0.059
110	25.061	25.0	0.1	0.059
110	30.062	30.1	0.0	0.059
110	35.065	35.0	0.0	0.059
110	40.067	40.0	0.0	0.059

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 15015492.
Dimension: Diameter 16 mm, Length 150 mm

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.055	20.1	0.1	0.059
75	25.061	25.2	0.1	0.059
75	30.063	30.1	0.1	0.059
75	35.065	35.1	0.1	0.059
75	40.067	40.1	0.1	0.059

UUC: Digital Calibrator

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Certificate No. : CDT-217-67

Page 2 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 15006715
ID NUMBER : RYG_F50220
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (thailand) Co., Ltd.
104 Phatthanakan Rd., Phatthanakan Rd.,
Khwang Suan Luang, Khel Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 11 Dec 2024
MEASUREMENT DATE : 20 Dec 2024
ISSUE DATE : 23 Dec 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:
The temperature calibration was done by
in-house calibration method as per ISO 17025
according to requirements. The used standards
are: 1. Temperature probe, 2. Wet bulb standard
temperature probe. The temperature scale was
based on ITS-90.

Traceability:
The measurement results are traceable to the
International System of Units (SI) through
National Institute of Metrology (NIM) (NIST)
Certificate number: 17-0347-24, Certificate
number: FR 0113-24

Reference Used During Calibration:
1. Standard Temperature Probe
Model: NIS 100-6500, Serial No. 65165/07,
Due date: 26 Mar 2025
2. Digital Temperature Indicator
Model: DIT 1003 A, Serial No. 029407,
Due date: 21 Oct 2022

Uncertainty of Measurement:
The reported uncertainty of measurement is
based on the standard uncertainty multiplied by a
coverage factor k=2, which for a normal
distribution corresponds to a coverage
probability of approximately 95%. The standard
uncertainty has been determined by an internal
validation of measurement data
based on the expression of uncertainty in
measurement.

REVIEW BY: *Spt S*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 20 Dec 2025

Calibrated by:
Mr. Spt S. Thirachai
Spt S. Thirachai
Mr. Spt S. Thirachai



Approved signatory:

Mr. Spt S. Thirachai
Calibration Department Manager

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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 70 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 17022563.
Dimension: Diameter 3.3 mm, Length 170 mm

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.057	20.0	-0.1	0.059
80	25.062	25.0	0.1	0.059
80	30.064	30.0	0.1	0.059
80	35.064	35.0	0.0	0.059
80	40.067	40.0	0.0	0.059

Table 2: This equipment was connected with Glub thermometer probe Model: TP3276.2, S/N: 20019632.
Dimension: Diameter 3.3 mm, Length 205 mm

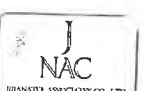
Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.057	20.0	0.1	0.059
110	25.062	25.0	0.1	0.059
110	30.064	30.0	0.1	0.059
110	35.064	35.1	0.1	0.059
110	40.067	40.1	0.1	0.059

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 15015492.
Dimension: Diameter 16 mm, Length 150 mm

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.057	20.2	0.1	0.059
75	25.062	25.2	0.1	0.059
75	30.064	30.1	0.1	0.059
75	35.064	35.1	0.1	0.059
75	40.067	40.1	0.1	0.059

UUC: Digital Calibrator

End of Certificate of Calibration



Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 15003276
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.055	20.3	0.2	0.099
80	25.061	25.2	0.1	0.099
80	30.063	30.1	0.0	0.099
80	35.025	35.0	0.0	0.099
80	40.034	39.9	-0.1	0.099

Table 2: This equipment was connected with Globe thermometer probe Model: TP3207.2, S/N: 15026490
Dimension: Diameter 3.3 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.055	19.9	-0.2	0.099
110	25.062	24.9	-0.2	0.099
110	30.051	29.9	-0.2	0.099
110	35.045	34.9	-0.1	0.099
110	40.034	39.8	-0.2	0.099

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 15031951
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.055	20.1	0.1	0.099
75	25.061	25.2	0.1	0.099
75	30.063	30.1	0.1	0.099
75	35.025	35.0	0.0	0.099
75	40.034	39.9	-0.1	0.099

UUC*: Unit Under Calibration

End of Certificate of Calibration

Certificate No. : CDT-219-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 15020724
ID NUMBER : RYG-F50226
CONDITION AS-RECEIVED : Used Item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 11 Dec 2024
MEASUREMENT DATE : 20 Dec 2024
ISSUE DATE : 23 Dec 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follows:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

REVIEW BY: *S/S*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 20 Dec 2025

Calibrated by:
Mr. Soravit Thachalad
Mr. Miss Nitraporn Lertsomphol
Mr. Miss Rungnirum Phoommit



Approved signatory:

[Signature]
Mr. Pannya Booncharoen
Calibration Department Manager

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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 21001206.
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.067	20.1	0.0	0.099
80	25.052	25.0	-0.1	0.099
80	30.046	30.1	0.1	0.099
80	35.025	35.1	0.1	0.099
80	40.011	40.0	0.0	0.099

Table 2: This equipment was connected with Globe thermometer probe Model: TP3276.2, S/N: 21001250
Dimension: Diameter 3.3 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.067	20.1	0.0	0.099
110	25.052	25.1	0.0	0.14
110	30.046	30.1	0.1	0.099
110	35.025	35.1	0.1	0.099
110	40.010	40.1	0.1	0.099

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 21001796.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.067	20.1	0.0	0.099
75	25.052	25.0	-0.1	0.099
75	30.046	30.0	0.0	0.099
75	35.025	34.9	-0.1	0.099
75	40.010	39.8	-0.2	0.099

UUC*: Unit Under Calibration

Remark: The reported uncertainty of measurement is 0.14, based on standard uncertainty multiplied by a coverage factor k=2.14 providing a level of confidence of approximately 95%.

End of Certificate of Calibration

Certificate No. : CDT-067-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 20032242
ID NUMBER : RYG-F50522
CONDITION AS-RECEIVED : Used Item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 03 Mar 2025
MEASUREMENT DATE : 17 Mar 2025
ISSUE DATE : 20 Mar 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follows:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

REVIEW BY: *S/S*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 18/03/2026

Calibrated by:
Mr. Soravit Thachalad
Mr. Miss Nitraporn Lertsomphol
Mr. Miss Rungnirum Phoommit



Approved signatory:

[Signature]
Mr. Pannya Booncharoen
Calibration Department Manager

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

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

Certificate No.: CDT-220-67

MEASUREMENT ITEM: Heat Stress Monitor
MANUFACTURER: Delta CHIM
MODEL/TYPE: HD32.2
SERIAL NUMBER: 15020734
ID NUMBER: RYG_F50230
CONDITION AS RECEIVED: Used item
CUSTOMER: ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

RECEIVED DATE: 11 Dec 2024
MEASUREMENT DATE: 23 Dec 2024
ISSUE DATE: 23 Dec 2024

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature: 23.0 ± 3.0 °C
Relative Humidity: 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:
The table on next page give the measured values.

REVIEW BY: Spt S
APPROVED BY: Spt S
NEXT CAL DATE: 08/04/2026

Calibrated by:
Mr. Sorawit Thachaid
Miss Jiraporn Lertsomphol
Miss Ruangsungmal Phoommit



Approved signatory

Mr. Parinya Booncharoen
Calibration Department Manager

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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201 2, S/N: 15015112.
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.067	20.0	0.1	0.039
80	25.060	25.0	0.1	0.039
80	30.054	30.0	0.1	0.039
80	35.054	35.0	0.1	0.039
80	40.019	40.0	0.1	0.039

Table 2: This equipment was connected with Globe thermometer probe Model: TP327 2, S/N: 15078-37.
Dimension: Diameter 23 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.062	20.1	0.0	0.039
110	25.051	25.1	0.0	0.039
110	30.054	30.0	0.0	0.116
110	35.073	35.0	0.0	0.102
110	40.019	40.0	0.0	0.023

Table 3: This equipment was connected with temperature probe Model: TP3207 2, S/N: 15031277.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.067	20.1	0.0	0.069
75	25.061	25.0	0.0	0.071
75	30.055	30.0	0.0	0.071
75	35.055	35.0	0.0	0.071
75	40.019	40.0	0.0	0.059

UUC*: Under Calibration

Remark: The reported uncertainty of measurement is 0.10, based on standard uncertainty and coverage factor k=2 (95% level of confidence of approximately 95%).

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

Certificate No.: CDT-082-68

MEASUREMENT ITEM: Heat Stress Monitor
MANUFACTURER: Delta CHIM
MODEL/TYPE: HD32.2
SERIAL NUMBER: 15020736
ID NUMBER: RYG_F50232
CONDITION AS RECEIVED: Used item
CUSTOMER: ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

RECEIVED DATE: 02 Apr 2025
MEASUREMENT DATE: 09 Apr 2025
ISSUE DATE: 10 Apr 2025

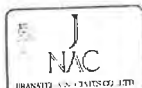
ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature: 23.0 ± 3.0 °C
Relative Humidity: 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:
The table on next page give the measured values.

REVIEW BY: Spt S
APPROVED BY: Spt S
NEXT CAL DATE: 08/04/2026

Calibrated by:
Mr. Sorawit Thachaid
Miss Jiraporn Lertsomphol
Miss Ruangsungmal Phoommit



Approved signatory

Mr. Parinya Booncharoen
Calibration Department Manager

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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201 2, S/N: 15027737.
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.062	20.2	0.1	0.099
80	25.054	25.2	0.1	0.099
80	30.040	30.2	0.2	0.099
80	35.029	35.2	0.2	0.099
80	40.019	40.1	0.1	0.099

Table 2: This equipment was connected with Globe thermometer probe Model: TP3276 2, S/N: 15031164.
Dimension: Diameter 3.3 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.062	20.2	0.1	0.059
110	25.054	25.2	0.1	0.099
110	30.040	30.1	0.1	0.099
110	35.029	35.1	0.1	0.099
110	40.019	40.1	0.1	0.059

Table 3: This equipment was connected with temperature probe Model: TP3207 2, S/N: 15015503.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.062	20.2	0.1	0.099
75	25.054	25.0	-0.1	0.099
75	30.040	29.9	-0.1	0.099
75	35.029	34.8	-0.2	0.099
75	40.019	39.7	-0.3	0.099

UUC*: Under Calibration

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Certificate No : CDT-221-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 15020735
ID NUMBER : RYG_FS0291
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS Laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

RECEIVED DATE : 11 Dec 2024
MEASUREMENT DATE : 23 Dec 2024
ISSUE DATE : 23 Dec 2024

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

NOTED: The certificate is valid only to the item calibrated on date and place of calibration

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The temperature probe was calibrated by the laboratory according to the ISO 17025:2017, QMS according to the requirements of the standard. The temperature probe was calibrated against a standard temperature probe. The temperature scale was based on ITS-90.

Traceability:
The measurement results are traceable to the International System of Units (SI) through the National Institute of Metrology (NIMT) of India. The certificate number is 11/0547/25, dated 11/05/2024.

Reference Used During Calibration:
1. Standard Temperature Probe
Model: STS 100 AS500, Serial No. 15011302,
Due date: 26 Jan 2025
2. Digital Temperature Indicator
Model: DSI 1000 A-M, Serial No. 15011302,
Due date: 21 Oct 2025

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$, which for a normal distribution encompasses a coverage probability of approximately 95%. The level of uncertainty has been determined in accordance with the GUM (Evaluation of measurement uncertainty) Guide to the expression of uncertainty in measurement.

REVIEW BY: [Signature]
APPROVED BY: [Signature]
NEXT CAL DATE: 23/12/25



Approved signatory

[Signature]
Mr. Niratya Banerjee
Calibration Department Manager

Calibrated by:
Niratya Banerjee
10/12/24, 10/12/24
10/12/24, 10/12/24

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 15035050.
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.064	20.1	0.0	0.009
80	20.064	20.1	0.0	0.009
80	20.037	20.1	0.1	0.009
80	15.037	15.0	0.0	0.009
80	10.024	10.0	0.0	0.009

Table 2: This equipment was connected with Globe thermometer probe Model: TP3270.2, S/N: 15033216.
Dimension: Diameter 3.3 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.064	20.1	0.0	0.009
110	20.063	20.1	0.0	0.009
110	20.047	20.1	0.1	0.009
110	15.037	15.1	0.1	0.009
110	10.024	10.1	0.1	0.009

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 15033221.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.064	20.1	0.0	0.009
75	20.063	20.0	0.0	0.009
75	10.019	10.0	0.0	0.009
75	10.019	10.0	0.0	0.009
75	10.019	10.0	0.0	0.009

UUC: Unit Under Calibration

End of Certificate of Calibration



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



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/11 PATTANAKARN ROAD NO. 11, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL: 0-2717-3902-4 FAX: 0-2719-9181



Certificate of Calibration

Certificate No.: 24PH145

Page: 1 of 2

Equipment : Lux Meter
Manufacturer : Tonnors
Model : TM-201L
Serial No. : 180702490
ID No. : RYG_FS0471
Condition As-Received : Used item

Received Date : 12 March 2024
Calibration Date : 14 March 2024

Reference : 2403-0362WSC
Ambient Temperature : (23 ± 2) °C
Relative Humidity : (50 ± 15) %

Procedure used : Calibration were conducted using calibration procedure No. CP-PH01 based on inverse square law technique

Condition of this result of calibration

1. Reference standards instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Photometry & Encoder	LMguide 9.6 m	120RC003	DL-0064-22	20 Jul 2025
2) Luminous intensity standard lamp	OL FEL-U	F-1543	TP-1030-23	08 Jun 2024

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

3. Test Equipment : Programmable Voltage/Current Source (Model: OL83A, S/N: 16221394)

4. Test Equipment : Illuminance Meter (Model: S1002, S/N: 080129)

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

6. This Calibration is traceable to the International System of Unit maintained through -

- National Institute of Metrology Thailand (NIMT)

- National Institute of Metrology (Thailand), NSC-ONSAC Accredited No. Calibration 0144

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

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand

APPROVED BY: [Signature]
NEXT CAL DATE: 15/3/25

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

Result of calibration

Function : Illuminance Measurement

Standard Value	UUC Reading	Error	Uncertainty
(lx)	(lx)	(lx)	(± lx)
0	0.0	0.0	-
20	20.1	0.1	0.26
50	50.0	0.0	0.85
100	100.0	0.0	1.3
150	150.0	0.0	2.0
190	190.0	0.0	2.5

Function : Illuminance Measurement

Standard Value	UUC Reading	Error	Uncertainty
(lx)	(lx)	(lx)	(± lx)
200	199	-1	2.6
500	499	-1	6.5
1000	1000	0	13
1500	1501	1	20
1900	1901	1	25

Function : Illuminance Measurement

Standard Value	UUC Reading	Error	Uncertainty
(lx)	(lx)	(lx)	(± lx)
2000	1990	-10	26
3000	3000	0	39
4000	4000	0	52
5000	5000	0	65

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

UUC = Unit Under Calibration.

-000-

Calibrated by : Nivat N. as
Issue Date : 18 March 2024

Approved Signatory :

[Signature]
[] Phatinee Pradipal
[] Wanlop Larpkem
[x] Nunlavit Khamchai



Certificate of Calibration

Certificate No.: 24PH577
Page: 1 of 2

Equipment : Lux Meter
Manufacturer : PEAK METER
Model : PM6612L
Serial No.: H12A-D16324
ID No.: RYG_FS0536
Condition As-Received: Used Item
Received Date: 11 November 2024
Calibration Date: 20 November 2024
Reference: 2411-0341WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %

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

Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phathanakan 40, Phathanakan Rd.,
Khwaeng Phathanakan, Khet Suan Luang,
Bangkok 10250 Thailand

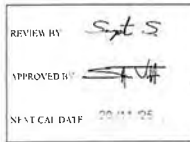
Procedure used: Calibration were conducted using calibration procedure No. CP-PH01 based on inverse square law technique.

Condition of this result of calibration

1. Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Photometry & Encoder	LMguide 9.6 m	120RC003	DL-0064-22	20 Jul 2025
2) STANDARD LAMP	OL FEL-U	F-1783	TP-1008-24	09 Jan 2025

2. This result of calibration was made on requested at the point specified by customer.
3. Test Equipment : Programmable Voltage/Current Source (Model : OL63A, SN : 16221994).
4. Test Equipment : Illuminance Meter (Model : 51002, SN : 080129)
5. The certificate is valid only to the item calibrated on date and place of calibration.
6. This Certification is traceable to the International System of Unit maintained through:-
- National Institute of Metrology Thailand (NIMT)
- National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144



Calibrated by : Nival Nias
Issue Date : 20 November 2024

Approved Signatory :
[] Phalinee Prabpalpal
[] Chatchawan Khunpluek
[x] Nuntawat Khamchai



Cert. No.: 24PH577
Page: 2 of 2

Result of calibration: () Without adjustment (*) After adjustment
Function : Illuminance Measurement Range : Autorange

Standard Value	Before Adjust UUC* Reading	After Adjust UUC* Reading	Error	Uncertainty
(lx)	(lx)	(lx)	(lx)	(± lx)
0	0.00	0.00	0.00	-
15	-	14.7	-0.3	0.20
100	-	99.2	-0.8	1.3
500	-	499	-1	6.5
1000	951	1000	0	19
2000	-	1988	-11	26
3000	-	2980	-20	39
4000	-	3980	-20	52
5000	4730	4980	-20	65

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

Before adjustment light source factor setting mode : L0 = 1.209
After adjustment light source factor setting mode : L0 = 1.271
UUC* = Unit Under Calibration.

-000-



Certificate of Calibration

Cert. No.: 24CH890
Page: 1 of 2

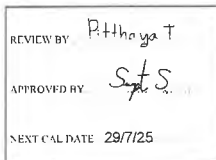
Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go S2
Serial No.: C219171496
ID No.: RYG_FS0550
Condition As-Received: Used Item
Received Date: 26 July 2024
Calibration Date: 30 July 2024
Reference: 2407-0932DSC-2
Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In-house method :
- CP-CH5 by direct measurement with DC voltage
standard and direct measurement with
certified reference material (CRM)

Calibrated by : Warakorn Lemgagrakul
Approved by :
Approved Signatory

() Unnopphol Harachai
() Ponpan Paipim
(x) Saihip Meangmai

Issue Date : 30 July 2024



The Uncertainties are for a confidence probability of approximately 95%

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



Cert. No.: 24CH890
Page: 2 of 2

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	23E2802	27 Aug 2024

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	970651	25 Apr 2026
pH 6.986	CPA chem	970852	25 Apr 2025
pH 9.997	CPA chem	970853	25 Apr 2025

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
	pH Meter S/N: C219171496	4.00	177.48	178	4.00	0.58
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.00	0.58	2.00

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode S/N: 3293237	4.008	4.01	177	0.0071	2.00
	6.986	6.99	2	0.011	2.00
	9.997	10.00	-173	0.0092	2.00

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

-000-



Certificate of Calibration

Cert. No : 24LM121
Page.: 1 of 2

Equipment : pH Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seve2Go S2
Serial No. : C129171496
ID No. : RYG_FS0550
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu,
A.Pluskaeng, Rayong 21140, Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 26 July 2024
Calibrated Date : 30 July 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lemgagrakul

Approved by :

Kunchit

Approved Signatory

() Ponpan Palpim
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 01 August 2024

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : pH Meter with Sensor
Condition As-Received : Used Item
Reference : 2407-0932DSC-4

Cert. No.: 24LM121
Page.: 2 of 2

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	3240076	241317	TPA	21 Mar 2025

2) This certificate is valid only to the item calibrated on date and place of calibration.
3) This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 3184175

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
25.0	100	25.004	25.3	0.296	0.16	2.00
30.0	100	30.001	30.4	0.399	0.16	2.00
40.0	100	40.004	40.4	0.396	0.16	2.00
50.0	100	50.004	50.4	0.396	0.16	2.00

UUC* : Unit Under Calibration

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

-o0o-



Certificate of Calibration

Certificate No : 23E3924
Page : 1 of 2

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenExcellence
Serial No. : B534291445
ID No. : RYG_EN0152
Condition As-Received : Used Item
Received Date : 05 December 2023
Calibration Date : 14 December 2023
Reference : 2312-0161DSC
Ambient Temperature : (23 ± 2) °C
Relative Humidity : (50 ± 10) %
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluskaeng
Rayong 21140, Thailand

Procedure used : Calibration were conducted using calibration procedure No CP-E17 according to EURAMET cg-5

Condition of this result of calibration

* Reference standards instruments

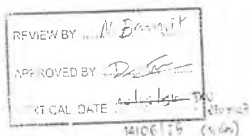
Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5502A	2435802	EE-0041-23	26 Apr 2024

2) The result of calibration was made on request at the point specified by customer

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

4) This Certification is traceable to the International System of Unit maintained through:-

-National Institute of Metrology Thailand (NIMT)



Calibrated by : Nantawat Prasomsorn
Issue Date : 16 December 2023

Approved Signatory :
[] Phalinee Prabpaipal
[] Nantawat Prasomsorn
[] Pongsagorn Boonyasorn



Cert. No : 23E3924
Page.: 2 of 2

Result of calibration :- (*) Without adjustment () After adjustment

Function: DC voltage measurement	Range: 2000 mV	Standard Value (mV)	UUC* Reading (mV)	Error (mV)	Uncertainty (± μV)
		-200.0000	-199.9	0.1	68
		-150.0000	-150.0	0.0	65
		-100.0000	-100.0	0.0	63
		-50.0000	-50.0	0.0	61
		0.0000	0.0	0.0	58
		50.0000	50.0	0.0	61
		100.0000	100.0	0.0	63
		150.0000	150.0	0.0	65
		200.0000	199.9	-0.1	68

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

UUC* = Unit Under Calibration.

-o0o-



Cert No : 23CH1574
Page : 1 of 3

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenExcellence
Serial No. : 6834291445
ID No. : RYG_EN0152
Condition As-Received : Used Item
Received Date : 08 December 2023
Calibration Date : 15 December 2023
Reference : 2312-0151DSG-3
Submitted by : ALS Laboratory Group (Thailand) Co. Ltd. Rayong Branch
616/10 Moo 5, T. Maenam Khu, A. Pluakdaeng,
Rayong 21140, Thailand

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In-house method :
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
- CP-CH6 by comparison with standard thermometer

Calibrated by : Warakorn Lerngagrakul

Approved by :
Approved Signatory

() Sathip Meangmai
() Warakorn Lerngagrakul
(✓) Ponpan Palpim

Issue Date : 19 December 2023

The Uncertainties are for a confidence probability of approximately 95%

Measured in accordance with ISO 17025:2017 and ISO 9001:2015
Laboratory Accredited by TTA and TTA-UKAS

A 0061666

Cert No : 23CH1574
Page : 2 of 3

Condition of this calibration result

1 Reference Standard Instrument : -

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	23E2802	27 Aug 2024
2) Ref. Standard Thermometer	4982054	110RC044	23I908	26 July 2024

This certification is traceable to the International System of Unit maintained through -
- Technology Promotion Association (Thailand-Japan)

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	913598	14 July 2025
pH 6.886	CPA chem	931959	01 Oct 2024
pH 9.997	CPA chem	940106	02 Nov 2024

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

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
			pH	mV		
pH Meter S/N : B634291445	4.000	177.48	177.3	4.000	0.058	2.00
	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00



Cert No : 23CH1574
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 S/N : 3225368	4.008	4.013	184.1	0.0045	2.00
	6.986	6.990	8.7	0.0084	2.00
	9.997	10.002	-164.7	0.0083	2.11

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe:

- Model : InLab®Expert Pro-ISM
- Serial No : 3225368

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	25.003	24.3	-0.703	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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Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel : +66 2543 8381-6, e-mail : service.thailand@sartorius.com



NSC-TIS-TIS 17025
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

REVIEW BY :
APPROVED BY :
NEXT CAL DATE : 02/02/2025

Model Number : MSE224S-100-DU
Description : Analytical Balance
Serial Number : 0028207039
ID No : RYG_EN0002
Manufacturer : Sartorius
Certificate No : 24E-0059
Issued Date : Friday, February 23, 2024
Reference No. : 229196
Page No : 1 of 2

Customer Name : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu, A. Pluak Daeng, Rayong 21140, Thailand.

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng, Rayong 21140, Thailand.

Calibrated By : Mr. Chonchai Inthana
Calibration Date : Thursday, February 22, 2024
Calibration Procedure No : This calibration was conducted by
Using In-house calibration procedure number (WI-003)
Based on UKAS LAB 14 : 2019

Metrological data :

Capacity : 220 g Readability : 0.0001 g
Reasons for calibration
☐ New Installation ☐ Service / Repair ☒ Re-calibration / Maintenance
Equipment Condition : ☒ Good Operate ☐ Fail

Measurement Method UKAS Publication Ref : Lab 14

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2 YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Balometer/Temo Lulion MHB-382SD	DKSH	C1923184S	23-Aug-2024

This certificate relate and apply this equipment only.
This certificate may not be reproduced other than in full except with the prior written approval of the Verification Operation Division
Sartorius (Thailand) Co., Ltd.

Mr. Chonchai Inthana (Technical Manager)



a 1193851



Certificate of Calibration

Accredited by

NSC-TISI-TIS 17025
Calibration 0426

Model Number : MSE224S-100-DU
Description : Analytical Balance
Serial Number : 0026207038
ID No : RYG_EN0002
Manufacturer : Sartorius
Certificate No : 24BCI0059
Issued Date : Friday, February 23, 2024
Reference No : 229196
Page No : 2 of 2

Calibration Results : Without Adjustment

Repeatability			Eccentricity (Off-center loading error)		
The repeatability is the ability of a weighing instrument to display nearly identical readings under constant test conditions when the same load within a measurement range is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.			The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R111).		
Nominal Value : (Low Load)	20.0000	199.9999	Nominal value :	100	g
20 g	20.0000	200.0000	Tolerance	0.0004	g
Tolerance	0.0001	0.0001	Difference		
0.0001 g	20.0000	199.9999	1	-	-
	20.0001	200.0000	2	-0.0001	-
Nominal Value : (High Load)	19.9999	200.0000	3	-0.0001	-
200 g	20.0000	200.0000	4	0.0000	-
Tolerance	0.0001	0.0001	5	-0.0001	-
0.0001 g	19.9999	200.0000	6	-	-
	19.9999	200.0000			
Standard Deviation	0.00007	0.00006			

Linearity				
The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.				
Tolerance	0.0002	g		
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00018
0.05	0.0500	0.0500	0.0000	0.00018
0.1	0.1000	0.1000	0.0000	0.00018
0.5	0.5000	0.5000	0.0000	0.00018
1	1.0000	1.0000	0.0000	0.00018
5	5.0000	5.0000	0.0000	0.00018
10	10.0000	10.0000	0.0000	0.00018
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	49.9999	-0.0001	0.00019
100	100.0000	100.0000	0.0000	0.00023
200	200.0000	199.9999	-0.0001	0.00032
End of Report				

SOP FM 33 03 February 2022

Calibration certificate

Calibration Certificate No. 25BKL0004

Object	Electronic non-automatic weighing instrument	This calibration certificate documents the traceability to national standards
Manufacturer	Sartorius	Uncertainties of measurements are taken into account when only statements of compliance are made
Type	MSE224S-100-DU	This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP-WI-05
Serial QM Ident. no	26207038 RYG_EN0002	This certificate relate and apply this equipment only
Customer	ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)	
	616/10 Moo 5 T Maenam Khu. A Pluak Daeng, Rayong 21140, Thailand	
Order no	2230	
Number of pages	4	
Date of calibration	20 Feb 2025	

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.
The user is obliged to have the object recalibrated at appropriate intervals.

Date	06 Mar 2025	Approval of the Calibration Certificate	Person in charge
		Mr Chonchai Inthana	Kachen Lalee

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129 Rama 9 Road, Huaykwang
10310 Bangkok

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Page 1 | 4

Calibration certificate No. : 25BKL0004

Calibration Certificate

Calibration object

Single range instrument

Model	MSE224S-100-DU
Serial Number	26207038
QM Ident. no Inventory no.	RYG_EN0002 -
Maximum capacity (Max. load)	220 0000 g
Measured range	220 0000 g
Scale interval	0.0001 g

Place of calibration

Address	According to page 1
Department Cost center	Laboratory Department -
Building Floor	- 1st Floor.
Room	Balance Room
Maximum temperature variation at place of calibration	5 K

Calibration procedure

EURAMET cg-18, V4.0 - Guidelines on the Calibration of Non-Automatic Weighing Instruments

Test equipment

Test equipment type	Test equipment ID	Valid until
Thermometer	MHB-382SD s/nB011342 Traceable to SI unit through DKSH	21 Aug 2025
Test weight set OIML R111 E2	Certificate No M23081975_E2(Traceable to SI unit through TCS)	23 Aug 2025

Adjustment Status

The measuring device was internally adjusted before the calibration

Environmental and measuring conditions

Date of calibration	20 Feb 2025
Temperature at place of calibration Temp. diff.	24.4 °C 0.6 K
Twilight - Tplace	
Measuring conditions	The installation site is suitable. The device was levelled. Balance was loaded up to Max before test.
Comments	Humidity 50.2 %RH.

Measurement results | Measurement uncertainties

Repeatability		Eccentricity	
Test load (nominal): 10 g 200 g		Test load (nominal): 100 g	
10 g	200 g	Center	100.0000 g
1 10.0000 g	200.0000 g	Front left	99.9998 g
2 10.0000 g	200.0001 g	Back left	100.0000 g
3 10.0001 g	200.0001 g	Back right	100.0000 g
4 10.0000 g	200.0000 g	Front right	100.0000 g
5 10.0001 g	200.0000 g	Maximum deviation from center loading indication	
6 10.0001 g	200.0001 g	Δload max = 0.0002 g	
7 10.0000 g	200.0000 g		
8 10.0000 g	200.0001 g		
9 10.0001 g	200.0000 g		
10 10.0000 g	200.0000 g		
s = 0.00005 g	s = 0.00005 g		

Error of indication

Test load L	Indication I	Error E	Expansion factor k	Uncertainty U(E)	Uncertainty relative U(E)/I
0.0100 g	0.0100 g	0.0000 g	2.00	0.00013 g	1.3 %
0.1000 g	0.1000 g	0.0000 g	2.00	0.00013 g	0.13 %
0.5000 g	0.5000 g	0.0000 g	2.00	0.00013 g	0.027 %
1.0000 g	1.0000 g	0.0000 g	2.00	0.00013 g	0.013 %
5.0000 g	5.0000 g	0.0000 g	2.00	0.00014 g	0.0027 %
10.0000 g	10.0000 g	0.0000 g	2.00	0.00014 g	0.0014 %
20.0000 g	20.0000 g	0.0000 g	2.00	0.00014 g	0.00072 %
50.0000 g	50.0000 g	0.0000 g	2.00	0.00016 g	0.00032 %
100.0000 g	100.0001 g	0.0001 g	2.00	0.00021 g	0.00021 %
200.0000 g	200.0000 g	0.0000 g	2.00	0.00034 g	0.00017 %
220.0000 g	220.0000 g	0.0000 g	2.00	0.00039 g	0.00018 %
Maximum error of indication		E max = 0.0001 g			

U(E) is the coefficient of U(E) and test load L. The uncertainty of measurement U(E) is valid only if error E is confirmed. You will find reference notes on the uncertainty of measurement in the user. Assume to the calibration certificate. Interpretation of measurement results.
Reference note: The reported expanded uncertainty of measurement is stated as the standard uncertainty multiplied by the documented Expansion factor, determined in accordance with the European Calibration Guidelines (EURAMET) up to 18. V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

End of calibration certificate

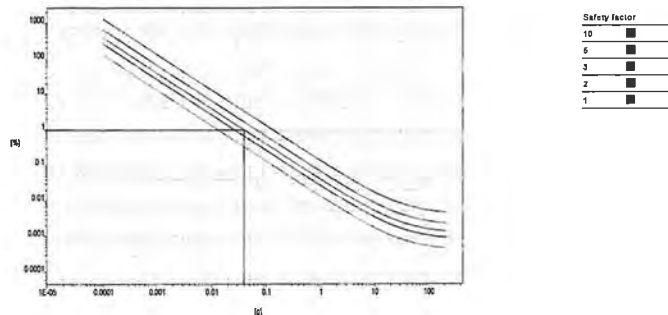
Uncertainty of measurement in use

Device adjusted before measurement	Yes
Temperature deviation considered	1.5 K (isoCAL active)
Temperature coefficient considered	1 · 10 ⁻⁴ /K
Uncertainty of the weighing result $U_{95}(W)$	$U_{95}(W) = 0.00013 \text{ g} + 3.95 \cdot 10^{-4} \cdot R$

Reference note: The current uncertainty of measurement is calculated by entering of the reading R into this formula. In relation to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated as the standard uncertainty multiplied with an Expansion factor of 2, determined in accordance with the European Calibration Guide EN ISO 17025:2018. There is a 95 % probability that the value of the measurand will be in the assigned value range.

Indication in % from max load	Net indication R	Uncertainty $U_{95}(W)$	Uncertainty relative $U_{95}(W)/R$
1 %	2.2000 g	0.00014 g	0.0063 %
25 %	55.0000 g	0.00035 g	0.00063 %
50 %	110.0000 g	0.00056 g	0.00051 %
75 %	165.0000 g	0.00078 g	0.00047 %
100 %	220.0000 g	0.00100 g	0.00045 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

Process accuracy	1.00 %
Safety factor	3
Minimum sample weight	0.0395 g

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10310 Bangkok

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



Certificate of Calibration

Cert. No.: 24TM632
Page : 1 of 3

Equipment :	Hot Air Oven	REVIEW BY: <i>Thanitak</i>
Manufacturer :	Memmert	APPROVED BY: <i>D. Harnsri</i>
Model :	UFE 500	NEXT CAL DATE: 21/09/25
Serial No. :	G511.1572	
ID No. :	RYG_EN0010	
Submitted by :	ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch) 616/10 Moo 5 T. Maenam Khu, A. Phukdaeng, Rayong 21140 Thailand	
Location :	Oven Room	
Received Order :	21 March 2024	
Calibration Date :	21 March 2024	
Ambient Temperature :	(26 ± 10) °C	
Relative Humidity :	(50 ± 30) %	
Calibrated by :	Man Pattanapongpaiboon	
Approved by :	<i>Suwil Imjai</i> Approved Signatory	
	() Pornthippa Tameyakul () Unnopphol Harachai (✓) Suwil Imjai	
Issue Date :	22 March 2024	

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-1
Procedure Used :-

Cert. No.: 24TM632
Page : 2 of 3

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

The temperature scale used was based on ITS-90

Condition of this result of calibration

1. Reference standard instrument-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

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

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

Remark : TPA: Technology Promotion Association (Thailand - Japan)

Result of Calibration :- () Without Adjustment

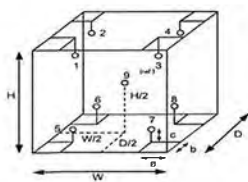
Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	57	59
AC Supply (Volt)	222	224

* Ref. Std. ID No. : @ Calibration Point

Position :	(180) °C	(104) °C
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09



Probe Installation Details :	Dimension of Chamber :
a = 5.0 cm	D = 0.40 m
b = 5.0 cm	W = 0.56 m
c = 5.0 cm	H = 0.48 m
	Capacity = 0.11 m³



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-1
Result of Calibration :- () Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM632
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.051	0.59	0.62	2
180.0	180.0	180.0	0.15	1.3	1.7	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	103.921	103.786	103.757	103.759	103.950	103.817	104.213	103.672	103.673	0.42
180.0	179.614	179.270	179.145	179.599	180.001	180.423	180.293	180.629	179.429	1.1

Average* : The average of 30 values in each position

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

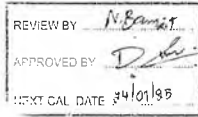
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Cert.No.: 23TW168
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-115V
Serial No : 15E102796
ID No : RYG_EN0032
Received Date : 21 July 2023
Test Date : 24 July 2023
Reference : 2307-0713DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd
Rayong Branch
616/10 Moo 5, T.Maenam Khu, A Pluakdaeng,
Rayong 21140, Thailand
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirihean
Approved by :
Approved Signatory
() Malee Butkruea
(✓) Sailhip Meangmai
() Warakorn Lermagatrakul
Issue Date : 26 July 2023



Condition of this result of calibration

1. Reference Standard Instruments :
This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).
- | Instruments | Serial No. | ID No. | Certificate No. | Due Date |
|-------------|------------|----------|-----------------|-------------|
| 1) Burette | - | 130BU10 | 23CG1172 | 22 Mar 2025 |
| 2) Balance | 1126143764 | 14QRC004 | 22MM50 | 20 Sep 2023 |
2. Standard Material :-
- | Material | Manufacturer | Lot.No. | Assay |
|---------------------------------|--------------|-----------|--------|
| Sodium Thiosulfate pentahydrate | Merck | AM1763316 | 100.2% |
- Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No : 15E100464

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested it is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

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B 0320211

a 1172155



Cert. No.: 23LM125
Page.: 1 of 2

Certificate of Calibration

Equipment : DO Meter with Sensor
Manufacturer : YSI
Model : 5000-115V
Serial No : 15E102796
ID No : RYG_EN0032
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd
Rayong Branch
616/10 Moo 5 T. Maenam Khu, A Pluakdaeng,
Rayong 21140 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 25 July 2023
Calibrated Date : 27 July 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Preecha Hahib
Approved by :
Approved Signatory
() Pornthippa Tameyakul
() Malee Butkruea
(✓) Suwit Imjai
Issue Date : 31 July 2023



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2307-0713DSC-2
Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-
- | Instrument | Serial No. | Cert. No. | Traceable | Due Date |
|------------------------|------------|-----------|-----------|-------------|
| 1) Digital Thermometer | 218B080 | 221285 | TPA | 21 Oct 2023 |
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit
Remark : TPA : Technology Promotion Association (Thailand - Japan)
Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 1228475367

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	100	20.011	19.91	-0.101	0.15	2.00

UUC* : Unit Under Calibration

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

-o0o-

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced or used for any other purpose without the prior written approval of the Technical Committee, Technology Promotion Association (Thailand-Japan)

A 0053616

a 1159515



Certificate of Calibration

Cert. No.: 25LM10
Page.: 1 of 2

Equipment : DO Meter with Sensor

Manufacturer : YSI

Model : 5000-115V

Serial No. : 15E102796

ID No. : RYG_EN0032

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
(Rayong Branch)
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,
Rayong 21140 Thailand

Location : TPA On Site Calibration Laboratory

Received Order : 17 January 2025

Calibrated Date : 20 January 2025

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngagrakul

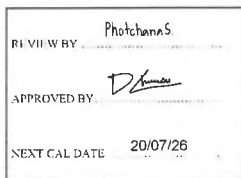
Approved by :

- () Chakni Waewwanjua
(✓) Suwit Imjai
() Kunchit Promprat

Issue Date : 23 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2501-0600DSC-2
Procedure Used :-

Cert. No.: 25LM10
Page.: 2 of 2

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) Into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	2411022	TPA	17 Sep 2025
2) This certificate is valid only to the item calibrated on date and place of calibration.				
3) This certification is traceable to the International System of Unit.				

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement

This instrument was connected with temperature sensor, S/N : 15E100464

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	60	20.002	19.81	-0.192	0.15	2.00

UUC* : Unit Under Calibration

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

-o0o-



Certificate of Testing

Cert.No.: 25TW15
Page.: 1 of 2

Equipment : DO Meter

Manufacturer : YSI

Model : 5000-115V

Serial No. : 15E102796

ID No. : RYG_EN0032

Received Date : 17 January 2025

Test Date : 20 January 2025

Reference : 2501-0600DSC-1

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
(Rayong Branch)
616/10 Moo 5, T.Maenam Khu, A.Pluckdaeng,
Rayong 21140, Thailand

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %

Test Procedure : In - house method : CP-CH9
by Comparison Technique With Azide Modification Method

Tested by : Walalak Srihuan

Approved by :

- () Pornthippa Tameyakul
() Ponpan Paipim
(✓) Sathip Meangmai

Issue Date : 21 January 2025

Sathip
Approved Signatory



Cert.No.: 25TW15
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 15E100464

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.20	0.0084

This report was certified only for the instrument we tested. It is allowable to use for study
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced
other in full, without written approval of the laboratory

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Certificate of Calibration

Cert. No.: 24TM1663
Page : 1 of 3

Equipment : Low Temp. Incubator
Manufacturer : Memmert
Model : IPP750
Serial No. : V818.0084
ID No. : RYG_EN0154

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd, Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand
Location : BOD Room

Received Order : 01 November 2024
Calibration Date : 01 November 2024
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
AC Line Voltage : $(220 \pm 22) \text{ V}$

Calibrated by : Krisda Males
Approved by : Kunchit
Approved Signatory

() Ponpan Palpim
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 07 November 2024

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2411-0002OC-1
Procedure Used :-

Cert. No.: 24TM1663
Page : 2 of 3

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44073381	24LM73	TPA	18 May 2025

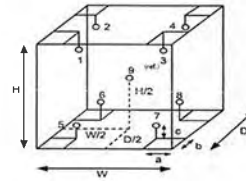
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- () Without Adjustment

Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	24	25
REL.Humid. (%)	55	53
AC Supply (Volt)	220	221



Probe Installation Details :

a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :

D = 0.60 m
W = 1.0 m
H = 1.2 m
Capacity = 0.72 m³

Position :	Ref. Std. ID No. :
1	1RTD-2/1
2	1RTD-2/2
3	22-01RTD-03
4	1RTD-2/4
5	1RTD-2/5
6	1RTD-2/6
7	23-01RTD-07
8	1RTD-2/8
9 (ref.)	23-01RTD-09



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2411-0002OC-1
Result of Calibration :- () Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM1663
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.026	0.26	0.53	2

Calibration Point (°C)	Measured Temperature (°C)								Uncertainty (± °C)
	1	2	3	4	5	6	7	8 9 (ref.)	
20.0	20.071	19.915	20.273	20.179	19.977	19.782	20.056	20.026 20.033	0.30

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location, which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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Certificate of Calibration

Cert.No.: 24CG3711
Page: 1 of 2

Equipment : Burette
Capacity : 50 mL
Serial No. :
ID. No. : RYG_EN0216
Manufacturer : Wilag
Made in : Germany
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng
Rayong 21140, Thailand

Ambient Temperature : $(20 \pm 2.5) ^\circ\text{C}$
Relative Humidity : $(50 \pm 10) \%$
Barometric Pressure : 756 mmHg
Calibration Procedure : ASTM E 542 - 01

Calibrated by : Sa-nguekam Wongsu

Approved by :
Approved Signatory

(✓) Srisuda Khamtha
() Ponpan Palpim
() Unnopphol Harachai

Issue Date : 24 September 2024

The Uncertainties are for a confidence probability of approximately 95%

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



Metrology

SCI ECO Services Company Limited

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Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100
Bangkok Tel : +668 9205 6851, +669 8247 2360
Website : www.scieco.co.th E-Mail : calibrate@scg.com



Certificate No. T250454

Page 1 of 3

Certificate of Calibration

Equipment : Chamber (Oven)
Manufacturer : MEMMERT
Model : UF 110
Serial No. : B423.0853
Customer Code : RYG_EN0213
ID No. : T5884A5
Customer : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)

616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140

Customer Location : ENVIRONMENT LABORATORY

Date of Receipt : 12 March 2025

Calibrated By : Sujjar Naknakred (Site Calibration Manager)

Approved By : Boonchai Suriyavong (Site Calibration Manager)

Date of Issue : 21 MAR 2025

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

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

FM-L14 11/18-08-66



Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



Certificate No. T250454

Page 2 of 3

Calibration Report

Equipment : Chamber (Oven)
Date of Calibration : 19 March 2025
Environment : Temperature : 26.5-26.9 °C
Line Voltage : 223.9-231.3 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine resistance thermometer detectors into its chamber, the other one resistance thermometer detector use for ambient temperature measurement. The calibration was done in according to WI-120 (based on ASTM E145-94 (Reapproved 2019) and AS2853-1986).
All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
RTD	100 ohm	27-(CH1-10)	T240709	19 April 2025
DATA LOGGER	34970A	T149	T240709	19 April 2025

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244)

4. Condition of calibrated item : good

Equipment Description :

Time Constant : 1 Hour 44 Minute At 104 °C
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max
☒ Close
☐ Not Available

5. Adjustment :

() without adjustment (X) after adjustment

Approved By :

FM-L15 11/18-08-66



Metrology

SCI ECO Services Company Limited

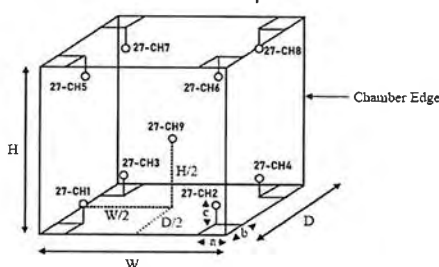
33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



Certificate No. T250454

Page 3 of 3

Calibration Report



Remark : Internal Dimensions of Chamber : W (Width) = 56 cm, H (Height) = 46 cm and D (Depth) = 40 cm.
Size of Installed Standard sensor number 27-CH1 to number 27-CH8 : a = 5 cm, b = 5 cm and c = 5 cm.
Size of Installed Standard sensor number 27-CH9 : W/2 = 56 cm/2, H/2 = 46 cm/2 and D/2 = 40 cm/2

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)								
	27-CH1	27-CH2	27-CH3	27-CH4	27-CH5	27-CH6	27-CH7	27-CH8	27-CH9
104	103.84	104.10	104.10	104.46	103.73	104.14	103.95	103.57	104.22
180	179.41	179.92	180.80	181.37	179.54	179.52	179.82	179.41	180.31

Chamber (Oven)			Temperature Distribution				
Setting °C	Reading (°C)		Average (°C)	Stability (°C)	Uniformity (°C)	Uncertainty (°C)	Coverage Factor k
	Min	Max					
104.0	103.9	104.3	104.01	0.08	0.65	0.42	2.00
180.0	-	180.0	180.01	0.37	1.26	0.49	2.00

* The quoted uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

End of Certificate.

Approved By :

FM-L15 11/18-08-66



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.: 24TM635
Page : 1 of 3

Equipment : Water Bath
Manufacturer : Memmert
Model : WN622
Serial No. : L513.0648
ID No. : RYG_EN0061

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd (Rayong Branch)
616/10 Moo 5, T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140, Thailand
Location : Wet Chemistry Lab

Received Order : 21 March 2024
Calibration Date : 21 March 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Pornthipha Tameyakul
() Unnopphol Harachai
(✓) Suwit Imjai

Approved Signatory

Issue Date : 23 March 2024

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-0563OC-4
Procedure Used :-

Cert. No. : 24TM635
Page : 2 of 3

Calibration was conducted using in-house calibration procedure CP-OT04 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

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

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

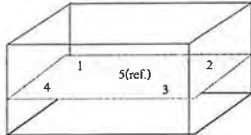
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	
Beginning of Calibration	25	55	222
Finished of Calibration	25	57	223



Front

Position :	Ref. Std. ID No. :
1	4803988-001
2	4803988-002
3	4803988-003
4	4803988-004
5(ref.)	4803988-005



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-0563OC-4
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No. : 24TM635
Page : 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)					Uncertainty (± °C)
			1	2	3	4	5 (ref.)	
85.0	85.0	85.0	84.428	84.424	84.489	84.507	84.477	0.18

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Coverage Factor k
85.0	0.19	0.11	2

Average* : The average of 30 values in each position.

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.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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Metrology

SCI ECO Services Company Limited

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Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851, +669 8247 2360
Website : www.scieco.co.th E-Mail : calibrate@scg.com



Certificate No. T241120

Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cold Room)
Manufacturer : MODULAR
Model : IREVCOHCOO
Serial No. : C00351459
Customer Code : RYG_EN0184
ID No. : T1939A5
Customer : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu,
A.Pluaekdaeng, Rayong 21140

Customer Location : Laboratory

Date of Receipt : 5 June 2024

Calibrated By : Sujjar Naknakred (Site Calibration Manager)

Approved By : Preecha Phisassutthikul (Temperature Calibration Manager)

Date of Issue : 12 JUN 2024

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

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



Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T Banpa, A Kaengkhoh, Saraburi 18110, Thailand



Certificate No. T241120

Page 2 of 4

Calibration Report

Equipment : Chamber (Cold Room)
Date of Calibration : 11 June 2024
Environment : Temperature : 23.1-24.1 °C
Line Voltage : 222.3-226.3 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-720 (based on ASTM E145-94 (Recapproved 2001) and AS2853-1986).
All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN161-TN170	T240713	19 April 2025
TC	TYPE T	TN171-TN180	T240713	19 April 2025
DATA LOGGER	34970A	T129	T240713	19 April 2025

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TIS-TIS 17025 CALIBRATION 0241)

4. Condition of calibrated item : good

Equipment Description :

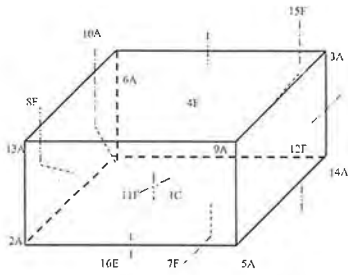
Time Constant : 3 Hour 30 Minute At 3 °C
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

() without adjustment (X) after adjustment

Approved By : Preecha Phisassutthikul

Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C =	TN161	11F =	TN171
2A =	TN162	12F =	TN172
3A =	TN163	13A =	TN173
4F =	TN164	14A =	TN174
5A =	TN165	15F =	TN175
6A =	TN166	16E =	TN176
7F =	TN167		
8F =	TN168		
9A =	TN169		
10A =	TN170		

Approved By:

TM-L15 DA 18-09-2023

FM-L15 DA 18-09-2023

Calibration Report

Measurement Results:

Calibration Point	Average Standard Reading at each position (°C)									
	TN161	TN162	TN163	TN164	TN165	TN166	TN167	TN168	TN169	TN170
3	2.73	2.70	2.77	2.78	2.99	2.35	3.09	3.21	3.08	2.90
	TN171	TN172	TN173	TN174	TN175	TN176				
	3.39	3.01	2.92	2.81	3.42	3.42				

Chamber (Cold Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage Factor k
	Min	Max					
3.0	2.9	3.4	3.7	2.97	1.32	1.13	2.02
							2.00

* The quoted Uncertainty exclude ' uniformity '

The calibration result apply only the above calibrated item

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %

Approved By:

Certificate of Calibration

Equipment: SPECTROPHOTOMETER
Model: DR6000
Serial No. (or ID.): 1627845 (RYG_EN0037)
Manufacturer: HACH
Condition: In Condition

Certificate No.: C06230441
Issued Date: 19 September 2023
Job No.: WO-00005382
Page: 1 of 3

Customer: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature 23.9 °C ± 0.2
Humidity 65.3 %RH ± 1.4

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) (Wet Chemistry)
616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr.Nattapat Rungueang
Calibration Date: 18 September 2023

The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04

Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Stams Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584
The standard for Photometric Certificate No. 911494 and 111588
The standard for Stray light Certificate No. 111586 and 111585
The standard for Spectral resolution Certificate No. 111587

(Mr. Nattapat Rungueang)
Person in charge

(Mr. Nitnun Srihawan)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI) it provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM)

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited

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CAL-FM-C06-15 12 Sep 2022

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
418.81	418.3	0.31	0.13	
536.66	536.6	0.06	0.13	
637.98	638.3	-0.32	0.13	
748.48	748.7	-0.22	0.13	
807.03	807.4	-0.37	0.13	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.289	0.0040	0.0045
	0.5168	0.519	-0.0022	0.0045
	1.0298	1.029	0.0008	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.283	0.0037	0.0045
	0.5073	0.509	-0.0017	0.0045
	1.0083	1.007	0.0013	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4595	0.462	-0.0025	0.0045
	0.9334	0.933	0.0004	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.245	0.0011	0.0045
	0.4652	0.466	-0.0008	0.0045
	0.9468	0.946	0.0008	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2594	0.259	0.0004	0.0045
	0.5040	0.505	-0.0010	0.0045
	1.0032	1.002	0.0012	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2579	0.257	0.0009	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.971	0.0010	0.0045

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CAL-FM-C06-15:12 Sep 2022

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวล้อม

Calibration Results:

Without Adjustment

Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7355	0.737	-0.0015	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2864	0.290	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6374	0.637	0.0004	0.0080
Stray light *				
Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)	
280.62 +/- 0.11 nm	260.6	1.3	1.886	
391.44 +/- 0.11 nm	391.4	1.3	1.886	
Spectral Resolution *				
Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.86	266.69	1.36	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4568	0.2780		
Absorbance (A)	0.413	0.300		

* Calibration Marked * Not TISI Accredited * in this Certificate have been included for completeness.

The End of Certificate

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CAL-FM-C06-15: 12 Sep 2022

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: DR6000

เลขที่ใบงาน: WO-00005382

หมายเลขเครื่อง: 1627845

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
18 Sep 2023			18 Sep 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด - เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แบตตันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.2 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	741.5 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด (Electrode and Connection Cable)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาตั้งอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
		Turbidimeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่นก 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เงื่อนไข/ข้อควรระวัง: *856.1nm=656.1nm

*486.0nm=485.5nm

Mr.Nattapat Rungueang

Service Engineer

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CAL-FM-R3-03: 20 Jul 2022

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
418.61	418.5	0.11	0.13	
536.66	536.7	-0.04	0.13	
637.98	638.3	-0.32	0.13	
748.48	748.8	-0.32	0.13	
807.03	807.5	-0.47	0.13	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.291	0.0020	0.0045
	0.5168	0.518	-0.0012	0.0045
	1.0298	1.031	-0.0012	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.285	0.0017	0.0045
	0.5073	0.508	-0.0007	0.0045
	1.0083	1.009	-0.0007	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4595	0.461	-0.0015	0.0045
	0.9334	0.935	-0.0016	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.246	0.0001	0.0045
	0.4652	0.466	-0.0008	0.0045
	0.9468	0.948	-0.0012	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2594	0.259	0.0004	0.0045
	0.5040	0.505	-0.0010	0.0045
	1.0032	1.004	-0.0008	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2579	0.258	-0.0001	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.973	-0.0010	0.0045

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CAL-FM-C06-16: 11 Mar 2024



Certificate of Calibration

Equipment:	SPECTROPHOTOMETER			Certificate No.:	C06250108
Model:	DR6000			Issued Date:	18 March 2025
Serial No. (or ID.):	1627845 (RYG_EN0037)			Job No.:	WO-00064379
Manufacturer:	HACH			Page:	1 of 3
Condition:	In Condition				
Customer:	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) 616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand.				
Environment Condition:	Temperature	24.4	°C	±	0.3
	Humidity	60.8	%RH	±	3.5 %RH
Calibration Place:	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) (Wet Chemistry Lab) 616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand.				
Calibration By:	Mr.Preecha Phooarsai				
Calibration Date:	18 March 2025				
The Method used:	In house method, CAL-WI-24, base on ASTM E 275-06 and ASTM E 387-04				
Traceability:	This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Sarna Scientific Limited.				
	The standard for Wavelength Certificate No. 111593 and 111584				
	The standard for Photometric Certificate No. 9114984 and 111588				
	The standard for Stray light Certificate No. 111586 and 111585				
	The standard for Spectral resolution Certificate No. 111587				

(Mr. Preecha Phooarsai)

Person in charge

(Miss Kaewkan Suradech)

Authorized signatory

The certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is estimated in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

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CAL-FM-C06-16: 11 Mar 2024

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00064379

Calibration Results:
Without Adjustment

Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7355	0.738	-0.0025	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2864	0.290	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6374	0.637	0.0004	0.0080
Stray light *				
Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%)	Absorbance (A)	
260.62 +/- 0.11 nm	260.6	1.7	1.770	
391.44 +/- 0.11 nm	391.4	1.4	1.854	

Spectral Resolution *

Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.65	266.69	1.38	2.00
UUC: Wavelength (nm)	268.2	266.2		
Std Absorbance (A)	0.4566	0.2780		
UUC: Absorbance (A)	0.413	0.299		

* Calibration Marked * Not TISI Accredited * in this Certificate have been included for completeness.

The End of Certificate

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CAL-FM-C06-15: 11 Mar 2024

ชนิดเครื่องมือ: SPECTROPHOTOMETER		รุ่น: DR6000	หมายเลขเครื่อง: 1627845	
ตรวจสอบ (รับ)		ตรวจสอบ (ส่ง)		หมายเหตุ
18 Mar 2025		18 Mar 2025		
ปกติ	ไม่ปกติ	ปกติ	ไม่ปกติ	
General				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1. ความแม่นยำเครื่อง	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3. สวิตช์ ปิด - เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Spectrophotometer				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6. แบตเตอรี่ไฟฟ้า (Battery Backup) >= 2.5 VDC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
pH Meter and Conductivity Meter				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	12. อิเล็กโทรด (Electrode and Connection Cable)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	15. ขาจับอิเล็กโทรด (Stand)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Turbidimeter				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	16. ค่าความขุ่นที่ทดสอบ (No Sample)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ระดับการส่องสว่างของแสง (>= 2.5 ไมล์ 3.0)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Automatic titrator				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	18. สภา Piston Burettes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	19. Function Rinsing and Dosing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

เพิ่มเติมข้อแนะนำ: * 656.1nm = 656.1nm

* 486.0nm = 485.7nm

Mr.Preecha Phooarsai
Service Engineer

บริษัท ดีเคเอส อีซี จำกัด
DKSH Technology Limited
2523 หมู่ 5 ตำบลบางคูเวียง อำเภอบางคูเวียง จังหวัดนนทบุรี 11060
2523 Sukhumvit Road, Bangkok, Phraklang, Bangkok 11060
Phone: +66 2638 1200 Email: info@dksh.com Website: www.dksh.com/en/india

Delivering Growth - in Asia and Beyond

CAL-FM-R31-03: 20 Jul 2022

Certificate of Calibration

Certificate No. C29240011

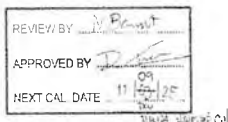
Page 2 of 4

Represent to Certificate of Calibration No. C29240007

Equipment:	Block Digestion Unit	Certificate No.:	C29240011
Model:	KT-20s	Issued Date:	22 March 2024
Serial No. (or ID):	5720210009/5770200073	Job No.:	WO-00320429
Manufacturer:	Gerhardt	Page:	1 of 4
Condition:	In Condition	Digestion Block:	20 holes

Customer: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng, Rayong 21140, Thailand

Environment Condition	Temperature	25 °C ± 0.7 °C
	Humidity:	54 %RH ± 4 % RH
	Voltage	225 VAC ± 1.7 VAC



Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
(Wet Chemistry Lab)
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr. Thanatnorn Phunook
Calibration Date: 11 March 2024
The Method used: In house method base on by comparison with standard
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through N.M. Technical Center Laboratory (NTL)
Certificate No. TC22/0050

(Mr. Thanatnorn Phunook)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is valid for the units of measurement according to the International System of Units (SI). It provides traceability of measurement results to national standards and/or recognized reference material standards laboratories.

The measurement uncertainty is stated in the expanded uncertainty which is derived from the standard uncertainty as defined by the laboratory. It is a statistical estimate of the range of values that will encompass the true value of the measurand with a probability of 95%. It is determined in accordance with the Guide to the Expression of Uncertainty in Measurements (GUM).

These results may be affected by deviations from specified conditions. The results are not valid for use outside the conditions specified in this certificate. The report shall not be reproduced except in full by any person or organization.

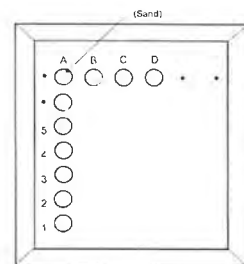
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CAL-FM-C06-15: 11 Mar 2024



Fig. 1. Front view



Location of standard

Fig. 2 Digestion block

Definitions

Indicating Temperature: The average reading of no stirring device which forms an integral part of the Digestion block.

Measured Temperature: The average reading of working standard at any position of location.

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Delivering Growth - in Asia and Beyond

CAL-FM-C06-15: 11 Mar 2024

Calibration Results:
Pre Calibration

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC (°C)	Uncertainty (± °C)
A1	360	360	360	401.5	21.5	1.5
A2				401.2	21.2	1.5
A3				399.1	19.1	1.5
A4				397.8	17.8	1.5
A5				395.1	15.1	1.5
B1				396.6	16.6	1.5
B2				396.1	16.1	1.5
B3				392.9	12.9	1.5
B4				391.6	11.6	1.5
B5				390.7	10.7	1.5
C1				395.3	15.3	1.5
C2				395.6	15.6	1.5
C3				392.8	12.8	1.5
C4				391.7	11.7	1.5
C5				390.3	10.3	1.5
D1				397.6	17.6	1.5
D2				396.8	16.8	1.5
D3				395.0	15.0	1.5
D4				394.2	14.2	1.5
D5				393.6	13.6	1.5

Calibration Results:
Without adjustment

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC (°C)	Uncertainty (± °C)
A1	360	365	365	382.5	17.5	1.5
A2				382.4	17.4	1.5
A3				382.1	17.1	1.5
A4				379.7	14.7	1.5
A5				378.3	13.3	1.5
B1				380.1	15.1	1.5
B2				380.1	15.1	1.5
B3				378.5	13.5	1.5
B4				378.3	13.3	1.5
B5				379.1	14.1	1.5
C1				380.1	15.1	1.5
C2				380.1	15.1	1.5
C3				378.9	13.9	1.5
C4				378.2	13.2	1.5
C5				377.2	12.2	1.5
D1				380.5	15.5	1.5
D2				380.6	15.6	1.5
D3				378.1	13.1	1.5
D4				378.7	13.7	1.5
D5				377.7	12.7	1.5

The End of Certificate

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: WO-00020429

ชนิดเครื่องมือ: Block Digestion Unit รุ่น: KT-20s
หมายเลขเครื่อง: 5720210009/5770200073

ตรวจสอบ (วัน)	รายการตรวจเช็ค	ตรวจสอบ (ส่ง)	หมายเหตุ
11 Mar 2024		11 Mar 2024	
ปกติ	ไม่ปกติ	ปกติ	ไม่ปกติ
	General		
<input checked="" type="checkbox"/>	<input type="checkbox"/> 1 สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/> 2 การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/> 3 การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/> 4 การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/> 5 สภาพ Hole	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/> 6 สภาพฝาปิด	<input type="checkbox"/>	<input checked="" type="checkbox"/> ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/> 7 สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/> 8 สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ชื่อแนบเข้า

Mr. Thanathorn Phunook
Service Engineer



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL 0-2711-3000 FAX 0-2719-9484

Certificate of Testing

Cert.No : 24TW201
Page: 1 of 2

Equipment :	DO Meter
Manufacturer :	Mettler Toledo
Model :	Seven2GO S9
Serial No. :	C231550484
ID No. :	RYG_FS0601
Received Date :	19 September 2024
Test Date :	20 September 2024
Reference :	2409-0756DSC-4
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch 616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) % In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Test Procedure :	
Tested by :	Walalak Sirithean
Approved by :	 Approved Signatory
() Unnophol Harachai () Ponpan Paipim (✓) Saitip Meangmai	
Issue Date :	23 September 2024

REVIEW BY	Pitthaya T.
APPROVED BY	
NEXT CAL DATE	20/09/25



Cert.No.: 24TW201
Page: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 940132

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.16	0.0045

This report was certified only for the instrument we tested. It is allowable to use for study
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other in full, without written approval of the laboratory

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL 0-2717-3000-29 FAX 0-2715-9484



Certificate of Calibration

Cert. No.: 24LM155
Page: 1 of 2

Equipment : DO Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2GO 59
Serial No. : C231550464
ID No. : RYG_FS0601
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch
616/10 Moo 5, T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140, Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 19 September 2024
Calibrated Date : 23 September 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lernagatrakul

Approved by :

() Ponpan Paipim
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 25 September 2024

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2409-0756DSC-6

Cert. No.: 24LM155
Page: 2 of 2

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with
Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	23H1216	TPA	11 Oct 2024

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

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

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- () Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N: 940132

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	80	20.002	20.1	0.098	0.16	2.00

UUC* : Unit Under Calibration

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

-o0o-

Agilent Technologies

Agilent Technologies (Thailand) Limited
110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221/1222/1223/1224/1225/1226/1227/1228/1229/1230/1231/1232/1233/1234/1235/1236/1237/1238/1239/1240/1241/1242/1243/1244/1245/1246/1247/1248/1249/1250/1251/1252/1253/1254/1255/1256/1257/1258/1259/1260/1261/1262/1263/1264/1265/1266/1267/1268/1269/1270/1271/1272/1273/1274/1275/1276/1277/1278/1279/1280/1281/1282/1283/1284/1285/1286/1287/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Service Instrument:

Model Number	Model Description	Serial Number	System Handle	Parent Asset
SYS-IO-5100	ICP-DES 5100/5110 System			
G8010A	Agilent 5100 SVDV ICP-DES Spectrometer	MY18010005	ICP DES 5100	SYS-IO-5100
G8410A	SPS 4 Autosampler	AU15443764	ICP DES 5100	SYS-IO-5100



Service Items:

Item	Service/Part #	Description	Qty	Entitlement	Service Start	Service End
1000	EQI	Enterprise Operational Qualification	1.00	Agreement Entitlement 100 % covered	22.09.2024	23.09.2024
1010	6610030100	Bottle ICP-DES Wavecal soln 600mL 5 ppm	1.00	Agreement Entitlement 100 % covered		
1020	5190-7001	Calibration blank solution 5pct HND3	1.00	Agreement Entitlement 100 % covered		

Additional Information:

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Service Information:

Problem Description: WU-OQ-IO-5100 5001263665		
Service Provided: Complete OQHW 5100 CPOES Equipment ID: BKK_EL0037, all test passed		
Service Overview Code: Reason Code: Scheduled Service Diagnosis Code: Scheduled Service Resolution Code: Scheduled Service		
Reported Hours: 4.0	Travel Hours: 2.0	
Customer Field Service Representative Name: Suwan Onkhom	Customer Field Service Representative Signature: 	Date: 23 Sep 2024
Customer Name: CHANATTAGARN IMCHOM	Customer Signature: 	Date: 23 Sep 2024
Additional Comments:		

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Metrological Center
SCI ECO Services Company Limited
33/2 Moo 3, T.Banpa, A Kaengkhohi, Saraburi 18110
Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109
Website : www.scieco.co.th E-Mail : calibrate@scg.co.th




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Certificate No. T231676

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Certificate of Calibration

Equipment : HEATING BLOCK
Manufacturer : Environmental Express
Model : SC 196
Serial No. : 6974CECW3285
Customer Code : BKK_EL0054
ID No. : TS306A3
Customer : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,
Khet Suan Luang, Bangkok 10250
Customer Location : Acid Digestion Lab
Date of Receipt : 13 September 2023
Calibrated By : Sane Musikawan (Site Calibration Manager)
Approved By :  / Sujjar Naknakred (Site Calibration Manager)
Date of Issue : 26 SEP 2023

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

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

Certificate No. T231676

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Calibration Report

Equipment : HEATING BLOCK
Date of Calibration : 22 September 2023
Environment : Temperature : 21.8-23.1 °C
Line Voltage : 221.6-226.3 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 20 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20.

All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

2. Reference Standard Instrument :

Instrument	Model	Instrument No	Certificate No	Due Date
TC	TYPE T	TN21-TN30	T230014	17 January 2024
TC	TYPE T	TN31-TN40	T230014	17 January 2024
DATA LOGGER	34970A	1151	T230014	17 January 2024

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244)

4. Condition of calibrated item : good

Equipment Description :

Time Constant 2 Hour 20 Minute At 95 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

() without adjustment (X) after adjustment

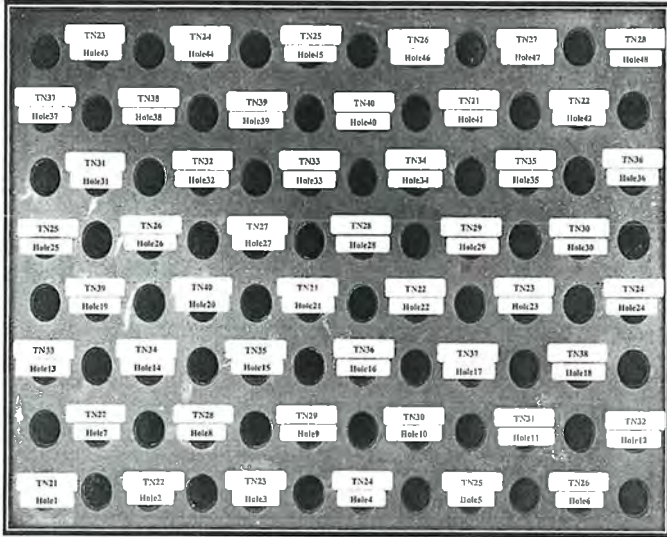
Approved By: 



Certificate No. T231676

Page 3 of 6

Calibration Report



FRONT CONTROL

Approved By. _____

FM-L13 108 30-05-57



Certificate No T231676

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Calibration Report

Measurement Results		Average Standard Reading at each position (°C)					
Calibration Point		TN21	TN22	TN23	TN24	TN25	TN26
R1 Hole1-Hole6	CAL POINT	Max	95.01	94.41	95.20	95.41	95.17
		Min	94.57	93.95	94.75	94.92	94.00
	Average	94.79	94.18	94.98	95.17	94.26	94.95
R2 Hole7-Hole12		TN27	TN28	TN29	TN30	TN31	TN32
	Max	95.36	95.43	95.19	95.16	95.35	94.97
	Min	94.94	94.95	94.72	94.71	94.90	94.57
	Average	95.15	95.19	94.96	94.94	95.13	94.77
R3 Hole13-Hole18		TN33	TN34	TN35	TN36	TN37	TN38
	Max	95.37	95.50	95.22	95.21	95.33	95.31
	Min	94.99	95.09	94.78	94.82	94.88	94.96
	Average	95.18	95.30	95.00	95.02	95.11	95.13
R4 Hole19-Hole24		TN39	TN40	TN21	TN22	TN23	TN24
	Max	95.59	94.42	94.52	94.24	94.63	94.67
	Min	95.21	94.06	94.13	93.88	94.28	94.27
	Average	95.40	94.24	94.33	94.06	94.45	94.47
R5 Hole25-Hole30		TN25	TN26	TN27	TN28	TN29	TN30
	Max	95.19	95.38	92.95	95.30	95.14	95.03
	Min	94.83	95.03	92.56	94.95	94.79	94.70
	Average	95.01	95.20	92.75	95.12	94.96	94.87
R6 Hole31-Hole36		TN31	TN32	TN33	TN34	TN35	TN36
	Max	94.63	94.90	94.77	94.31	94.24	93.87
	Min	94.24	94.55	94.44	93.98	93.92	93.56
	Average	94.43	94.72	94.60	94.14	94.08	93.71
R7 Hole37-Hole42		TN37	TN38	TN39	TN40	TN21	TN22
	Max	94.30	94.44	94.04	93.81	94.89	95.35
	Min	93.95	94.05	93.67	93.48	94.39	94.90
	Average	94.13	94.24	93.86	93.65	94.64	95.12
R8 Hole43-Hole48		TN23	TN24	TN25	TN26	TN27	TN28
	Max	95.99	95.63	95.28	95.29	95.45	94.87
	Min	95.57	95.15	94.82	94.84	94.99	94.48
	Average	95.78	95.39	95.05	95.07	95.22	94.68

Approved By. _____

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Certificate No T231676

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Calibration Report

Measurement Results		Average Standard Reading at each position (°C)					
Calibration Point		TN21	TN22	TN23	TN24	TN25	TN26
R1 Hole1-Hole6	CAL POINT	Max	105.23	104.32	105.43	105.25	104.44
		Min	104.94	103.95	105.15	105.04	104.11
	Average	105.09	104.13	105.29	105.15	104.26	105.12
R2 Hole7-Hole12		TN27	TN28	TN29	TN30	TN31	TN32
	Max	105.30	105.12	105.18	105.22	105.12	105.16
	Min	105.11	104.92	104.96	105.00	104.92	104.97
	Average	105.20	105.02	105.07	105.11	105.02	105.06
R3 Hole13-Hole18		TN33	TN34	TN35	TN36	TN37	TN38
	Max	105.27	105.63	105.02	104.80	104.69	105.19
	Min	105.17	105.37	104.75	104.59	104.50	105.00
	Average	105.27	105.50	104.89	104.69	104.60	105.09
R4 Hole19-Hole24		TN39	TN40	TN21	TN22	TN23	TN24
	Max	105.31	104.43	106.41	104.71	105.63	105.82
	Min	105.08	104.22	106.15	104.41	105.37	105.56
	Average	105.19	104.33	106.28	104.56	105.50	105.69
R5 Hole25-Hole30		TN25	TN26	TN27	TN28	TN29	TN30
	Max	104.95	106.26	105.34	105.78	105.59	105.87
	Min	104.67	105.96	105.08	105.56	105.36	105.68
	Average	104.81	106.11	105.21	105.67	105.48	105.77
R6 Hole31-Hole36		TN31	TN32	TN33	TN34	TN35	TN36
	Max	104.75	104.86	104.80	105.20	104.50	104.39
	Min	104.54	104.63	104.59	105.00	104.32	104.18
	Average	104.65	104.75	104.69	105.10	104.41	104.28
R7 Hole37-Hole42		TN37	TN38	TN39	TN40	TN21	TN22
	Max	104.30	104.90	104.85	104.65	104.88	104.85
	Min	104.09	104.72	104.66	104.49	104.63	104.52
	Average	104.19	104.81	104.75	104.57	104.76	104.68
R8 Hole43-Hole48		TN23	TN24	TN25	TN26	TN27	TN28
	Max	105.71	105.85	105.39	105.61	105.42	105.19
	Min	105.45	105.61	105.14	105.27	105.18	104.94
	Average	105.58	105.73	105.27	105.44	105.30	105.07

Approved By. _____

FM-L13 108 30-05-57



Certificate No. T231676

Page 6 of 6

Calibration Report

Measurement Results:

HEATING BLOCK			Temperature Distribution	
Setting (°C)	Reading (°C)		Stability (± °C)	Uncertainty (± °C)
	Min, Max	Average		
100.0	100.3, 100.5	100.4	0.26	0.81
107.0	107.0, 107.1	107.1	0.19	0.78

* The quoted uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item

The result of test was found accurate as shown on date and place of test only

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution providing a level of confidence of approximately 95 %

Approved By. _____

FM-L13 108 30-05-57



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhohi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhohi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T250355

Page 1 of 6

Certificate of Calibration

Equipment : HEATING BLOCK
Manufacturer : Environmental Express
Model : SC 196
Serial No. : 6974CECW3285
Customer Code : BKK_EL0054
ID No. : T5306A3
Customer : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250
Customer Location : Acid Digestion Lab
Date of Receipt : 26 February 2025
Calibrated By : Atiphong Rongrat (Technician)
Approved By : Boonchai Suriyawong (Site Calibration Manager)
Date of Issue : 7 MAR 2025

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

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

FM-L12 109/30-05-57

Certificate No. T250355

Page 2 of 6

Calibration Report

Equipment : HEATING BLOCK
Date of Calibration : 4 March 2025
Environment : Temperature : 24.4-24.9 °C
Line Voltage : 221.6-226.3 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20.

All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN221-TN230	T240712	19 April 2025
TC	TYPE T	TN231-TN240	T240712	19 April 2025
TC	TYPE T	TN241-TN250	T240401	16 March 2025
TC	TYPE T	TN251-TN260	T240401	16 March 2025
DATA LOGGER	34970A	T193	T240401	16 March 2025

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244)

4. Condition of calibrated item : good

Equipment Description :

Time Constant	2	Hour	40	Minute	At	95	°C
Fresh Air Damper	<input type="checkbox"/> Open	<input type="checkbox"/> Min	<input type="checkbox"/> Medium	<input type="checkbox"/> Max			
	<input type="checkbox"/> Close						
	<input checked="" type="checkbox"/> Not Available						

5. Adjustment :

() without adjustment

(X) after adjustment

Approved By, Boonchai Suriyawong

FM-L13 108/30-05-57



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhohi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhohi, Saraburi 18110

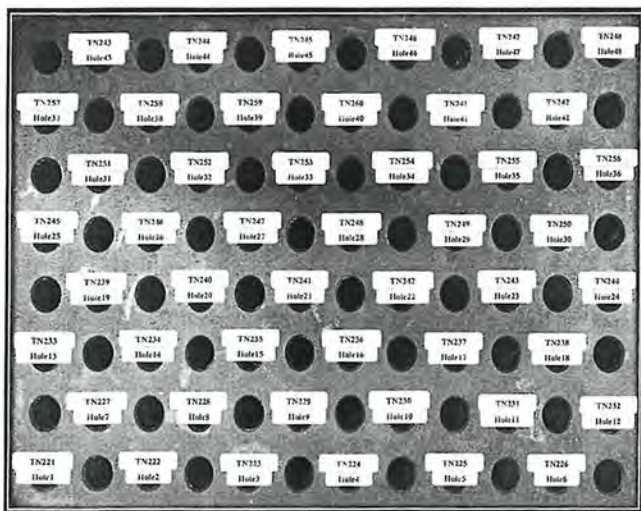
Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T250355

Page 3 of 6

Calibration Report



FRONT CONTROL

Approved By, Boonchai Suriyawong

FM-L13 108/30-05-57

Certificate No. T250355

Page 4 of 6

Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)					
R1 Hole1-Hole6	TN221	TN222	TN223	TN224	TN225	TN226
CAL POINT	Max	94.85	95.37	95.03	95.25	94.75
	Min	94.17	94.66	94.38	94.63	94.87
	Average	94.51	95.02	94.70	94.94	94.43
R2 Hole7-Hole12	TN227	TN228	TN229	TN230	TN231	TN232
	Max	94.71	94.56	94.79	95.32	95.44
	Min	94.05	93.88	94.10	94.65	94.90
	Average	94.38	94.22	94.44	94.99	95.17
R3 Hole13-Hole18	TN233	TN234	TN235	TN236	TN237	TN238
	Max	95.26	95.42	95.40	95.71	95.41
	Min	94.54	94.64	94.71	95.10	94.86
	Average	94.90	95.03	95.06	95.41	95.13
R4 Hole19-Hole24	TN239	TN240	TN241	TN242	TN243	TN244
	Max	95.13	95.06	95.68	96.16	95.35
	Min	94.39	94.43	94.86	95.51	94.88
	Average	94.76	94.75	95.27	95.83	95.12
R5 Hole25-Hole30	TN245	TN246	TN247	TN248	TN249	TN250
	Max	94.95	95.81	95.39	95.82	95.66
	Min	94.47	95.03	94.67	94.99	94.84
	Average	94.71	95.42	95.03	95.41	95.25
R6 Hole31-Hole36	TN251	TN252	TN253	TN254	TN255	TN256
	Max	96.07	95.34	96.28	95.39	94.95
	Min	95.28	94.55	95.51	94.62	94.13
	Average	95.67	94.95	95.90	95.00	94.54
R7 Hole37-Hole42	TN257	TN258	TN259	TN260	TN261	TN262
	Max	95.15	95.63	96.11	95.09	95.34
	Min	94.38	94.38	95.32	94.28	94.54
	Average	94.76	95.25	95.71	94.69	94.94
R8 Hole43-Hole48	TN263	TN264	TN265	TN266	TN267	TN268
	Max	95.84	95.87	95.44	95.72	95.63
	Min	95.06	95.10	94.60	94.95	94.87
	Average	95.45	95.48	95.02	95.34	95.26

Approved By, Boonchai Suriyawong

FM-L13 108/30-05-57



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110

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Certificate No. T250355

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Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)					
R1 Hole1-Hole6	TN221	TN222	TN223	TN224	TN225	TN226
CAL POINT	Max	104.48	104.40	104.60	105.27	105.24
	Min	104.15	104.02	104.25	104.94	104.91
	Average	104.32	104.21	104.42	105.10	105.08
R2 Hole7-Hole12	TN227	TN228	TN229	TN230	TN231	TN232
	Max	105.20	105.45	105.58	105.96	105.81
	Min	104.92	105.14	105.29	105.64	105.53
	Average	105.06	105.29	105.43	105.80	105.67
R3 Hole13-Hole18	TN233	TN234	TN235	TN236	TN237	TN238
	Max	106.09	106.14	105.83	106.25	105.97
	Min	105.80	105.89	105.57	106.00	105.69
	Average	105.94	106.01	105.70	106.13	105.83
R4 Hole19-Hole24	TN239	TN240	TN241	TN242	TN243	TN244
	Max	105.87	105.75	105.30	105.07	105.22
	Min	105.62	105.52	105.13	104.90	105.03
	Average	105.74	105.63	105.21	104.98	105.14
R5 Hole25-Hole30	TN245	TN246	TN247	TN248	TN249	TN250
	Max	105.02	105.54	105.52	105.75	105.97
	Min	105.45	105.35	105.31	105.57	105.81
	Average	105.53	105.44	105.41	105.66	105.89
R6 Hole31-Hole36	TN251	TN252	TN253	TN254	TN255	TN256
	Max	106.19	106.34	106.47	105.96	105.76
	Min	106.02	106.16	105.31	105.77	105.58
	Average	106.10	106.25	106.39	105.87	105.67
R7 Hole37-Hole42	TN257	TN258	TN259	TN260	TN241	TN242
	Max	106.21	105.59	105.45	105.36	106.08
	Min	106.04	105.42	105.28	105.20	105.90
	Average	106.12	105.51	105.37	105.28	105.99
R8 Hole43-Hole48	TN243	TN244	TN245	TN246	TN247	TN248
	Max	106.54	106.33	105.78	105.38	105.42
	Min	106.38	106.16	105.60	105.20	105.25
	Average	106.46	106.25	105.69	105.29	105.33

Approved By:

FM-L13 108/30-05-57

FM-L13 108/30-05-57



Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851, +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.com



Certificate No. T232160

Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cooling Room)

Manufacturer : KOLDTECH

Model : KM 320

Serial No. : TBN-1012061/05

Customer Code : BKK_EN0167

ID No. : T2463A3

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

Customer Location : Laboratory

Date of Receipt : 29 November 2023

Calibrated By : Atiphong Rongrat (Technician)

Approved By : / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 09 JAN 2024

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

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

FM-L14 119/18-08-66



Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



Certificate No. T232160

Page 2 of 4

Calibration Report

Equipment : Chamber (Cooling Room)

Date of Calibration : 6 December 2023

Environment : Temperature : 23.4-24.9 °C
Line Voltage : 221.4-230.2 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

- This equipment was calibrated by insert 16 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986). All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.
- Reference Standard Instrument :

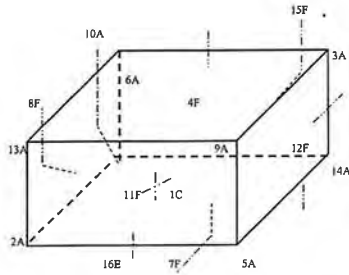
Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN161-TN170	T230773	10 April 2024
TC	TYPE T	TN171-TN180	T230773	10 April 2024
DATA LOGGER	34970A	T149	T230773	10 April 2024
- This certificate is traceable to : National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244)
- Condition of calibrated item : good
Equipment Description :

Time Constant	1 Hour	30 Minute	At 3 °C
Fresh Air Damper	<input type="checkbox"/> Open <input type="checkbox"/> Min <input type="checkbox"/> Medium <input type="checkbox"/> Max		
	<input type="checkbox"/> Close		
	<input checked="" type="checkbox"/> Not Available		
- Adjustment : (X) without adjustment () after adjustment

Approved By:

FM-L15 118/18-08-66

Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN161	12F = TN172
2A = TN162	13A = TN173
3A = TN163	14A = TN174
4F = TN164	15F = TN175
5A = TN165	16E = TN176
6A = TN166	
7F = TN167	
8F = TN168	
9A = TN169	
10A = TN170	
11F = TN171	

Approved By:

FM-L15118/18-08-66

Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)											
	TN161	TN162	TN163	TN164	TN165	TN166	TN167	TN168	TN169	TN170	TN171	TN172
3.0	2.83	3.34	2.95	3.46	3.45	3.76	3.25	3.46	3.39	3.50	3.58	3.42
	TN173	TN174	TN175	TN176								
	3.33	3.39	3.15	3.43								

Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage
	Min , Max	Average					Factor k
3.0	2.8 , 4.1	3.5	3.36	1.10	2.00	1.90	2.09

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

Approved By:

FM-L15118/18-08-66

Certificate of Calibration

Equipment : Chamber (Cooling Room)
Manufacturer : KOLDTECH
Model : KM 320
Serial No. : TBN-1012061/05
Customer Code : BKK_EN0167
ID No. : T2463A3
Customer : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,
Khet Suan Luang, Bangkok 10250
Customer Location : Laboratory Room
Date of Receipt : 28 May 2025
Calibrated By : Atiphong Rongrat (Technician)
Approved By : / Boonchai Suriyawong (Site Calibration Manager)
Date of Issue : 19 JUN 2025

REVIEW BY
APPROVED BY
NEXT CAL DATE 04/12/26

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

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

FM-T1 06 102/27-03-68

Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 4 June 2025
Environment : Temperature : 23.4-24.9 °C
Line Voltage : 221.4-230.2 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

- This equipment was calibrated by insert 16 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986). All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.
- Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No	Due Date
TC	TYPE T	TN91-TN100	T242036	3 December 2025
TC	TYPE T	TN101-TN110	T242036	3 December 2025
DATA LOGGER	34970A	T121	T242036	3 December 2025
- This certificate is traceable to : National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244).
- Condition of calibrated item : good
Equipment Description :
Time Constant 2 Hour 20 Minute At 3 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available
- Adjustment : (X) without adjustment () after adjustment

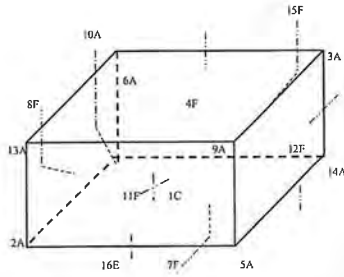
Approved By:

FM-T1 L07 102/27-03-68

Certificate No. T250873

Page 3 of 4

Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN91	12F = TN102
2A = TN92	13A = TN103
3A = TN93	14A = TN104
4F = TN94	15F = TN105
5A = TN95	16E = TN106
6A = TN96	
7F = TN97	
8F = TN98	
9A = TN99	
10A = TN100	
11F = TN101	

Approved By:

FM-T1 07 102/27-03-68

Certificate No. T250873

Page 4 of 4

Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)											
	TN91	TN92	TN93	TN94	TN95	TN96	TN97	TN98	TN99	TN100	TN101	TN102
3.0	2.95	2.92	3.09	2.92	3.16	3.50	3.40	3.03	3.14	2.98	3.44	3.13
	TN103	TN104	TN105	TN106								
	3.19	3.06	3.46	2.92								

Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stnblity (± °C)	Uniformity (°C)	Uncertainty (±°C)	Coverage Factor k
	Min	Max					
3.0	2.8	3.9	3.4	1.20	1.30	1.90	2.04

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

Approved By:

FM-T1 07 102/27-03-68



Certificate of Calibration

ICS-2100: Anion (ID#659)

This certificate is to verify that instrument below are calibrated

by Archemica Lab Co., Ltd.

ICS-2100 S/N: 15010977

AS-HV S/N: 5450A36659

For

ALS Laboratory Group (Thailand) Co., Ltd.



Operator Signature: Date: Jan 12, 2024

(Mr. Nudanaei Laekhwan)

Application Chemist

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Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-QQ + GCMS-QQ

System ID: GM-10
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Pathanakarn 40, Pathanakarn Rd., Kwang Suan Luang, Khoi Suan Luang, Bangkok 10250

Date: November 21, 2024 2:12:44 PM
EOP Name: AgilentRecommended, AgilentRecommended

EOP Revision: GC 02 55, GCMS 02 56
Overall Qualification Status: Pass

REVIEW BY:
APPROVED BY:
NEXT CAL DATE: 21-May-21

CDS Logon Verification - GC

Logon: asbkk smv03

Overall CDS Logon Verification Test Status
Pass

System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status
Pass

Inlet Pressure Accuracy

Name: 7890
Front MMI

Setpoint Status: Pass
Setpoint: Actual
Inlet Pressure: 25.0 psi 25.2 psi
Accuracy: 0.2 psi
Agilent Recommended: 1.2

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

Page 1 / 15

Overall Inlet Pressure Accuracy Test Status
Pass

GC Oven Temperature Accuracy

Name:	7890			
Setpoint Status:	Pass			
Zone:	Oven			
Setpoint/Actual:	230.0 228.2 °C			
Temperature:	230.0 228.2 °C			
Accuracy:	-1.8 °C			
Agilent Recommended:	>= -1.0 % setpoint in K (-5.0 °C) <= 1.0 % setpoint in K (5.0 °C)			
Setpoint Status:	Pass			
Zone:	Oven			
Setpoint/Actual:	100.0 100.7 °C			
Temperature:	100.0 100.7 °C			
Accuracy:	0.7 °C			
Agilent Recommended:	>= -1.0 % setpoint in K (-3.7 °C) <= 1.0 % setpoint in K (3.7 °C)			

Overall GC Oven Temperature Accuracy Test Status
Pass

NOTE: This test's 2 comment(s) and 0 deviation(s) are available in the Attachments section.

GC Oven Temperature Stability

Name:	7890	
Setpoint Status:	Pass	
Setpoint/Average:	100.0 100.7333 °C	
Temperature:	100.0 100.7333 °C	
Stability:	0.1 °C	
Agilent Recommended:	<= 0.5 °C	

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

Page 2 / 15

Overall GC Oven Temperature Stability Test Status
Pass

NOTE: This test's 1 comment(s) and 0 deviation(s) are available in the Attachments section.

Tune EI

Tested Combination1	Front	MMI	/ External	TQ
Name:	7000D			
Setpoint Status:	Pass			
Filament:	1			
Setpoint Status:	Pass			
Filament:	2			

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination1	Front	MMI	/ External	TQ
Name:	Injection Tower			
Source:	EI - Extractor			
Setpoint Status:	Completed			
Injection Volume on Column:	1.0 uL			

Overall Scouting Run Status

Completed

Instrument Detection Limit

Tested Combination1	Front	MMI	/ External	TQ
Name:	Injection Tower			
Source:	EI - Extractor			

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

Page 3 / 15

Setpoint Status: Pass

Injection Volume on Column:	1.0 uL	Area	4.58 %	Retention Time	0.01 %
Minimum RSD:	4.58 %	Area	12.00	Retention Time	1.00 %
Agilent Recommended:	<= 12.00	Area	12.00	Retention Time	1.00 %
Status:	Pass	Area	12.00	Retention Time	1.00 %
Instrument Detection Limit:	1.54238 fg	Area	12.00	Retention Time	1.00 %
Agilent Recommended:	<= 4.03800	Area	12.00	Retention Time	1.00 %
Status:	Pass	Area	12.00	Retention Time	1.00 %

Overall Instrument Detection Limit Test Status

Pass

Mass Ratio Precision

Tested Combination1	Front	MMI	/ External	TQ	
Name:	Injection Tower				
Source:	EI - Extractor				
Setpoint Status:	Pass				
Injection Volume on Column:	0.5 uL	Area Mass 1	2.23 %	Mass Ratio	0.10 %
RSD:	2.23 %	Area Mass 1	2.23 %	Mass Ratio	0.10 %
Agilent Recommended:	<= 5.00	Area Mass 1	2.23 %	Mass Ratio	0.10 %
Status:	Pass	Area Mass 1	2.23 %	Mass Ratio	0.10 %

Overall Mass Ratio Precision Test Status

Pass

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	GM-10
Manufacturer	Agilent Technologies
Name	7890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging
Tested Combination1	Injection Tower
Injection Technique	Front
Detector	External
LTM Included?	No
Sampler 1	Agilent Technologies
Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7893A
Model Number	G4513A
Serial Number	CN18180003
Firmware Revision	A.11.02
Usage	Sample Injection
Location	Front
Syringe Volume (uL)	10

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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Sampler 2	
Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN18170137
Firmware Revision	A 11 03
Vial Header	Not Installed
Mainframe 1	
Manufacturer	Agilent Technologies
Name	7890
Model Number	G3442B
Serial Number	CN18153080
Firmware Revision	B 02.05
Oven Type	Standard
Inlet 1	
Manufacturer	Agilent Technologies
Name	7890
Type	MMI
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes
Inlet 2	
Manufacturer	Agilent Technologies
Name	7800
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

Detector 1	
Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External
Mass Spectrometer 1	
Manufacturer	Agilent Technologies
Type	TQ
Name	7000D
Model Number	G7000D
Serial Number	US1826U108
Firmware Revision	G 7000 085A
High Vacuum System	Turbo Pump
Liquid Injection Scouting Run Standard	OPN Std
MS EI Source 1	
Manufacturer	Agilent Technologies
Source Type	EI - Extractor
Number of filaments	2

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

Electronic Signature

Purpose
This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and login to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details
Full Name of Signor: Supasak Nimsongtham
Logged On User Name: supasak.nimsongtham@agilent.com
Signature Creation Date: November 21, 2024
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\CleanStore\AceSelfQualification.

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

User Name: supasak.nimsongtham		System ID: GM-10		
Report Generated by Hostname: SCG115HRC		Print Date: November 21, 2024 2 12 48 PM		
GM-10 2024 Transaction Log:				
Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 11:58:17 AM	Auth	SessionCreated	Session	Host Name: SCG115HRC, Drive Serial Number: C2031778
November 21, 2024 11:58:17 AM	Start	Configuration	Session	None
November 21, 2024 11:58:17 AM	Auth	Enrollment	Licensing	User is Field Engineer and does not require an unlock code
November 21, 2024 12:01:39 PM	Auth	Exp loaded	Session	EOP details for primary technique (GC) - File path: [ProtocolPack\GC\Config\kms02.05GC 02.05 exp], EOP File Name: [GC02.05 exp], EOP Name: [AgilentRecommended] Protocol Revision: [GC 02.05 exp], EOP details for hydrocarbon technique (GCMS) - File path: [ProtocolPack\GCMS\Config\kms02.05GCMS 02.05 exp], EOP File Name: [GCMS02.05 exp], EOP Name: [AgilentRecommended]
November 21, 2024 12:02:04 PM	End	Configuration	Session	None
November 21, 2024 12:02:12 PM	Start	Qualification	Session	GC
November 21, 2024 12:02:12 PM	Start	Execution	CDS Logon Verification - GC: 7890 - Qualitative test	None
November 21, 2024 12:03:09 PM	End	Execution	CDS Logon Verification - GC: 7890 - Qualitative test	Run Count: 1

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

User Name: supasak.nims@agilent.com
Report Generated by Hostname: SCG115HMC

System ID: GM-10
Print Date: November 21, 2024 2:24:46 PM

GM-10 2024 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 12:03:11 PM	start	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No septums associated	None
November 21, 2024 12:03:20 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No septums associated	Run Count: 1
November 21, 2024 12:03:23 PM	start	Execution	Inlet Pressure Accuracy - Front MMI - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
November 21, 2024 12:03:28 PM	End	Execution	Inlet Pressure Accuracy - Front MMI - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count: 1
November 21, 2024 12:03:30 PM	start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % septum in K	None
November 21, 2024 12:06:02 PM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % septum in K	Manual Data Entry
November 21, 2024 12:06:05 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % septum in K	Run Count: 1
November 21, 2024 12:06:07 PM	start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % septum in K	None
November 21, 2024 12:06:20 PM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % septum in K	Manual Data Entry

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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User Name: supasak.nims@agilent.com
Report Generated by Hostname: SCG115HMC

System ID: GM-10
Print Date: November 21, 2024 2:17:45 PM

GM-10 2024 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 12:06:23 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % septum in K	Run Count: 1
November 21, 2024 12:06:25 PM	start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: <= 0.5°C	None
November 21, 2024 12:07:10 PM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
November 21, 2024 12:07:14 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: <= 0.5°C	Run Count: 1
November 21, 2024 12:07:16 PM	start	Execution	Time El - 70000 TQ - Source - None (Qualitative - No septums associated)	None
November 21, 2024 12:07:28 PM	End	Execution	Time El - 70000 TQ - Source - None (Qualitative - No septums associated)	Run Count: 1
November 21, 2024 12:07:29 PM	start	Execution	Time El - 70000 TQ - Source - None (Qualitative - No septums associated)	None
November 21, 2024 12:07:39 PM	End	Execution	Time El - 70000 TQ - Source - None (Qualitative - No septums associated)	Run Count: 1
November 21, 2024 12:07:41 PM	start	Execution	Scouting Run - Injection Tower, Front MMI, TQ - Source - El - Extractor - Part of GCMS System Preparation	None

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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User Name: supasak.nims@agilent.com
Report Generated by Hostname: SCG115HMC

System ID: GM-10
Print Date: November 21, 2024 2:17:45 PM

GM-10 2024 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 12:08:53 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, TQ - Source - El - Extractor - Part of GCMS System Preparation	Data File Path: C:\GM-10\002024\00001.D
November 21, 2024 12:09:23 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 - [Integration Type: Injection Baseline Correction Mode: Advanced Initial Slope Sensitivity: 10 Initial Peak Width: 0.01 Initial Area Reject: Circular Height Reject: Scouting Run: On at 4] Reintegration: On at 4]
November 21, 2024 12:09:50 PM	End	Execution	Scouting Run - Injection Tower, Front MMI, TQ - Source - El - Extractor - Part of GCMS System Preparation	Run Count: 1
November 21, 2024 12:09:53 PM	start	Execution	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	None
November 21, 2024 12:10:48 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00001.D
November 21, 2024 12:18:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00002.D

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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User Name: supasak.nims@agilent.com
Report Generated by Hostname: SCG115HMC

System ID: GM-10
Print Date: November 21, 2024 2:18:45 PM

GM-10 2024 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 12:16:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00003.D
November 21, 2024 12:16:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00004.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00005.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00006.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00007.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00008.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ - Source - El - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data File Path: C:\GM-10\002024\00009.D

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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User Name: supachak.niamsangtham
Report Generated by Hostname: SCG1115HKG
System ID: GM-10
Print Date: November 21, 2024 2:12:46 PM

GM-10 2024 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 12:16:41 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MM, TQ - Source: EI - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Data Res Path: C:\GM-10 002024MRP009.D
November 21, 2024 12:19:15 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 - [Integration Type: Injection, Baseline Correction Note: Advanced Initial Slope Sensitivity: 10 Initial Peak Width: 0.01 Initial Area Reject: 0 Initial Height Reject: 50000 Integration: Off at 0 Integration: On at 4]
November 21, 2024 12:22:43 PM	End	Execution	Instrument Detection Limit - Injection Tower, Front MM, TQ - Source: EI - Extractor - RSD L (Area) <= 12.00% - RSD L (Rel. Time) <= 1.00%	Run Count: 1
November 21, 2024 12:22:52 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	None
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Data Res Path: C:\GM-10 002024MRP009.D
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Data Res Path: C:\GM-10 002024MRP009.D
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Data Res Path: C:\GM-10 002024MRP009.D

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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User Name: supachak.niamsangtham
Report Generated by Hostname: SCG1115HKG
System ID: GM-10
Print Date: November 21, 2024 2:12:46 PM

GM-10 2024 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Data Res Path: C:\GM-10 002024MRP009.D
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Data Res Path: C:\GM-10 002024MRP009.D
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Data Res Path: C:\GM-10 002024MRP009.D
November 21, 2024 12:33:20 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 - [Integration Type: Injection, Baseline Correction Note: Advanced Initial Slope Sensitivity: 10 Initial Peak Width: 0.01 Initial Area Reject: 50000 Integration: Off at 0 Integration: On at 4]
November 21, 2024 12:35:42 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MM, TQ - Source: EI - Extractor - L (RSD) <= 5.00%	Run Count: 1
November 21, 2024 12:37:11 PM	End	Qualification	Session	QQ
November 21, 2024 12:37:11 PM	Start	Reporting	Session	None
November 21, 2024 1:11:02 PM	Audit	Reporting	Session	Report Generated Certificate
November 21, 2024 1:37:30 PM	Audit	Reporting	Session	Report Generated Report

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Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor 7 Rama4 Road
Siam Bangkok Bangkok Thailand 10500
Tel: 02-8324300 Fax: 02-6375496-7
www.barascientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-374/24
Equipment UV-Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11454908533 CD
ID No. BKK_EN0018
Date of receipt 13 September 2024
Date of calibration 13 September 2024
Date of issue 13 SEP 2024

REVIEW BY *Jinda K.*
APPROVED BY *Sont P.*
NEXT CAL DATE *13/9/2025*

Customer name ALS Laboratory Group (Thailand) Co., Ltd
Address 104 Soi Phattanakan 40 Phattanakan Road, Phattanakan Suan Luang, Bangkok 10250

Temperature (25.3 - 26.7) °C (On site)
Humidity (50.4 - 55.9) %RH (On site)

Equipment condition Good Operation

Calibration Location Organic Preparation Lab

Calibration Procedure In-house method WI-UV-702-01 based on ASTM E275-01

Traceability Wavelength Accuracy is traceable to certificate No 106372 and 106371
Photometric Accuracy is traceable to certificate No 106364 and 111398
Stray Light is traceable to certificate No 106377
The above certificate are traceable to SI unit through Starra Scientific Ltd
(UKAS accredited calibration laboratory NO 0659)

Calibrated by Mr Wanchana Janloey

Approved by

Sont P.
Mr. Sontthi Temboonsakdi
Service Manager

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Certificate of Calibration

Certificate No. BSCC-UV-374/24

Number of Page(s) 2 of 3

Calibration Results:

1. Wavelength Accuracy

Certified Wavelength (nm)	UUC (nm)	Error (nm)	Uncertainty (±nm)
241.70	241.55	-0.15	0.18
334.02	333.85	-0.17	0.19
418.53	418.57	0.04	0.18
572.99	572.97	-0.02	0.18
878.41	879.17	-0.24	0.18

2. Photometric Accuracy (UV)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (±A)
235	0.0000	0.0000	0.0000	0.0075
	0.7171	0.7189	-0.0022	0.0075
	0.0000	0.0000	0.0000	0.0075
257	0.8354	0.8345	-0.0009	0.0075
	0.0000	0.0000	0.0000	0.0075
	0.2788	0.2781	-0.0005	0.0075
313	0.0000	0.0000	0.0000	0.0075
	0.0000	0.0000	0.0000	0.0075
	0.6199	0.6194	-0.0005	0.0075

*CNR = Customer not request

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FM-UV-706-02 Rev.01 (23/01/23)



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Certificate of Calibration

Certificate No. **BCCC-UV-374/24**

Number of Page(s) **3 of 3**

Calibration Results:

3. Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (±A)
420.0	0.0000	0.0000	0.0000	0.0042
	0.5761	0.5765	0.0004	0.0042
	0.7119	0.7105	-0.0014	0.0042
	1.0189	1.0174	-0.0015	0.0042
	0.0000	0.0000	0.0000	0.0042
440.0	0.5610	0.5613	0.0003	0.0042
	0.7001	0.6984	-0.0017	0.0042
	1.0026	1.0011	-0.0015	0.0042
	0.0000	0.0000	0.0000	0.0042
	0.5205	0.5232	0.0027	0.0042
465.0	0.6814	0.6589	-0.0026	0.0042
	0.9456	0.9444	-0.0012	0.0042
	0.0000	0.0000	0.0000	0.0042
	0.5249	0.5245	-0.0004	0.0042
	0.6975	0.6958	-0.0017	0.0042
548.1	1.0009	0.9994	-0.0015	0.0042
	0.0000	0.0000	0.0000	0.0042
	0.5590	0.5586	-0.0004	0.0042
	0.7725	0.7708	-0.0017	0.0042
	1.1125	1.1114	-0.0011	0.0042
635.0	0.0000	0.0000	0.0000	0.0042
	0.5666	0.5666	0.0000	0.0042
	0.7620	0.7604	-0.0016	0.0042
	1.0982	1.0971	-0.0011	0.0042

*CNR = Customer not request

4. Stray Light*

Standard cut-off wavelength (nm)	Wavelength (nm)	Transmission (%)	Absorbance (A)
200.85±0.11nm	199.58	0.9520	2.0217

The Stray light transmission reference is less than 1.0%T and Stray light absorbance reference is greater than 2.00A
*Stray Light not NISC-ONSC Accredited.

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

End of Certificate

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FM-UV-708-02 Rev.01 (23/01/15)

Agilent Technologies

Agilent Technologies (Thailand) Limited
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Email: ccc.smt@agilent.com
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Customer Contact:

ALS Laboratory Group (Thailand) Co., Ltd.
101/111 Rama 4 Road Silom Bangkok
Bangkok 10500 Thailand
TAX ID: 0105540004853
Chanatarn Imchom@alsglobal.com
27603098

SERVICE REPORT

Customer Purchase Order Number: 70371613
Customer Number: 70371613

Service Request: Service Request Date:

Service Order: 6006041263
Service Confirmation: 6905338201

Invoice To:
ALS Laboratory Group (Thailand) Co., Ltd.
101/111 Rama 4 Road Silom Bangkok
Bangkok 10500 Thailand
TAX ID: 0105540004853

REVIEW BY: Supakorn M.
APPROVED BY: Supakorn M.
NEXT CAL DATE: 12/06/2025

Delivery Site:

ALS Laboratory Group (Thailand) Co., Ltd.
101/111 Rama 4 Road Silom Bangkok
Bangkok 10500 Thailand
TAX ID: 0105540004853

Location:

Room
Bldg
Lab
Dept

Direct Inquiries to:

Contact Name: ccc.smt@agilent.com
Contact Email: ccc.smt@agilent.com
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Contact Fax: +662 632 4334

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Bangkok 10500 Thailand
Tel: 02-637 6300
Fax: 02-637 6324

Page 1 of 3

Service Confirmation Number: 6905338201
Service Confirmation Date: 12.12.2023

Service Confirmation Number: 6905338201
Service Confirmation Date: 12.12.2023

Service Instrument:

Model Number	Model Description	Serial Number	System Handle	Parent Asset
SYS-IM-7700-E	ICP-MS 7700 System Enhanced		ICP-MS 7700 (HPLC)	
G1316A	1260 Thermostatted Column Compartment	DEACN12300	ICP-MS 7700 (HPLC)	SYS-IM-7700-E
G1329B	1260 Standard Autosampler	DEAAC11088	ICP-MS 7700 (HPLC)	SYS-IM-7700-E
G1311B	1260 Quaternary Pump	DEAB704380	ICP-MS 7700 (HPLC)	SYS-IM-7700-E
G3281A	Agilent 7700x ICP-MS	JP12691612	ICP-MS 7700 (HPLC)	SYS-IM-7700-E

Service Items:

Item	Service/Part #	Description	Qty	Entitlement	Service Start	Service End
1000	EQD	Enterprise Operational Qualification	1.00	Agreement Entitlement 100 % covered	12.12.2023	12.12.2023
1010	5185-5650	ICP-MS Checkout Solutions	1.00	Agreement Entitlement 100 % covered		

Additional Information:

Service Information:

Problem Description:
WU-00-IM/HPLC-7700-5001143313

Service Provided:
Perform OQ Hardware control test: CSD, Autosampler, IIS, Auto tune, BG and Stability. After done the instrument BKK_EL0026 calibrated pass all

Service Overview Code:
Reason Code: Scheduled Service
Diagnosis Code: Scheduled Service
Resolution Code: Scheduled Service

Reported Hours:
8.0

Travel Hours:
1.0

Customer Field Service Representative Name:
Pantthep Kurasethale

Customer Field Service Representative Signature:

Date:
12 Dec 2023

Customer Name:
Supakorn Mak

Customer Signature:

Date:
12 Dec 2023

Additional Comments:


REVIEW BY Orran T.
APPROVED BY Sauk N
NEXT CAL DATE 06/22/25
n Certificate

PRODUCT ID *Quicktrace M-8000 , Teledyne Leeman Labs*

BKK_EL0129 Autosampler
S/N: 052222A560

This certifies for products which ~~was~~ performed in acceptable criteria specifications

Provided by
Scientist Instrument Co., Ltd.
113 Soi Ekachai 44, Ekachai Road
Khlong Bang Phrun, Bangbon
Bangkok 10150 Thailand

Certified by  **Thunraphol Sakdayos**
Service Engineer

ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียน

ห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๑๐๐

๒ ๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ สิงหาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผน

๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผน

๓. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผน

ตามที่หนังสือถึงถึง บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สกนที่ ๑๐๔ ขอพัฒนาการ ๔๐
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว เห็นว่า บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๑๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย น้ำดื่ม อากาศเสีย สิ่งปฏิกูล
หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๘ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทั้งผ่านเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสีระ จันทะโร)
นักวิทยาศาสตร์อาวุโส ฝ่ายราชการกรม
ผู้อำนวยการศูนย์วิจัยและพัฒนา
ปฏิบัติการทางเคมีและสิ่งแวดล้อมโรงงานอุตสาหกรรม

กองวิจัยและควบคุมคุณภาพโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ที่ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๓๒ ต่อ ๒๑๑๓ ๕

โทรสาร ๐ ๒๕๓๐ ๖๓๓๒ ต่อ ๒๑๑๔

ไปรษณีย์อิเล็กทรอนิกส์ sarabanditw@mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



สิ่งที่ส่งมาด้วย ๒

- ๒ -

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔

ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒ ๐ พฤศจิกายน ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๘๑ ราย

๑) นายอภิสิทธิ์ กิตติภาวนิชย์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๑

๒) นายภัทรพร สว่างเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๒

๓) นายราชธิ์ เกื้อเกียรติ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๓

๔) นายศิริชัย พงษ์ประสม

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๔

๕) นายณัฐวุฒิ ศิวะนง

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๕

๖) นางสาวจินดา ไขว่จตุรรม

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๖

๗) นางสาวลลิตา น้อยเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๗

๘) นางสาวชลธิชา วัฒน

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๘

๙) นางสาวนันทิมา ราษฎร์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๐๙

๑๐) นางสาวนันทิมา ราษฎร์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๐

๑๑) นางสาวศรีมาตา เจริญราษฎร์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๑

๑๒) นางสาวสุวิมล มงคลเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๒

๑๓) นางสาวศิริกัญญา บุญบาท

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๓

๑๔) นายพนกร จันทะโร

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๔

๑๕) นายณเรช ภิรมย์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๕

๑๖) นายณิชา จริยา

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๖

๑๗) นางสาวณิศาพร แก้วรัตน์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๗

๑๘) นางสาวสุวิมล ชัยเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๘

๑๙) นางสาวสุภาวดี ธรรมการ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๑๙

๒๐) นางสาวณิศา ชัยเศรษฐกุล

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๐

๒๑) นางสาวศิริพร พงษ์ศิริ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๑

๒๒) นางสาวเสาวลักษณ์ คุ้มคำ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๒

๒๓) นายอภิสิทธิ์ สิงหา

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๓

๒๔) นายศักดิ์สิทธิ์ ไพศาลพิบูลย์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๔

๒๕) ว่าที่ร้อยตรีหญิง พรรณีภา ชำนาญ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๕

๒๖) นางจิตตา คำแก้ว

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๖

๒๗) นางสาวอรพรรณ รักษ์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๗

๒๘) นางสาวนพรัตน์ วัฒนาราม

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๘

๒๙) นายสุเทพ วรินทร์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๒๙

๓๐) นางสาวสุวิมล รุ่งคำ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๐

๓๑) นายพนม ศรีภิรมย์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๑

๓๒) นายสุกัญญา คุ้ม

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๒

๓๓) ว่าที่ร้อยตรี เจริญเกียรติ อมรรศิริ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๓

๓๔) นางสาววิภา ธีรานา

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๔

๓๕) นายอนุพงษ์ วัฒนศิริประเสริฐ

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๕

๓๖) นางสาวจุฑารัตน์

๓๖) นางสาวจุฑารัตน์ โอนสินทิยะ
๓๗) นางสาวจตุรรม พิมพ์ภักดิ์
๓๘) นางสาวปรารถนา ศิริพงษ์
๓๙) นางสาวเดือนดี ทางกลาง
๔๐) นางสาวจิราพร ศิริเวช
๔๑) นายวรากร ภูกริช
๔๒) นายพนม วิริยะกิจ
๔๓) นายธิดา เจริญ
๔๔) นายศุภมิตร จำเริญ
๔๕) นายสุวิมล พรหมเสนา
๔๖) นายอนุชิต ภิรมย์
๔๗) นายชวฤทธิ์ วงษ์จันทร์
๔๘) นายอาทิตย์ ศรีเสนา
๔๙) นายเจริญทรัพย์ คงศักดิ์ไทย
๕๐) นายเจษฎา บุญยิ่ง
๕๑) นายณณานิธิ เอนก
๕๒) นายอภิวัฒน์ ทุมพู
๕๓) นางสาวภาณุภา งาม
๕๔) นางสาวพัชร ขาวลมูล
๕๕) นางสาวอริยา บุญเพ็ญ
๕๖) นางสาวภาณุภา งาม
๕๗) นางสาวสุวิมล งาม
๕๘) นายธีรวัฒน์ ปังสุ
๕๙) นายอภิสิทธิ์ ยะโส
๖๐) นายประจักษ์ วรรณชัย
๖๑) นายชยพร พงษ์ทิพย์
๖๒) นางสาวกนกวรรณ จันทร์
๖๓) นายสิทธิโชค รุ่งเจริญ
๖๔) นายศิริวรรณ ใจบุญ
๖๕) นางสาวพรพรรณ คุ้ม
๖๖) นายอภิสิทธิ์ ศรีวิเศษ
๖๗) นายสุวิมล พงษ์
๖๘) นายสุวิมล พงษ์
๖๙) นายสุวิมล พงษ์
๗๐) นายสุวิมล พงษ์
๗๑) นายสุวิมล พงษ์
๗๒) นายสุวิมล พงษ์
๗๓) นายสุวิมล พงษ์
๗๔) นายสุวิมล พงษ์
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๗๙) นายสุวิมล พงษ์
๘๐) นายสุวิมล พงษ์
๘๑) นายสุวิมล พงษ์
๘๒) นายสุวิมล พงษ์
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๙๖) นายสุวิมล พงษ์
๙๗) นายสุวิมล พงษ์
๙๘) นายสุวิมล พงษ์
๙๙) นายสุวิมล พงษ์
๑๐๐) นายสุวิมล พงษ์

ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๖
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๗
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๘
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๓๙
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๐
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๑
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๒
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๓
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๔
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๕
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๖
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๗
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๘
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๔๙
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๕๐
ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๐๕๑
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๓๕) นายประเสริฐ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
20	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Formaldehyde	Distillation, Colorimetric Method ⁽⁴⁾
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ⁽⁴⁾ 2) DPD Colorimetric Method ⁽⁴⁾
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Hexavalent Chromium	Colorimetric Method ⁽⁴⁾
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
39	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

40 Manganese...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
42	Methiocarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Methods ⁽⁴⁾
54	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽⁴⁾
56	Total Phosphorous	Digestion, Colorimetric Method ⁽⁴⁾
57	Total Suspended Solids	Dried from 103-105 °C ⁽⁴⁾
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
60	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

น้ำดื่ม...

น้ำดื่ม จำนวน 126 ชนิด

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

18 Bis(2-ethylhexyl)phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	Colorimetric Method ⁽⁴⁾

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

56 1,3-Dichloropropene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

76 γ-HCH...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

94 N-Nitrosodiphenylamine...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Polychlorinated Biphenyls - PCB :016 - PCB :221 - PCB :232 - PCB :242 - PCB :248 - PCB :254 - PCB :260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾ 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₈ -C ₁₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(4,25)

110 TPH (C₈-C₁₆)...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
110	TPH (C ₁₀ -C ₁₄)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^{9,20}
111	TPH (C ₁₀ -C ₃₃)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^{9,20}
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶⁰
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰

จากผลเสีย

จากผลเสีย (ปฏิกิริยา) จำนวน 28 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
5	Carbon Monoxide	1) Instrumental Analyzer Method ⁶⁰ 2) Sampling Bag Non-Dispersive Infrared Method ⁶⁰
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ⁶⁰ 2) Isokinetic Sampling, Ion Chromatographic Method ⁶⁰
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
10	Cresol	Absorption Sampling, Gas Chromatographic Method ⁶⁰
11	Dioxins	Isokinetic Sampling ⁶⁰
12	Hydrogen Chloride	1) Adsorption Sampling, Ion Chromatographic Method ⁶⁰ 2) Isokinetic Sampling, Ion Chromatographic Method ⁶⁰
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ⁶⁰ 2) Isokinetic Sampling, Ion Chromatographic Method ⁶⁰
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁶⁰

15 Lead...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁶⁰
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
19	Opacity	Ringelmann's Method ⁶⁰
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁶⁰ 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ⁶⁰ 3) Instrumental Analyzer Method ⁶⁰
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁶⁰ 2) Instrumental Analyzer Method ⁶⁰
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ⁶⁰
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ⁶⁰ 2) Paired Train, Isokinetic Sampling, Gravimetric Method ⁶⁰

27 Vanadium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶⁰ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶⁰
28	Xylene	Absorption Sampling, Gas Chromatographic Method ⁶⁰

สิ่งปฏิกูลหรือวัสดุอันตราย จำนวน 35 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^{19,20} 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,20} 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,20}
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{10,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{10,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,16} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{10,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{10,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,16} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{10,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{10,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,16} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}

5 Beryllium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
28	<ul style="list-style-type: none"> - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3',3',4,6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl - Pentachlorophenol 	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^{1,5,28} 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28} Electrometric Method ^{23,29} 4) Digestion, Inductively Coupled Plasma Method ^{1,6,16} 5) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 6) Digestion, Inductively Coupled Plasma Method ^{7,14} 7) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
29	pH	
30	Selenium	

31 Silver...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,14} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,14} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^{1,9,24} 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,14} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,14} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}

ดิน...

ดิน จำนวน 125 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
2	Acetone	1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^{13,29} 2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ¹³
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^{7,14} 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^{7,14} 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^{7,14} 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^{15,23}

11 Benzo(b)fluoranthene

ลำดับที่	สารเคมี	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^{7,14} 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^{15,23}
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^{15,23}
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^{15,23}
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{10,28} 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{11,28}

23 Cadmium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,14,19) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,14,19)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,19)

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(12,28,29)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
39	DDO	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)

49 1,2-Dichloroethane...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)

63 Di-n-Octyl Phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽¹³⁾

73 n-Hexane...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
75	β -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
76	γ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁸⁾ 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽²¹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁸⁾

84 Methanol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)

96 Polychlorinated biphenyls (PCBs)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
97	Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
98	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)

99 Phenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
108	TPH (C ₉ -C ₁₀)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
109	TPH (C ₁₀ -C ₁₅)	1) Automated Extraction, Gas Chromatographic Method ^(11,24) 2) Solvent Extraction, Gas Chromatographic Method ^(12,22) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(22,23)
110	TPH (C ₁₆ -C ₃₅)	1) Automated Extraction, Gas Chromatographic Method ^(11,24) 2) Solvent Extraction, Gas Chromatographic Method ^(12,22) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(22,23)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,23)

115 2,4,5-Trichlorophenol...

ลำดับที่	สารเคมี	วิธีการตรวจ
115	2,4,5-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,23) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,23) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(7,24) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7, 11)
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,24)
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(7,24) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,11)

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ที่ ๒๓ ๒๓๐๑๖/ ๔ ๒ ๒๑



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงวังใหม่
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๕ เมษายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอ็มเอสแอล แอสโซซิเอตส์ จำกัด (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอรับสารบบห้องปฏิบัติการวิเคราะห์เอกชน
ฉบับที่ ๒๓ มีนาคม ๒๕๖๗

ตามที่ขอขึ้นทะเบียน บริษัท เอ็มเอสแอล แอสโซซิเอตส์ จำกัด (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖ ๓๐๔ ๑๒๓๔๕๖๗ ๘๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ของห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

๑) นางสาวพรวิมล หงษ์หงษ์ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๐๖๕

๒) นายอัษฎิน สุทธิระ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๑

๓) นางสาวศุภาดา ปิ่นบุษ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๖๕

๒. ให้เพิ่มเจ้าหน้าที่ของห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๒ ราย

๑) นางสาวฐิติภา อธิพันธ์ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๒

๒) นางสาวณัฐนันท์ กิ่งหวงศ์ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๓

๓) นางสาวณัฐนันท์ กิ่งหวงศ์ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๔

๔) นายอานันท์ วงศ์ทะนุ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๕

๕) นายกฤษณะพล ปัญญาวงศ์ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๖

๖) นายณัฏฐกร พรทะนะ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๗

๗) นายวิวัฒน์ มุ่งสกลาสนะ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๘

๘) นายณัฐพงษ์ โสภากะ ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๒๙

๙) นายศุภวัฒน์ ปานเพ็ง ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๓๐

๑๐) นายณัฏฐกร รุ่งเป็น ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๓๑

๑๑) นายณัฐกร รุ่งเป็น ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๓๒

๑๒) นายณัฐกร รุ่งเป็น ทะเบียนเลขที่ ๖-๒๐๔-๙-๐๑๑๓๓

อนึ่ง หนังสือฉบับนี้

อนึ่ง หนังสือฉบับนี้จะส่งมอบพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๔
จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายพรยศ อธิ์นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนากลุ่มพืชโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๐ ต่อ ๒๑๐๓๕
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เขตราชเทวี กรุงเทพฯ ๑๐๐๐๐

๑๘ ธันวาคม ๒๕๖๓

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนเนลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒ ธันวาคม ๒๕๖๓


ตามคำขอที่อ้างถึง บริษัท เอนเนลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
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กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ออกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๘ ราย ได้แก่

๑) นายประจักษ์ วรรณสุขชัย	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๐
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๔) นางสาวอรุณ คำคลอง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๓
๕) นายกิตติพงศ์ แซ่ลี	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๔
๖) นายจิรเมธ ประเสริฐศิริพงษ์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๕
๗) นายภัทรพงษ์ วัฒนฯ ทอง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๖
๘) นางสาวจิราวรรณ กระทั่งกันต์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๗

จึงเรียนมาเพื่อทราบ

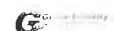
ขอแสดงความนับถือ


(นายธีรพันธ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนากลุ่มพืชโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๐ ต่อ ๒๑๐๓๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabangodiv@mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๐๐(๑)/ ๓๑๔๐



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๐๐๐

๑๐ เมษายน ๒๕๖๔

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนเนลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒ เมษายน ๒๕๖๔

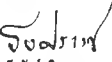
ตามคำขอที่อ้างถึง บริษัท เอนเนลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ออกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๒ ราย ได้แก่

๑) นายอิทธิพงศ์ บัวแดง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๒
๒) นายมงคล ผลาพิทย์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๖๓

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายธีรพันธ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

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โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๐ ต่อ ๒๑๐๓๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabangodiv@mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



พ.อ. ๐๓๐๐(๑)/ ๔๖๗๗



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๐๐๐

๐๕ มิถุนายน ๒๕๖๔

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนเนลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๗ พฤษภาคม ๒๕๖๔

ตามคำขอที่อ้างถึง บริษัท เอนเนลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น


กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ออกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์เอกชน
จำนวน ๓๑ ราย ได้แก่

๑) นายคุณากร มั่นใจ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๓๔
๒) นายชัยมงคล แสนมาตร	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๓๕
๓) นายอภิรักษ์ ภูมิสิทธิ์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๓๖
๔) นายพิชญานนท์ อธิ์นกร	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๓๗
๕) นายศุภรวัช แก้วกันหา	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๓๘
๖) นายวิกรม มีศิริ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๓๙
๗) นายณัฐนันท์ คำจันทร์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๔๐
๘) นายศิริพงษ์ มีไพฑูริย์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๔๑
๙) นายธีรพงษ์ ศรีคำแพง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๔๒
๑๐) นายอภิสิทธิ์ ศรีทองแก้ว	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๔๓
๑๑) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศิริ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๐๔๔

อนึ่ง หนังสือฉบับนี้จะส่งมอบพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายธีรพันธ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนากลุ่มพืชโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๐ ต่อ ๒๑๐๓๕

ไปรษณีย์อิเล็กทรอนิกส์ sarabangodiv@mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



อากาศเสีย

ภาคผนวก (ต่อหน้า) จำนวน 7 รายการ

ลำดับ ที่	สารเคมี	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ⁽⁹⁾ 2) Instrumental Analyzer Method ⁽⁹⁾
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽⁹⁾
3	Opacity	Ringelmann's Method ^(10,11)
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽⁹⁾ 2) Instrumental Analyzer Method ⁽¹⁰⁾
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Acid Method ⁽⁹⁾ 2) Instrumental Analyzer Method ⁽¹¹⁾
6	Sulfuric Acid	Isokinetic Sampling, Barium - Titrimetric Method ⁽⁶⁾
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽⁷⁾

เอกสารอ้างอิง

1. ธงชัย พรหมสถิต และวิบูลย์ลักษณ์ วิสุทธิกิตติ์, บรรณาธิการ, (2547) คู่มือวิเคราะห์น้ำเสีย, พิมพ์ครั้งที่ 4, กรุงเทพฯ: สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย.
2. APHA, AWWA, WEF, Standard Methods for the Examination of Water and Wastewater, 24th ed. Washington, DC : APHA, 2023
3. กระทรวงอุตสาหกรรม, ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549, เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้ถ่านเป็นเชื้อเพลิง, ราชกิจจานุเบกษา 4 ธันวาคม 2549, เล่มที่ 123 ตอนที่พิเศษ 1254
4. กระทรวงอุตสาหกรรม, ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549, เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำของโรงงาน, ราชกิจจานุเบกษา 4 ธันวาคม 2549, เล่มที่ 123 ตอนที่พิเศษ 1254
5. United States Environmental Protection Agency, Standards of Performance for New Stationary Sources, 40 CFR 60, Appendix A, 2017.
6. United States Environmental Protection Agency, Standards of Performance for New Stationary Sources, 40 CFR 60, Appendix A, 2019.

7. United States...

7. United States Environmental Protection Agency, Standards of Performance for New Stationary Sources, 40 CFR 60, Appendix A, 2020.
8. United States Environmental Protection Agency, Standards of Performance for New Stationary Sources, 40 CFR 60, Appendix A, 2023.
9. United States Environmental Protection Agency, Determination of Carbon Monoxide Emission from Stationary Sources; Instrumental Analyzer Procedure, 40 CFR 60, Appendix A Method 10, 2017.
10. United States Environmental Protection Agency, Determination of Oxide of Nitrogen Emission from Stationary Sources; Instrumental Analyzer Procedure, 40 CFR 60, Appendix A Method 7E, 2023.
11. United States Environmental Protection Agency, Determination of Sulfur dioxide Emission from Stationary Sources; Instrumental Analyzer Procedure, 40 CFR 60, Appendix A Method 6C, 2017.

(Handwritten signature)

ที่ อก ๐๓๑๐/ ๑ ๐ ๐๘ ๘



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ ตุลาคม ๒๕๖๗

เรื่อง แจ้งรายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง หนังสือ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขที่ ENV 2024/005 ลงวันที่ ๓๐ สิงหาคม ๒๕๖๗

ตามหนังสือที่ยังถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอบางคนที จังหวัดระยอง ของนักเขียนเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน เนื่องจากมีความคลาดเคลื่อน ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรม ได้รับทราบและดำเนินการแก้ไขรายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๕ ราย ตามที่แจ้งรับเรียบร้อยแล้ว เป็นดังนี้

- ลำดับที่ ๒๗ นางพจนนา สีตา
- ลำดับที่ ๒๘ นางสาวอนิศา กุลสุริวงค์
- ลำดับที่ ๓๐ นางชลธิชา สุบงกช
- ลำดับที่ ๓๖ นายอุทิศดำรงค์ โชคปิตินันท์
- ลำดับที่ ๔๒ นายกันตภณ มณีสันพันธ์

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(Signature)
(นายพรต ภัสกรธอง)
นายพรต ภัสกรธอง
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๓๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ elrv@dwf.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



ที่ อก ๐๓๑๐(๓)/ ๕ ๒ ๔ ๖



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๐ พฤษภาคม ๒๕๖๘

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๓๐ เมษายน ๒๕๖๘

ตามคำขอที่ยังถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอบางคนที จังหวัดระยอง ของนักเขียนบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ออกเลิกเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑ ราย ได้แก่ นายปารามศ รัตยาคุณ ทะเบียนเลขที่ ๖-๓๒๓-๖-๐๐๕๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(Signature)

(นายปรวณ คำทรงษ์)
ผู้อำนวยการศูนย์เตือนภัยมลพิษโรงงาน
ปฏิบัติการตามพันธกิจกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๓๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒
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“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”





๒๗ พฤษภาคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงชื่อ-สกุลบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท แอแอลเอส แลเบอร์ทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขนิศการสมัครขอห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๕ พฤษภาคม ๒๕๖๘

ตามคำขอที่อ้างถึง บริษัท แอแอลเอส แลเบอร์ทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ร-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้คู อำเภอบัวหลวง
จังหวัดพระยง ขอเปลี่ยนแปลงชื่อ-สกุลบุคลากร ความละเอียดแจ้งแล้ว บั

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เปลี่ยนแปลงชื่อ-สกุลบุคลากร จำนวน ๓ ราย
จากนายณะสิทธิ์ วงศ์ชาโย เป็น นายณณสิทธิ์ วงศ์ชาโย

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประคม คำรงหงษ์)

ผู้อำนวยการกองฯและผู้อำนวยการสำนักงาน
ปฏิบัติการภาคเหนือภาคตะวันออกเฉียงเหนือ

ศูนย์วิจัยและพัฒนากิจการโรงงานภาคตะวันออก

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