ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์

ภาคผนวก ค-1

คุณภาพอากาศในบรรยากาศ

Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122139
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146369-1

Sample Description Air Quality
Location โรงเรียนบ่ามาบล่าบิด (A1) (GPS 47P 0734666, 1456798)
Parameter Nitrogen dioxide (ppm)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122139-1 Nov 02, 2024	24122139-2 Nov 03, 2024	24122139-3 Nov 04, 2024	24122139-4 Nov 05, 2024	24122139-5 Nov 06, 2024	24122139-6 Nov 07, 2024	24122139-7 Nov 08, 2024
10:00 AM - 11:00 AM	0.0017	0.0007	0.0005	0.0008	0.0006	0.0007	0.0007
11:00 AM - 12:00 PM	0.0019	0.0006	0.0006	0.0007	0.0008	0.0006	0.0006
12:00 PM - 01:00 PM	0.0010	0.0006	0.0006	0.0006	0.0007	0.0004	0.0005
01:00 PM - 02:00 PM	0.0008	0.0005	0.0006	0.0005	0.0006	0.0005	0.0006
02:00 PM - 03:00 PM	0.0010	0.0006	0.0005	0.0005	0.0006	0.0005	0.0005
03:00 PM - 04:00 PM	0.0009	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005
04:00 PM - 05:00 PM	0.0008	0.0006	0.0006	0.0006	0.0007	0.0005	0.0007
05:00 PM - 06:00 PM	0.0016	0.0005	0.0008	0.0036	0.0007	0.0007	0.0006
06:00 PM - 07:00 PM	0.0056	0.0011	0.0017	0.0026	0.0042	0.0017	0.0024
07:00 PM - 08:00 PM	0.0135	0.0016	0.0028	0.0038	0.0128	0.0031	0.0045
08:00 PM - 09:00 PM	0.0101	0.0016	0.0033	0.0022	0.0042	0.0017	0.0034
09:00 PM - 10:00 PM	0.0106	0.0014	0.0019	0.0014	0.0015	0.0018	0.0016
10:00 PM - 11:00 PM	0.0020	0.0013	0.0014	0.0022	0.0012	0.0018	0.0012
11:00 PM - 12:00 AM	0.0016	0.0017	0.0011	0.0011	0.0013	0.0021	0.0011
12:00 AM - 01:00 AM	0.0011	0.0010	0.0010	0.0010	0.0009	0.0014	0.0009
01:00 AM - 02:00 AM	0.0011	0.0008	0.0009	0.0009	0.0007	0.0014	0.0007
02:00 AM - 03:00 AM	0.0010	0.0009	0.0010	0.0011	0.0010	0.0010	0.0007
03:00 AM - 04:00 AM	0.0010	0.0009	0.0010	0.0011	0.0008	0.0010	0.0007
04:00 AM - 05:00 AM	0.0009	0.0008	0.0010	0.0015	0.0008	0.0013	0.0007
05:00 AM - 06:00 AM	0.0009	0.0008	0.0009	0.0015	0.0009	0.0011	0.0007
06:00 AM - 07:00 AM	0.0012	0.0009	0.0011	0.0014	0.0010	0.0011	0.0008
07:00 AM - 08:00 AM	0.0013	0.0012	0.0010	0.0023	0.0012	0.0016	0.0008
08:00 AM - 09:00 AM	0.0013	0.0011	0.0009	0.0021	0.0012	0.0011	0.0009
09:00 AM - 10:00 AM	0.0009	0.0008	0.0008	0.0010	0.0007	0.0008	0.0007
Average	0.0027	0.0009	0.0011	0.0015	0.0016	0.0012	0.0011
1hr - Maximum	0.0135	0.0017	0.0033	0.0038	0.0128	0.0031	0.0045
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122139
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173953-1

Sample Description Air Quality
Location บริเวณพื้นที่โครงการ (A2) (GPS 47P 0733878, 1451154)
Parameter Nitrogen dioxide (ppm)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122139-8 Nov 02, 2024	24122139-9 Nov 03, 2024	24122139-10 Nov 04, 2024	24122139-11 Nov 05, 2024	24122139-12 Nov 06, 2024	24122139-13 Nov 07, 2024	24122139-14 Nov 08, 2024
10:00 AM - 11:00 AM	0.0016	0.0015	0.0022	0.0085	0.0023	0.0015	0.0019
11:00 AM - 12:00 PM	0.0012	0.0026	0.0030	0.0059	0.0020	0.0024	0.0023
12:00 PM - 01:00 PM	0.0018	0.0078	0.0039	0.0051	0.0047	0.0033	0.0026
01:00 PM - 02:00 PM	0.0016	0.0090	0.0034	0.0048	0.0046	0.0031	0.0045
02:00 PM - 03:00 PM	0.0022	0.0050	0.0043	0.0054	0.0036	0.0051	0.0052
03:00 PM - 04:00 PM	0.0094	0.0052	0.0037	0.0100	0.0025	0.0031	0.0069
04:00 PM - 05:00 PM	0.0037	0.0020	0.0021	0.0032	0.0034	0.0030	0.0039
05:00 PM - 06:00 PM	0.0086	0.0081	0.0061	0.0047	0.0068	0.0033	0.0048
06:00 PM - 07:00 PM	0.0071	0.0085	0.0072	0.0070	0.0039	0.0028	0.0046
07:00 PM - 08:00 PM	0.0036	0.0059	0.0100	0.0081	0.0063	0.0055	0.0059
08:00 PM - 09:00 PM	0.0139	0.0097	0.0044	0.0065	0.0047	0.0050	0.0063
09:00 PM - 10:00 PM	0.0129	0.0083	0.0029	0.0057	0.0048	0.0071	0.0043
10:00 PM - 11:00 PM	0.0091	0.0027	0.0075	0.0038	0.0051	0.0048	0.0031
11:00 PM - 12:00 AM	0.0142	0.0053	0.0019	0.0037	0.0037	0.0031	0.0041
12:00 AM - 01:00 AM	0.0106	0.0036	0.0031	0.0119	0.0028	0.0067	0.0015
01:00 AM - 02:00 AM	0.0055	0.0028	0.0027	0.0034	0.0019	0.0036	0.0016
02:00 AM - 03:00 AM	0.0024	0.0015	0.0074	0.0024	0.0023	0.0017	0.0013
03:00 AM - 04:00 AM	0.0016	0.0025	0.0017	0.0013	0.0023	0.0017	0.0026
04:00 AM - 05:00 AM	0.0015	0.0014	0.0012	0.0013	0.0034	0.0016	0.0028
05:00 AM - 06:00 AM	0.0024	0.0017	0.0011	0.0013	0.0030	0.0038	0.0023
06:00 AM - 07:00 AM	0.0041	0.0026	0.0034	0.0022	0.0019	0.0016	0.0011
07:00 AM - 08:00 AM	0.0021	0.0023	0.0024	0.0015	0.0018	0.0018	0.0025
08:00 AM - 09:00 AM	0.0012	0.0024	0.0014	0.0017	0.0016	0.0016	0.0022
09:00 AM - 10:00 AM	0.0013	0.0023	0.0032	0.0029	0.0018	0.0017	0.0013
Average	0.0052	0.0044	0.0038	0.0047	0.0034	0.0033	0.0033
1hr - Maximum	0.0142	0.0097	0.0100	0.0119	0.0068	0.0071	0.0069
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122139
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173954-1

Sample Description Air Quality
Location บริเวณหมู7 บ่ามาบล่าบิด (A3) (GPS 47P 0735800, 1454617)
Parameter Nitrogen dioxide (ppm)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122139-15 Nov 02, 2024	24122139-16 Nov 03, 2024	24122139-17 Nov 04, 2024	24122139-18 Nov 05, 2024	24122139-19 Nov 06, 2024	24122139-20 Nov 07, 2024	24122139-21 Nov 08, 2024
11:00 AM - 12:00 PM	0.0023	0.0037	0.0105	0.0018	0.0019	0.0015	0.0013
12:00 PM - 01:00 PM	0.0024	0.0038	0.0192	0.0016	0.0016	0.0012	0.0011
01:00 PM - 02:00 PM	0.0029	0.0072	0.0011	0.0016	0.0012	0.0011	0.0010
02:00 PM - 03:00 PM	0.0045	0.0019	0.0011	0.0012	0.0011	0.0010	0.0010
03:00 PM - 04:00 PM	0.0024	0.0016	0.0011	0.0011	0.0011	0.0012	0.0010
04:00 PM - 05:00 PM	0.0022	0.0017	0.0012	0.0011	0.0011	0.0010	0.0010
05:00 PM - 06:00 PM	0.0016	0.0012	0.0013	0.0018	0.0011	0.0012	0.0011
06:00 PM - 07:00 PM	0.0017	0.0012	0.0014	0.0016	0.0013	0.0012	0.0011
07:00 PM - 08:00 PM	0.0021	0.0017	0.0015	0.0027	0.0015	0.0015	0.0014
08:00 PM - 09:00 PM	0.0042	0.0019	0.0017	0.0026	0.0018	0.0021	0.0015
09:00 PM - 10:00 PM	0.0026	0.0019	0.0022	0.0024	0.0029	0.0019	0.0021
10:00 PM - 11:00 PM	0.0022	0.0018	0.0026	0.0022	0.0022	0.0020	0.0023
11:00 PM - 12:00 AM	0.0022	0.0019	0.0020	0.0023	0.0021	0.0016	0.0018
12:00 AM - 01:00 AM	0.0020	0.0018	0.0017	0.0021	0.0017	0.0016	0.0018
01:00 AM - 02:00 AM	0.0018	0.0018	0.0016	0.0022	0.0015	0.0017	0.0017
02:00 AM - 03:00 AM	0.0016	0.0016	0.0015	0.0020	0.0016	0.0021	0.0016
03:00 AM - 04:00 AM	0.0016	0.0015	0.0019	0.0023	0.0015	0.0019	0.0015
04:00 AM - 05:00 AM	0.0016	0.0014	0.0016	0.0017	0.0014	0.0017	0.0014
05:00 AM - 06:00 AM	0.0016	0.0013	0.0017	0.0018	0.0014	0.0016	0.0015
06:00 AM - 07:00 AM	0.0169	0.0014	0.0020	0.0020	0.0015	0.0014	0.0016
07:00 AM - 08:00 AM	0.0067	0.0016	0.0019	0.0028	0.0016	0.0018	0.0015
08:00 AM - 09:00 AM	0.0132	0.0018	0.0017	0.0035	0.0017	0.0021	0.0017
09:00 AM - 10:00 AM	0.0024	0.0019	0.0019	0.0027	0.0019	0.0017	0.0018
10:00 AM - 11:00 AM	0.0030	0.0014	0.0019	0.0016	0.0017	0.0014	0.0014
Average	0.0036	0.0020	0.0028	0.0020	0.0016	0.0016	0.0015
1hr - Maximum	0.0169	0.0072	0.0192	0.0035	0.0029	0.0021	0.0023
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122139
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173956-1

Sample Description Air Quality
Location บริเวณหมู่ 3 เขาคันทรง (A4) (GPS 47P 0732763, 1450289)
Parameter Nitrogen dioxide (ppm)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122139-22 Nov 02, 2024	24122139-23 Nov 03, 2024	24122139-24 Nov 04, 2024	24122139-25 Nov 05, 2024	24122139-26 Nov 06, 2024	24122139-27 Nov 07, 2024	24122139-28 Nov 08, 2024
09:00 AM - 10:00 AM	0.0017	0.0006	0.0007	0.0011	0.0014	0.0008	0.0008
10:00 AM - 11:00 AM	0.0014	0.0006	0.0005	0.0009	0.0011	0.0007	0.0008
11:00 AM - 12:00 PM	0.0011	0.0007	0.0005	0.0007	0.0008	0.0007	0.0008
12:00 PM - 01:00 PM	0.0011	0.0006	0.0006	0.0007	0.0007	0.0010	0.0009
01:00 PM - 02:00 PM	0.0016	0.0005	0.0006	0.0007	0.0011	0.0013	0.0006
02:00 PM - 03:00 PM	0.0095	0.0005	0.0005	0.0005	0.0007	0.0006	0.0006
03:00 PM - 04:00 PM	0.0040	0.0004	0.0006	0.0006	0.0015	0.0012	0.0007
04:00 PM - 05:00 PM	0.0013	0.0004	0.0005	0.0015	0.0008	0.0020	0.0014
05:00 PM - 06:00 PM	0.0011	0.0006	0.0009	0.0011	0.0007	0.0021	0.0007
06:00 PM - 07:00 PM	0.0017	0.0007	0.0007	0.0010	0.0012	0.0007	0.0011
07:00 PM - 08:00 PM	0.0015	0.0007	0.0007	0.0009	0.0011	0.0008	0.0012
08:00 PM - 09:00 PM	0.0015	0.0008	0.0008	0.0007	0.0013	0.0008	0.0018
09:00 PM - 10:00 PM	0.0015	0.0011	0.0010	0.0009	0.0007	0.0006	0.0041
10:00 PM - 11:00 PM	0.0012	0.0007	0.0006	0.0008	0.0006	0.0006	0.0008
11:00 PM - 12:00 AM	0.0008	0.0006	0.0005	0.0008	0.0006	0.0007	0.0005
12:00 AM - 01:00 AM	0.0007	0.0006	0.0012	0.0006	0.0006	0.0008	0.0013
01:00 AM - 02:00 AM	0.0006	0.0004	0.0006	0.0005	0.0005	0.0005	0.0004
02:00 AM - 03:00 AM	0.0006	0.0004	0.0005	0.0006	0.0005	0.0005	0.0004
03:00 AM - 04:00 AM	0.0005	0.0003	0.0005	0.0007	0.0004	0.0005	0.0004
04:00 AM - 05:00 AM	0.0005	0.0003	0.0005	0.0006	0.0004	0.0004	0.0003
05:00 AM - 06:00 AM	0.0005	0.0004	0.0006	0.0006	0.0004	0.0005	0.0004
06:00 AM - 07:00 AM	0.0005	0.0005	0.0015	0.0007	0.0005	0.0007	0.0003
07:00 AM - 08:00 AM	0.0005	0.0007	0.0012	0.0017	0.0010	0.0008	0.0004
08:00 AM - 09:00 AM	0.0007	0.0006	0.0009	0.0016	0.0008	0.0011	0.0005
Average	0.0015	0.0006	0.0007	0.0009	0.0008	0.0008	0.0009
1hr - Maximum	0.0095	0.0011	0.0015	0.0017	0.0015	0.0021	0.0041
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

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475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122139
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173957-1

Sample Description Air Quality
Location วัดช่องลม (A5) (GPS 47P 0727598, 1455574)
Parameter Nitrogen dioxide (ppm)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122139-29 Nov 02, 2024	24122139-30 Nov 03, 2024	24122139-31 Nov 04, 2024	24122139-32 Nov 05, 2024	24122139-33 Nov 06, 2024	24122139-34 Nov 07, 2024	24122139-35 Nov 08, 2024
09:00 AM - 10:00 AM	0.0001	0.0007	0.0011	0.0030	0.0014	0.0043	0.0009
10:00 AM - 11:00 AM	0.0012	0.0011	0.0008	0.0014	0.0012	0.0070	0.0021
11:00 AM - 12:00 PM	0.0008	0.0007	0.0013	0.0008	0.0054	0.0020	0.0005
12:00 PM - 01:00 PM	0.0007	0.0006	0.0013	0.0006	0.0006	0.0004	0.0004
01:00 PM - 02:00 PM	0.0009	0.0012	0.0004	0.0008	0.0021	0.0064	0.0007
02:00 PM - 03:00 PM	0.0018	0.0012	0.0008	0.0009	0.0007	0.0014	0.0030
03:00 PM - 04:00 PM	0.0007	0.0006	0.0020	0.0007	0.0012	0.0092	0.0028
04:00 PM - 05:00 PM	0.0032	0.0004	0.0012	0.0016	0.0005	0.0094	0.0060
05:00 PM - 06:00 PM	0.0017	0.0011	0.0004	0.0010	0.0008	0.0084	0.0004
06:00 PM - 07:00 PM	0.0007	0.0005	0.0006	0.0007	0.0007	0.0085	0.0002
07:00 PM - 08:00 PM	0.0007	0.0010	0.0007	0.0002	0.0003	0.0063	0.0003
08:00 PM - 09:00 PM	0.0004	0.0002	0.0006	0.0003	0.0002	0.0002	0.0002
09:00 PM - 10:00 PM	0.0004	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002
10:00 PM - 11:00 PM	0.0002	0.0002	0.0004	0.0003	0.0002	0.0001	0.0002
11:00 PM - 12:00 AM	0.0002	0.0002	0.0003	0.0002	0.0003	0.0002	0.0002
12:00 AM - 01:00 AM	0.0003	0.0001	0.0003	0.0002	0.0002	0.0002	0.0002
01:00 AM - 02:00 AM	0.0002	0.0002	0.0002	0.0003	0.0001	0.0003	0.0002
02:00 AM - 03:00 AM	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002
03:00 AM - 04:00 AM	0.0003	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002
04:00 AM - 05:00 AM	0.0003	0.0001	0.0003	0.0004	0.0002	0.0001	0.0001
05:00 AM - 06:00 AM	0.0001	0.0002	0.0003	0.0004	0.0002	0.0001	0.0001
06:00 AM - 07:00 AM	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002
07:00 AM - 08:00 AM	0.0006	0.0003	0.0010	0.0006	0.0003	0.0003	0.0003
08:00 AM - 09:00 AM	0.0010	0.0006	0.0023	0.0010	0.0016	0.0012	0.0009
Average	0.0007	0.0005	0.0007	0.0007	0.0008	0.0028	0.0009
1hr - Maximum	0.0032	0.0012	0.0023	0.0030	0.0054	0.0094	0.0060
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
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P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122139
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173962-1

Sample Description Air Quality
Location บริเวณหมู่ 4 บ้านมาบคลำ (A6) (47P 0737145, 1460076)
Parameter Nitrogen dioxide (ppm)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122139-36 Nov 02, 2024	24122139-37 Nov 03, 2024	24122139-38 Nov 04, 2024	24122139-39 Nov 05, 2024	24122139-40 Nov 06, 2024	24122139-41 Nov 07, 2024	24122139-42 Nov 08, 2024
11:00 AM - 12:00 PM	0.0011	0.0006	0.0006	0.0007	0.0008	0.0006	0.0006
12:00 PM - 01:00 PM	0.0009	0.0006	0.0006	0.0006	0.0007	0.0004	0.0005
01:00 PM - 02:00 PM	0.0010	0.0005	0.0006	0.0005	0.0006	0.0005	0.0006
02:00 PM - 03:00 PM	0.0009	0.0006	0.0005	0.0005	0.0006	0.0005	0.0005
03:00 PM - 04:00 PM	0.0008	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005
04:00 PM - 05:00 PM	0.0008	0.0006	0.0006	0.0006	0.0007	0.0005	0.0007
05:00 PM - 06:00 PM	0.0016	0.0005	0.0008	0.0030	0.0007	0.0007	0.0006
06:00 PM - 07:00 PM	0.0010	0.0011	0.0017	0.0019	0.0016	0.0017	0.0040
07:00 PM - 08:00 PM	0.0009	0.0016	0.0028	0.0014	0.0012	0.0031	0.0020
08:00 PM - 09:00 PM	0.0010	0.0016	0.0033	0.0022	0.0020	0.0017	0.0015
09:00 PM - 10:00 PM	0.0011	0.0014	0.0019	0.0014	0.0015	0.0018	0.0023
10:00 PM - 11:00 PM	0.0020	0.0013	0.0014	0.0022	0.0012	0.0018	0.0012
11:00 PM - 12:00 AM	0.0016	0.0017	0.0011	0.0011	0.0013	0.0021	0.0011
12:00 AM - 01:00 AM	0.0011	0.0010	0.0010	0.0010	0.0009	0.0014	0.0009
01:00 AM - 02:00 AM	0.0011	0.0008	0.0009	0.0009	0.0007	0.0014	0.0007
02:00 AM - 03:00 AM	0.0010	0.0009	0.0010	0.0011	0.0010	0.0010	0.0007
03:00 AM - 04:00 AM	0.0010	0.0009	0.0010	0.0011	0.0008	0.0010	0.0007
04:00 AM - 05:00 AM	0.0009	0.0008	0.0010	0.0015	0.0008	0.0013	0.0007
05:00 AM - 06:00 AM	0.0009	0.0008	0.0009	0.0015	0.0009	0.0011	0.0007
06:00 AM - 07:00 AM	0.0012	0.0009	0.0011	0.0014	0.0010	0.0011	0.0008
07:00 AM - 08:00 AM	0.0013	0.0012	0.0010	0.0023	0.0012	0.0016	0.0008
08:00 AM - 09:00 AM	0.0013	0.0011	0.0009	0.0021	0.0012	0.0011	0.0009
09:00 AM - 10:00 AM	0.0009	0.0008	0.0008	0.0010	0.0007	0.0008	0.0016
10:00 AM - 11:00 AM	0.0007	0.0005	0.0008	0.0006	0.0007	0.0007	0.0007
Average	0.0011	0.0009	0.0011	0.0013	0.0010	0.0012	0.0011
1hr - Maximum	0.0020	0.0017	0.0033	0.0030	0.0020	0.0031	0.0040
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122144
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146372-1

Sample Description Air Quality
Location โรงเรียนบ้านมาบลำบิด (A1) (GPS 47P 0734666, 1456798)
Parameter Sulfur Dioxide (mg/m3)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122144-1 Nov 02, 2024	24122144-2 Nov 03, 2024	24122144-3 Nov 04, 2024	24122144-4 Nov 05, 2024	24122144-5 Nov 06, 2024	24122144-6 Nov 07, 2024	24122144-7 Nov 08, 2024
10:00 AM - 11:00 AM	0.0034	0.0047	0.0034	0.0024	0.0018	0.0021	0.0024
11:00 AM - 12:00 PM	0.0039	0.0045	0.0029	0.0026	0.0016	0.0021	0.0026
12:00 PM - 01:00 PM	0.0024	0.0039	0.0024	0.0026	0.0016	0.0021	0.0021
01:00 PM - 02:00 PM	0.0026	0.0039	0.0026	0.0026	0.0021	0.0018	0.0024
02:00 PM - 03:00 PM	0.0042	0.0042	0.0026	0.0024	0.0018	0.0021	0.0024
03:00 PM - 04:00 PM	0.0039	0.0037	0.0024	0.0021	0.0021	0.0021	0.0024
04:00 PM - 05:00 PM	0.0029	0.0031	0.0026	0.0021	0.0018	0.0021	0.0024
05:00 PM - 06:00 PM	0.0045	0.0037	0.0029	0.0018	0.0018	0.0021	0.0026
06:00 PM - 07:00 PM	0.0029	0.0034	0.0024	0.0018	0.0016	0.0024	0.0026
07:00 PM - 08:00 PM	0.0026	0.0037	0.0021	0.0018	0.0018	0.0024	0.0026
08:00 PM - 09:00 PM	0.0029	0.0037	0.0024	0.0024	0.0013	0.0026	0.0024
09:00 PM - 10:00 PM	0.0029	0.0037	0.0021	0.0021	0.0016	0.0024	0.0026
10:00 PM - 11:00 PM	0.0045	0.0039	0.0024	0.0021	0.0016	0.0029	0.0024
11:00 PM - 12:00 AM	0.0039	0.0039	0.0024	0.0021	0.0013	0.0026	0.0026
12:00 AM - 01:00 AM	0.0029	0.0039	0.0021	0.0024	0.0013	0.0026	0.0024
01:00 AM - 02:00 AM	0.0026	0.0042	0.0024	0.0026	0.0013	0.0029	0.0024
02:00 AM - 03:00 AM	0.0026	0.0039	0.0024	0.0024	0.0013	0.0029	0.0026
03:00 AM - 04:00 AM	0.0024	0.0042	0.0024	0.0026	0.0016	0.0024	0.0026
04:00 AM - 05:00 AM	0.0026	0.0055	0.0021	0.0018	0.0010	0.0026	0.0026
05:00 AM - 06:00 AM	0.0024	0.0092	0.0026	0.0018	0.0013	0.0026	0.0026
06:00 AM - 07:00 AM	0.0024	0.0094	0.0026	0.0021	0.0013	0.0026	0.0029
07:00 AM - 08:00 AM	0.0024	0.0092	0.0026	0.0024	0.0021	0.0026	0.0026
08:00 AM - 09:00 AM	0.0026	0.0092	0.0026	0.0021	0.0021	0.0026	0.0034
09:00 AM - 10:00 AM	0.0034	0.0079	0.0026	0.0018	0.0021	0.0024	0.0029
Average (24 hrs)	0.0031	0.0050	0.0025	0.0022	0.0016	0.0024	0.0026
1hr - Maximum	0.0045	0.0094	0.0034	0.0026	0.0021	0.0029	0.0034
Standard 24 hrs - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Standard : Notification of the National Environment Board No. 10, 1995 (B.E. 2538), No. 24, 2004 (B.E. 2547).
Reference Method : US EPA Method Part 53 and 58

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122144
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173943-1

Sample Description Air Quality
Location บริเวณพื้นที่โครงการ (A2) (GPS 47P 0733878, 1451154)
Parameter Sulfur Dioxide (mg/m3)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122144-8 Nov 02, 2024	24122144-9 Nov 03, 2024	24122144-10 Nov 04, 2024	24122144-11 Nov 05, 2024	24122144-12 Nov 06, 2024	24122144-13 Nov 07, 2024	24122144-14 Nov 08, 2024
10:00 AM - 11:00 AM	0.0068	0.0060	0.0055	0.0120	0.0037	0.0037	0.0181
11:00 AM - 12:00 PM	0.0084	0.0058	0.0058	0.0128	0.0039	0.0037	0.0223
12:00 PM - 01:00 PM	0.0060	0.0063	0.0050	0.0045	0.0037	0.0039	0.0181
01:00 PM - 02:00 PM	0.0134	0.0058	0.0047	0.0031	0.0034	0.0039	0.0149
02:00 PM - 03:00 PM	0.0160	0.0058	0.0047	0.0026	0.0037	0.0018	0.0102
03:00 PM - 04:00 PM	0.0058	0.0065	0.0047	0.0024	0.0039	0.0034	0.0105
04:00 PM - 05:00 PM	0.0149	0.0065	0.0045	0.0026	0.0045	0.0039	0.0034
05:00 PM - 06:00 PM	0.0141	0.0060	0.0047	0.0026	0.0039	0.0037	0.0039
06:00 PM - 07:00 PM	0.0128	0.0055	0.0037	0.0021	0.0034	0.0034	0.0031
07:00 PM - 08:00 PM	0.0118	0.0052	0.0050	0.0024	0.0034	0.0029	0.0029
08:00 PM - 09:00 PM	0.0115	0.0055	0.0039	0.0026	0.0024	0.0029	0.0026
09:00 PM - 10:00 PM	0.0107	0.0055	0.0052	0.0034	0.0037	0.0034	0.0029
10:00 PM - 11:00 PM	0.0102	0.0052	0.0149	0.0029	0.0024	0.0026	0.0024
11:00 PM - 12:00 AM	0.0099	0.0058	0.0144	0.0031	0.0029	0.0031	0.0026
12:00 AM - 01:00 AM	0.0092	0.0055	0.0107	0.0029	0.0026	0.0031	0.0024
01:00 AM - 02:00 AM	0.0089	0.0060	0.0115	0.0031	0.0026	0.0026	0.0026
02:00 AM - 03:00 AM	0.0089	0.0058	0.0105	0.0034	0.0026	0.0029	0.0021
03:00 AM - 04:00 AM	0.0086	0.0052	0.0097	0.0029	0.0029	0.0026	0.0024
04:00 AM - 05:00 AM	0.0081	0.0052	0.0097	0.0026	0.0029	0.0029	0.0029
05:00 AM - 06:00 AM	0.0079	0.0050	0.0089	0.0024	0.0031	0.0055	0.0031
06:00 AM - 07:00 AM	0.0071	0.0050	0.0136	0.0024	0.0026	0.0084	0.0029
07:00 AM - 08:00 AM	0.0050	0.0052	0.0141	0.0024	0.0029	0.0126	0.0026
08:00 AM - 09:00 AM	0.0055	0.0055	0.0154	0.0031	0.0037	0.0120	0.0045
09:00 AM - 10:00 AM	0.0065	0.0058	0.0110	0.0037	0.0031	0.0110	0.0039
Average (24 hrs)	0.0095	0.0057	0.0084	0.0037	0.0032	0.0046	0.0061
1hr - Maximum	0.0160	0.0065	0.0154	0.0128	0.0045	0.0126	0.0223
Standard 24 hrs - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Standard : Notification of the National Environment Board No. 10, 1995 (B.E. 2538), No. 24, 2004 (B.E. 2547).
Reference Method : US EPA Method Part 53 and 58

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122144
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173944-1

Sample Description Air Quality
Location บริเวณหมู่7 ป่าหมากล่ำมิต (A3) (GPS 47P 0735800, 1454617)
Parameter Sulf ur Dioxide (mg/m3)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122144-15 Nov 02, 2024	24122144-16 Nov 03, 2024	24122144-17 Nov 04, 2024	24122144-18 Nov 05, 2024	24122144-19 Nov 06, 2024	24122144-20 Nov 07, 2024	24122144-21 Nov 08, 2024
11:00 AM - 12:00 PM	0.0018	0.0024	0.0031	0.0039	0.0047	0.0047	0.0052
12:00 PM - 01:00 PM	0.0024	0.0029	0.0039	0.0042	0.0045	0.0047	0.0050
01:00 PM - 02:00 PM	0.0026	0.0024	0.0039	0.0039	0.0045	0.0045	0.0050
02:00 PM - 03:00 PM	0.0021	0.0026	0.0042	0.0039	0.0045	0.0047	0.0050
03:00 PM - 04:00 PM	0.0021	0.0026	0.0042	0.0039	0.0045	0.0047	0.0050
04:00 PM - 05:00 PM	0.0013	0.0031	0.0045	0.0045	0.0047	0.0047	0.0055
05:00 PM - 06:00 PM	0.0016	0.0029	0.0042	0.0045	0.0045	0.0050	0.0055
06:00 PM - 07:00 PM	0.0016	0.0031	0.0042	0.0045	0.0047	0.0050	0.0052
07:00 PM - 08:00 PM	0.0016	0.0031	0.0045	0.0045	0.0050	0.0050	0.0055
08:00 PM - 09:00 PM	0.0016	0.0034	0.0045	0.0045	0.0050	0.0050	0.0058
09:00 PM - 10:00 PM	0.0018	0.0029	0.0047	0.0045	0.0050	0.0052	0.0060
10:00 PM - 11:00 PM	0.0018	0.0034	0.0045	0.0045	0.0045	0.0050	0.0060
11:00 PM - 12:00 AM	0.0018	0.0034	0.0045	0.0042	0.0045	0.0050	0.0055
12:00 AM - 01:00 AM	0.0016	0.0031	0.0045	0.0045	0.0045	0.0050	0.0058
01:00 AM - 02:00 AM	0.0016	0.0034	0.0045	0.0042	0.0047	0.0050	0.0055
02:00 AM - 03:00 AM	0.0018	0.0034	0.0042	0.0045	0.0042	0.0050	0.0055
03:00 AM - 04:00 AM	0.0018	0.0034	0.0042	0.0045	0.0047	0.0052	0.0055
04:00 AM - 05:00 AM	0.0021	0.0034	0.0045	0.0042	0.0045	0.0055	0.0055
05:00 AM - 06:00 AM	0.0021	0.0037	0.0042	0.0042	0.0045	0.0055	0.0058
06:00 AM - 07:00 AM	0.0024	0.0037	0.0042	0.0042	0.0045	0.0052	0.0055
07:00 AM - 08:00 AM	0.0021	0.0039	0.0039	0.0045	0.0050	0.0052	0.0058
08:00 AM - 09:00 AM	0.0021	0.0037	0.0042	0.0042	0.0050	0.0052	0.0055
09:00 AM - 10:00 AM	0.0024	0.0037	0.0042	0.0045	0.0047	0.0052	0.0058
10:00 AM - 11:00 AM	0.0024	0.0039	0.0039	0.0047	0.0047	0.0050	0.0058
Average (24 hrs)	0.0019	0.0032	0.0042	0.0043	0.0046	0.0050	0.0055
1hr - Maximum	0.0026	0.0039	0.0047	0.0047	0.0050	0.0055	0.0060
Standard 24 hrs - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Standard : Notif ication of the National Environment Board No. 10, 1995 (B.E. 2538), No. 24, 2004 (B.E. 2547).
Ref erence Method : US EPA Method Part 53 and 58

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122144
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173945-1

Sample Description Air Quality
Location บริเวณหมู่ 3 เขาคันทรง (A4) (GPS 47P 0732763, 1450289)
Parameter Sulf ur Dioxide (mg/m3)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122144-22 Nov 02, 2024	24122144-23 Nov 03, 2024	24122144-24 Nov 04, 2024	24122144-25 Nov 05, 2024	24122144-26 Nov 06, 2024	24122144-27 Nov 07, 2024	24122144-28 Nov 08, 2024
09:00 AM - 10:00 AM	0.0034	0.0045	0.0060	0.0010	0.0055	0.0034	0.0102
10:00 AM - 11:00 AM	0.0039	0.0097	0.0063	0.0018	0.0031	0.0039	0.0139
11:00 AM - 12:00 PM	0.0024	0.0081	0.0097	0.0016	0.0034	0.0050	0.0079
12:00 PM - 01:00 PM	0.0029	0.0065	0.0097	0.0029	0.0039	0.0045	0.0045
01:00 PM - 02:00 PM	0.0039	0.0039	0.0052	0.0055	0.0045	0.0097	0.0097
02:00 PM - 03:00 PM	0.0045	0.0034	0.0047	0.0097	0.0086	0.0092	0.0257
03:00 PM - 04:00 PM	0.0031	0.0034	0.0063	0.0076	0.0089	0.0084	0.0170
04:00 PM - 05:00 PM	0.0024	0.0029	0.0024	0.0026	0.0045	0.0055	0.0039
05:00 PM - 06:00 PM	0.0024	0.0026	0.0045	0.0016	0.0042	0.0031	0.0034
06:00 PM - 07:00 PM	0.0045	0.0024	0.0026	0.0003	0.0024	0.0029	0.0034
07:00 PM - 08:00 PM	0.0024	0.0042	0.0024	0.0005	0.0026	0.0024	0.0029
08:00 PM - 09:00 PM	0.0024	0.0026	0.0042	0.0008	0.0024	0.0024	0.0026
09:00 PM - 10:00 PM	0.0021	0.0021	0.0024	0.0003	0.0021	0.0045	0.0024
10:00 PM - 11:00 PM	0.0021	0.0034	0.0018	0.0021	0.0024	0.0024	0.0042
11:00 PM - 12:00 AM	0.0026	0.0026	0.0008	0.0034	0.0024	0.0024	0.0026
12:00 AM - 01:00 AM	0.0029	0.0031	0.0003	0.0042	0.0026	0.0021	0.0021
01:00 AM - 02:00 AM	0.0031	0.0045	0.0005	0.0031	0.0026	0.0021	0.0034
02:00 AM - 03:00 AM	0.0031	0.0031	0.0008	0.0034	0.0031	0.0026	0.0026
03:00 AM - 04:00 AM	0.0034	0.0034	0.0008	0.0034	0.0031	0.0029	0.0031
04:00 AM - 05:00 AM	0.0042	0.0042	0.0008	0.0039	0.0031	0.0031	0.0045
05:00 AM - 06:00 AM	0.0045	0.0045	0.0042	0.0045	0.0029	0.0031	0.0031
06:00 AM - 07:00 AM	0.0102	0.0045	0.0052	0.0050	0.0031	0.0034	0.0034
07:00 AM - 08:00 AM	0.0139	0.0047	0.0010	0.0068	0.0039	0.0042	0.0042
08:00 AM - 09:00 AM	0.0079	0.0052	0.0010	0.0071	0.0039	0.0045	0.0031
Average (24 hrs)	0.0041	0.0041	0.0035	0.0035	0.0037	0.0041	0.0060
1hr - Maximum	0.0139	0.0097	0.0097	0.0097	0.0089	0.0097	0.0257
Standard 24 hrs - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Standard : Notif ication of the National Environment Board No. 10, 1995 (B.E. 2538), No. 24, 2004 (B.E. 2547).
Ref erence Method : US EPA Method Part 53 and 58

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Analysis / Test Report

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P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122144
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173948-1

Sample Description Air Quality
Location วัดช่องลม (A5) (GPS 47P 0727598, 1455574)
Parameter Sulfur Dioxide (mg/m3)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122144-29 Nov 02, 2024	24122144-30 Nov 03, 2024	24122144-31 Nov 04, 2024	24122144-32 Nov 05, 2024	24122144-33 Nov 06, 2024	24122144-34 Nov 07, 2024	24122144-35 Nov 08, 2024
09:00 AM - 10:00 AM	0.0042	0.0029	0.0068	0.0037	0.0068	0.0058	0.0107
10:00 AM - 11:00 AM	0.0068	0.0068	0.0063	0.0029	0.0065	0.0060	0.0094
11:00 AM - 12:00 PM	0.0084	0.0068	0.0055	0.0024	0.0060	0.0055	0.0084
12:00 PM - 01:00 PM	0.0073	0.0060	0.0050	0.0013	0.0037	0.0055	0.0068
01:00 PM - 02:00 PM	0.0065	0.0055	0.0047	0.0018	0.0063	0.0029	0.0081
02:00 PM - 03:00 PM	0.0063	0.0068	0.0018	0.0042	0.0079	0.0016	0.0079
03:00 PM - 04:00 PM	0.0063	0.0094	0.0045	0.0060	0.0081	0.0045	0.0079
04:00 PM - 05:00 PM	0.0065	0.0065	0.0050	0.0094	0.0073	0.0058	0.0060
05:00 PM - 06:00 PM	0.0063	0.0071	0.0058	0.0110	0.0076	0.0058	0.0068
06:00 PM - 07:00 PM	0.0055	0.0081	0.0058	0.0065	0.0084	0.0065	0.0068
07:00 PM - 08:00 PM	0.0058	0.0039	0.0058	0.0034	0.0060	0.0060	0.0065
08:00 PM - 09:00 PM	0.0058	0.0042	0.0058	0.0031	0.0060	0.0063	0.0055
09:00 PM - 10:00 PM	0.0058	0.0031	0.0071	0.0065	0.0063	0.0081	0.0060
10:00 PM - 11:00 PM	0.0060	0.0060	0.0073	0.0068	0.0055	0.0084	0.0065
11:00 PM - 12:00 AM	0.0058	0.0073	0.0086	0.0071	0.0081	0.0081	0.0081
12:00 AM - 01:00 AM	0.0055	0.0081	0.0076	0.0068	0.0079	0.0079	0.0092
01:00 AM - 02:00 AM	0.0058	0.0079	0.0076	0.0063	0.0081	0.0081	0.0086
02:00 AM - 03:00 AM	0.0052	0.0110	0.0076	0.0068	0.0058	0.0081	0.0073
03:00 AM - 04:00 AM	0.0055	0.0058	0.0073	0.0071	0.0050	0.0076	0.0063
04:00 AM - 05:00 AM	0.0055	0.0063	0.0076	0.0073	0.0037	0.0073	0.0068
05:00 AM - 06:00 AM	0.0055	0.0034	0.0081	0.0071	0.0047	0.0073	0.0052
06:00 AM - 07:00 AM	0.0052	0.0055	0.0029	0.0073	0.0050	0.0060	0.0058
07:00 AM - 08:00 AM	0.0055	0.0029	0.0034	0.0073	0.0047	0.0099	0.0068
08:00 AM - 09:00 AM	0.0055	0.0092	0.0031	0.0071	0.0052	0.0092	0.0060
Average (24 hrs)	0.0059	0.0063	0.0059	0.0058	0.0063	0.0066	0.0072
1hr - Maximum	0.0084	0.0110	0.0086	0.0110	0.0084	0.0099	0.0107
Standard 24 hrs - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Standard : Notification of the National Environment Board No. 10, 1995 (B.E. 2538), No. 24, 2004 (B.E. 2547).
Reference Method : US EPA Method Part 53 and 58

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Approved by Orawan R.
Orawan Rakyong
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475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122144
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3173949-1

Sample Description Air Quality
Location บริเวณหมู่ 4 ป่าหมากตล่ำ (A6) (47P 0737145, 1460076)
Parameter Sulfur Dioxide (mg/m3)
Measurement Date Nov 02, 2024 - Nov 09, 2024
Measurement by Anuwet Tema

Time	24122144-36 Nov 02, 2024	24122144-37 Nov 03, 2024	24122144-38 Nov 04, 2024	24122144-39 Nov 05, 2024	24122144-40 Nov 06, 2024	24122144-41 Nov 07, 2024	24122144-42 Nov 08, 2024
11:00 AM - 12:00 PM	0.0031	0.0045	0.0029	0.0026	0.0016	0.0021	0.0026
12:00 PM - 01:00 PM	0.0024	0.0039	0.0024	0.0026	0.0016	0.0021	0.0021
01:00 PM - 02:00 PM	0.0029	0.0039	0.0026	0.0026	0.0021	0.0018	0.0024
02:00 PM - 03:00 PM	0.0031	0.0042	0.0026	0.0024	0.0018	0.0021	0.0024
03:00 PM - 04:00 PM	0.0034	0.0037	0.0024	0.0021	0.0021	0.0021	0.0024
04:00 PM - 05:00 PM	0.0026	0.0031	0.0026	0.0021	0.0018	0.0021	0.0024
05:00 PM - 06:00 PM	0.0026	0.0037	0.0029	0.0018	0.0018	0.0021	0.0026
06:00 PM - 07:00 PM	0.0029	0.0034	0.0024	0.0018	0.0016	0.0024	0.0026
07:00 PM - 08:00 PM	0.0026	0.0037	0.0021	0.0018	0.0018	0.0024	0.0026
08:00 PM - 09:00 PM	0.0029	0.0037	0.0024	0.0024	0.0013	0.0026	0.0024
09:00 PM - 10:00 PM	0.0029	0.0037	0.0021	0.0021	0.0016	0.0024	0.0026
10:00 PM - 11:00 PM	0.0045	0.0039	0.0024	0.0021	0.0016	0.0029	0.0024
11:00 PM - 12:00 AM	0.0039	0.0039	0.0024	0.0021	0.0013	0.0026	0.0026
12:00 AM - 01:00 AM	0.0029	0.0039	0.0021	0.0024	0.0013	0.0026	0.0024
01:00 AM - 02:00 AM	0.0026	0.0042	0.0024	0.0026	0.0013	0.0029	0.0024
02:00 AM - 03:00 AM	0.0026	0.0039	0.0024	0.0024	0.0013	0.0029	0.0026
03:00 AM - 04:00 AM	0.0024	0.0042	0.0024	0.0026	0.0016	0.0024	0.0026
04:00 AM - 05:00 AM	0.0026	0.0055	0.0021	0.0018	0.0010	0.0026	0.0026
05:00 AM - 06:00 AM	0.0024	0.0092	0.0026	0.0018	0.0013	0.0026	0.0026
06:00 AM - 07:00 AM	0.0024	0.0094	0.0026	0.0021	0.0013	0.0026	0.0029
07:00 AM - 08:00 AM	0.0024	0.0092	0.0026	0.0024	0.0021	0.0026	0.0026
08:00 AM - 09:00 AM	0.0026	0.0092	0.0026	0.0021	0.0021	0.0026	0.0034
09:00 AM - 10:00 AM	0.0034	0.0079	0.0026	0.0018	0.0021	0.0024	0.0031
10:00 AM - 11:00 AM	0.0047	0.0034	0.0024	0.0018	0.0021	0.0024	0.0039
Average (24 hrs)	0.0029	0.0050	0.0024	0.0022	0.0016	0.0024	0.0026
1hr - Maximum	0.0047	0.0094	0.0029	0.0026	0.0021	0.0029	0.0039
Standard 24 hrs - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Standard : Notification of the National Environment Board No. 10, 1995 (B.E. 2538), No. 24, 2004 (B.E. 2547).
Reference Method : US EPA Method Part 53 and 58

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Approved by Orawan R.
Orawan Rakyong
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TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew,
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122151
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146385-1

Sample Description Air Quality
Location โรงเรียนบ้านมาบล่ำบิด (A1) (GPS 47P 0734666, 1456798)
Date Analysis Commenced Nov 20, 2024
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)
24122151-1	Nov 02 - Nov 03, 2024	0.016	0.014	747	31
24122151-2	Nov 03 - Nov 04, 2024	0.064	0.021	747	31
24122151-3	Nov 04 - Nov 05, 2024	0.063	0.017	747	30
24122151-4	Nov 05 - Nov 06, 2024	0.041	0.013	747	31
24122151-5	Nov 06 - Nov 07, 2024	0.045	0.015	747	30
24122151-6	Nov 07 - Nov 08, 2024	0.042	0.013	747	30
24122151-7	Nov 08 - Nov 09, 2024	0.051	0.011	747	30
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (PM-10) : US EPA 40 CFR Part 50 Appendix J

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

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122151
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146385-2

Sample Description Air Quality
Location บริเวณพื้นที่โครงการ (A2) (GPS 47P 0733878, 1451154)
Date Analysis Commenced Nov 20, 2024
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)
24122151-8	Nov 02 - Nov 03, 2024	0.046	0.031	747	31
24122151-9	Nov 03 - Nov 04, 2024	0.036	0.029	747	31
24122151-10	Nov 04 - Nov 05, 2024	0.038	0.025	747	30
24122151-11	Nov 05 - Nov 06, 2024	0.024	0.016	747	31
24122151-12	Nov 06 - Nov 07, 2024	0.039	0.024	747	30
24122151-13	Nov 07 - Nov 08, 2024	0.030	0.019	747	30
24122151-14	Nov 08 - Nov 09, 2024	0.040	0.023	747	30
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (PM-10) : US EPA 40 CFR Part 50 Appendix J

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

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122151
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146385-3

Sample Description Air Quality
Location บริเวณหมู่7 บ้านมาบล่ำบิด (A3) (GPS 47P 0735800, 1454617)
Date Analysis Commenced Nov 20, 2024
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)
24122151-15	Nov 02 - Nov 03, 2024	0.024	0.017	747	31
24122151-16	Nov 03 - Nov 04, 2024	0.029	0.024	747	31
24122151-17	Nov 04 - Nov 05, 2024	0.035	0.017	747	30
24122151-18	Nov 05 - Nov 06, 2024	0.027	0.013	747	31
24122151-19	Nov 06 - Nov 07, 2024	0.032	0.015	747	30
24122151-20	Nov 07 - Nov 08, 2024	0.028	0.012	747	30
24122151-21	Nov 08 - Nov 09, 2024	0.045	0.021	747	30
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (PM-10) : US EPA 40 CFR Part 50 Appendix J

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

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122151
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146385-4

Sample Description Air Quality
Location บริเวณหมู่ 3 เขาคันทรง (A4) (GPS 47P 0732763, 1450289)
Date Analysis Commenced Nov 20, 2024
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)
24122151-22	Nov 02 - Nov 03, 2024	0.045	0.027	747	31
24122151-23	Nov 03 - Nov 04, 2024	0.049	0.023	747	31
24122151-24	Nov 04 - Nov 05, 2024	0.033	0.012	747	30
24122151-25	Nov 05 - Nov 06, 2024	0.026	0.008	747	31
24122151-26	Nov 06 - Nov 07, 2024	0.038	0.013	747	30
24122151-27	Nov 07 - Nov 08, 2024	0.039	0.010	747	30
24122151-28	Nov 08 - Nov 09, 2024	0.050	0.012	747	30
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (PM-10) : US EPA 40 CFR Part 50 Appendix J

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

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122151
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146385-5

Sample Description Air Quality
Location วัดช่องลม (A5) (GPS 47P 0727598, 1455574)
Date Analysis Commenced Nov 20, 2024
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)
24122151-29	Nov 02 - Nov 03, 2024	0.083	0.038	747	31
24122151-30	Nov 03 - Nov 04, 2024	0.071	0.046	747	31
24122151-31	Nov 04 - Nov 05, 2024	0.045	0.025	747	30
24122151-32	Nov 05 - Nov 06, 2024	0.022	0.012	747	31
24122151-33	Nov 06 - Nov 07, 2024	0.043	0.026	747	30
24122151-34	Nov 07 - Nov 08, 2024	0.040	0.021	747	30
24122151-35	Nov 08 - Nov 09, 2024	0.049	0.035	747	30
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (PM-10) : US EPA 40 CFR Part 50 Appendix J

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

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

TESTING
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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122151
Date Received : Nov 18, 2024
Date Reported : Nov 22, 2024
Report Number: 3146385-6

Sample Description Air Quality
Location บริเวณหมู่ 4 บ้านมาบคล้า (A6) (47P 0737145, 1460076)
Date Analysis Commenced Nov 20, 2024
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)
24122151-36	Nov 02 - Nov 03, 2024	0.029	0.019	747	31
24122151-37	Nov 03 - Nov 04, 2024	0.044	0.027	747	31
24122151-38	Nov 04 - Nov 05, 2024	0.073	0.019	747	30
24122151-39	Nov 05 - Nov 06, 2024	0.050	0.013	747	31
24122151-40	Nov 06 - Nov 07, 2024	0.061	0.016	747	30
24122151-41	Nov 07 - Nov 08, 2024	0.051	0.014	747	30
24122151-42	Nov 08 - Nov 09, 2024	0.049	0.014	747	30
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (PM-10) : US EPA 40 CFR Part 50 Appendix J

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

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Sample Number 24122145-1 to 7
Parameter Wind Speed / Wind Direction
Location โรงเรียนบ้านมาบค่าบิด (A1) (GPS 47P 0734666, 1456798)
Sampling Date Nov 02 - Nov 09, 2024
Sampling by Anuwet Tema

Time	Nov 02 - Nov 03, 2024		Nov 03 - Nov 04, 2024		Nov 04 - Nov 05, 2024		Nov 05 - Nov 06, 2024		Nov 06 - Nov 07, 2024		Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	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)
10:00 AM - 11:00 AM	0.3	23.0	NNE	0.4	74.0	ENE	2.9	44.0	NE	1.4	52.0	NE	1.8	359.0
11:00 AM - 12:00 PM	0.3	36.0	NE	0.3	73.0	ENE	1.7	6.0	N	3.5	19.0	NNE	1.1	31.0
12:00 PM - 01:00 PM	0.1	-	-	0.3	71.0	ENE	1.3	37.0	NE	0.9	80.0	E	2.2	5.0
01:00 PM - 02:00 PM	0.2	-	-	0.2	-	-	1.7	359.0	N	1.3	33.0	NNE	1.5	91.0
02:00 PM - 03:00 PM	1.0	35.0	NE	0.0	-	-	1.3	94.0	E	2.4	82.0	E	0.3	23.0
03:00 PM - 04:00 PM	0.0	-	-	1.0	330.0	NNW	0.4	21.0	NNE	0.6	45.0	NE	2.0	79.0
04:00 PM - 05:00 PM	0.2	-	-	0.4	316.0	NW	1.3	317.0	NW	1.9	17.0	NNE	1.3	67.0
05:00 PM - 06:00 PM	0.0	-	-	0.0	-	-	0.6	325.0	NW	0.9	329.0	NNW	1.1	0.0
06:00 PM - 07:00 PM	0.2	-	-	0.0	-	-	0.7	313.0	NW	0.3	320.0	NW	0.9	307.0
07:00 PM - 08:00 PM	0.3	354.0	N	0.0	-	-	0.6	338.0	NNW	1.5	359.0	N	0.5	310.0
08:00 PM - 09:00 PM	1.2	351.0	N	1.0	50.0	NE	0.5	352.0	N	1.2	7.0	N	0.4	338.0
09:00 PM - 10:00 PM	0.8	3.0	N	1.0	75.0	ENE	0.5	322.0	NW	0.6	335.0	NNW	0.4	335.0
10:00 PM - 11:00 PM	0.3	15.0	NNE	0.3	36.0	NE	1.3	309.0	NW	1.3	0.0	N	0.1	-
11:00 PM - 12:00 AM	0.0	-	-	0.0	-	-	0.4	355.0	N	1.0	33.0	NNE	0.7	310.0
12:00 AM - 01:00 AM	1.2	1.0	N	0.0	-	-	0.8	15.0	NNE	1.7	310.0	NW	0.6	17.0
01:00 AM - 02:00 AM	0.0	-	-	1.1	42.0	NE	0.7	359.0	N	0.4	265.0	W	0.6	283.0
02:00 AM - 03:00 AM	0.3	23.0	NNE	0.1	-	-	1.0	359.0	N	1.7	11.0	N	0.3	340.0
03:00 AM - 04:00 AM	0.1	-	-	0.0	-	-	0.6	346.0	NNW	0.9	346.0	NNW	0.1	-
04:00 AM - 05:00 AM	0.1	-	-	1.1	101.0	E	1.4	5.0	N	1.2	4.0	N	0.8	16.0
05:00 AM - 06:00 AM	0.0	-	-	0.0	-	-	1.5	295.0	WNW	1.9	310.0	NW	1.4	21.0
06:00 AM - 07:00 AM	0.3	85.0	E	0.0	-	-	2.3	359.0	N	1.3	15.0	NNE	3.2	359.0
07:00 AM - 08:00 AM	0.0	-	-	1.3	42.0	NE	1.5	9.0	N	1.8	32.0	NNE	1.8	18.0
08:00 AM - 09:00 AM	0.0	-	-	1.0	13.0	NNE	1.2	58.0	ENE	1.7	43.0	NE	2.5	22.0
09:00 AM - 10:00 AM	0.1	-	-	1.0	38.0	NE	2.3	58.0	ENE	1.1	15.0	NNE	2.6	0.0

Time	Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
10:00 AM - 11:00 AM	2.6	37.0	NE	0.6	326.0	NW
11:00 AM - 12:00 PM	1.4	25.0	NNE	0.1	-	-
12:00 PM - 01:00 PM	2.4	72.0	ENE	0.3	316.0	NW
01:00 PM - 02:00 PM	0.4	82.0	E	2.1	90.0	E
02:00 PM - 03:00 PM	1.6	37.0	NE	1.7	26.0	NNE
03:00 PM - 04:00 PM	0.5	55.0	NE	2.3	62.0	ENE
04:00 PM - 05:00 PM	1.6	60.0	ENE	2.2	18.0	NNE
05:00 PM - 06:00 PM	1.3	304.0	NW	3.1	46.0	NE
06:00 PM - 07:00 PM	0.5	310.0	NW	1.9	27.0	NNE
07:00 PM - 08:00 PM	0.3	312.0	NW	2.4	59.0	ENE
08:00 PM - 09:00 PM	0.5	352.0	N	2.1	5.0	N
09:00 PM - 10:00 PM	1.0	270.0	W	2.2	52.0	NE
10:00 PM - 11:00 PM	0.3	326.0	NW	1.9	50.0	NE
11:00 PM - 12:00 AM	2.5	352.0	N	2.9	34.0	NE
12:00 AM - 01:00 AM	1.1	5.0	N	0.8	59.0	ENE
01:00 AM - 02:00 AM	1.1	19.0	NNE	2.1	35.0	NE
02:00 AM - 03:00 AM	0.7	17.0	NNE	1.3	29.0	NNE
03:00 AM - 04:00 AM	1.0	356.0	N	1.4	16.0	NNE
04:00 AM - 05:00 AM	0.1	-	-	1.0	58.0	ENE
05:00 AM - 06:00 AM	0.6	36.0	NE	1.3	69.0	ENE
06:00 AM - 07:00 AM	1.2	359.0	N	0.8	81.0	E
07:00 AM - 08:00 AM	1.1	359.0	N	0.4	59.0	ENE
08:00 AM - 09:00 AM	2.4	9.0	N	0.9	53.0	NE
09:00 AM - 10:00 AM	2.1	12.0	NNE	0.3	38.0	NE

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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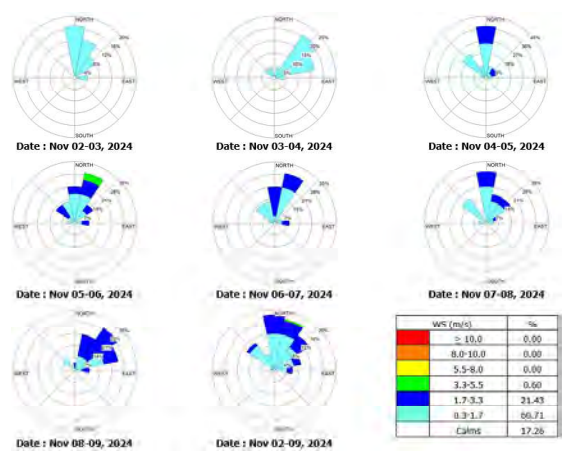
Sarayuth Jittranont
Assistant General Manager

Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew,
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Wind Rose



WS (m/s)	%
≥ 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	0.60
1.7-3.3	21.43
0.3-1.7	66.71
Calms	17.26

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Assistant General Manager

Analysis / Test Report

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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Sample Number 24122145-8 to 14
Parameter Wind Speed / Wind Direction
Location บริเวณพื้นที่โครงการ (A2) (GPS 47P 0733878, 1451154)
Sampling Date Nov 02 - Nov 09, 2024
Sampling by Anuwet Tema

Time	Nov 02 - Nov 03, 2024		Nov 03 - Nov 04, 2024		Nov 04 - Nov 05, 2024		Nov 05 - Nov 06, 2024		Nov 06 - Nov 07, 2024		Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	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)
10:00 AM - 11:00 AM	0.9	335.0	NNW	0.1	- -	1.3	68.0	ENE	1.8	312.0	NW	1.1	146.0	SE	1.1	195.0	SSW	0.3	157.0	SSE
11:00 AM - 12:00 PM	1.0	18.0	NNE	3.1	318.0	NW	2.2	106.0	ESE	0.0	-	-	1.0	312.0	NW	2.1	137.0	SE	0.2	-	-
12:00 PM - 01:00 PM	0.6	325.0	NW	0.2	-	-	2.4	75.0	ENE	1.4	150.0	SSE	1.9	319.0	NW	3.0	150.0	SSE	2.1	57.0	ENE
01:00 PM - 02:00 PM	0.4	332.0	NNW	2.1	320.0	NW	2.0	145.0	SE	2.4	197.0	SSW	3.2	19.0	NNE	3.3	126.0	SE	1.1	313.0	NW
02:00 PM - 03:00 PM	1.0	245.0	WSW	1.7	11.0	N	2.0	93.0	E	0.9	152.0	SSE	1.8	76.0	ENE	1.3	15.0	NNE	1.2	334.0	NNW
03:00 PM - 04:00 PM	0.7	235.0	SW	1.7	338.0	NNW	2.4	100.0	E	0.0	-	-	0.4	99.0	E	1.2	286.0	WNW	1.5	93.0	E
04:00 PM - 05:00 PM	0.2	-	-	0.6	312.0	NW	1.7	177.0	S	0.2	-	-	0.3	338.0	NNW	0.8	27.0	NNE	0.3	337.0	NNW
05:00 PM - 06:00 PM	1.1	60.0	ENE	0.1	-	-	0.2	-	-	0.8	166.0	SSE	0.7	98.0	E	0.5	98.0	E	0.0	-	-
06:00 PM - 07:00 PM	2.5	113.0	ESE	0.1	-	-	1.2	149.0	SSE	0.1	-	-	0.4	349.0	N	1.1	65.0	ENE	0.1	-	-
07:00 PM - 08:00 PM	2.9	111.0	ESE	0.3	86.0	E	0.9	134.0	SE	0.5	315.0	NW	0.5	342.0	NNW	0.6	24.0	NNE	0.6	123.0	ESE
08:00 PM - 09:00 PM	1.2	74.0	ENE	0.1	-	-	0.1	-	-	0.2	-	-	0.1	-	-	0.0	-	-	0.2	-	-
09:00 PM - 10:00 PM	2.1	325.0	NW	0.3	342.0	NNW	0.0	-	-	0.2	-	-	0.6	352.0	N	0.2	-	-	1.9	311.0	NW
10:00 PM - 11:00 PM	1.2	3.0	N	0.2	-	-	0.6	3.0	N	1.1	336.0	NNW	0.8	315.0	NW	0.1	-	-	0.9	299.0	WNW
11:00 PM - 12:00 AM	0.4	33.0	NNE	0.1	-	-	0.2	-	-	0.9	74.0	ENE	0.6	294.0	WNW	0.7	82.0	E	1.1	301.0	WNW
12:00 AM - 01:00 AM	0.5	332.0	NNW	0.2	-	-	0.0	-	-	0.4	34.0	NE	0.2	-	-	1.2	313.0	NW	2.9	339.0	NNW
01:00 AM - 02:00 AM	1.2	107.0	ESE	0.1	-	-	0.1	-	-	0.6	56.0	NE	0.3	306.0	NW	1.0	55.0	NE	0.2	-	-
02:00 AM - 03:00 AM	0.8	330.0	NNW	0.1	-	-	0.5	44.0	NE	0.2	-	-	0.1	-	-	0.6	355.0	N	1.0	344.0	NNW
03:00 AM - 04:00 AM	0.7	79.0	E	0.0	-	-	0.7	69.0	ENE	0.0	-	-	0.0	-	-	0.4	337.0	NNW	1.1	352.0	N
04:00 AM - 05:00 AM	0.6	322.0	NW	0.3	324.0	NW	0.5	278.0	W	0.0	-	-	0.1	-	-	0.8	94.0	E	0.3	57.0	ENE
05:00 AM - 06:00 AM	0.2	-	-	0.2	-	-	0.2	-	-	0.3	84.0	E	0.3	316.0	NW	1.3	87.0	E	0.0	-	-
06:00 AM - 07:00 AM	1.4	329.0	NNW	0.4	228.0	SW	0.4	318.0	NW	0.4	34.0	NE	0.8	126.0	SE	0.4	150.0	SSE	1.1	342.0	NNW
07:00 AM - 08:00 AM	0.6	304.0	NW	0.2	-	-	1.0	138.0	SE	0.1	-	-	0.9	157.0	SSE	1.2	151.0	SSE	1.0	356.0	N
08:00 AM - 09:00 AM	0.0	-	-	0.9	214.0	SW	1.3	114.0	ESE	0.4	61.0	ENE	1.1	25.0	NNE	1.8	143.0	SE	0.5	5.0	N
09:00 AM - 10:00 AM	0.4	332.0	NNW	0.0	-	-	1.6	79.0	E	0.0	-	-	1.0	93.0	E	1.0	47.0	NE	0.2	-	-

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Assistant General Manager

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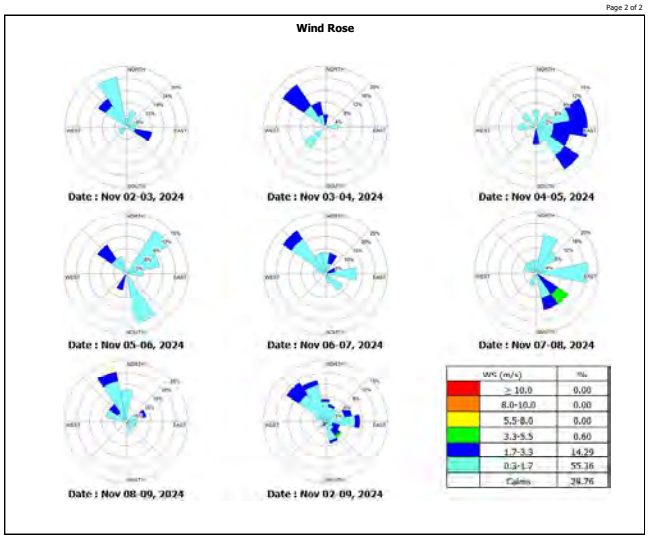
Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew,
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1



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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Sample Number 24122145-15 to 21
Parameter Wind Speed / Wind Direction
Location บริเวณหมู่ 7 บ้านบางล่ำบัด (A3) (GPS 47P 0735800, 1454617)
Sampling Date Nov 02 - Nov 09, 2024
Sampling by Anuwet Tema

Time	Nov 02 - Nov 03, 2024		Nov 03 - Nov 04, 2024		Nov 04 - Nov 05, 2024		Nov 05 - Nov 06, 2024		Nov 06 - Nov 07, 2024		Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	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)
11:00 AM - 12:00 PM	1.2	23.0	NNE	0.5	294.0	WNW	1.6	52.0	NE	1.6	55.0	NE	0.2	- -	0.7	29.0	NNE	0.6	277.0	W
12:00 PM - 01:00 PM	1.1	245.0	WSW	2.4	82.0	E	0.5	21.0	NNE	0.8	149.0	SSE	1.5	328.0	NNW	1.3	37.0	NE	0.4	322.0	NW
01:00 PM - 02:00 PM	2.2	242.0	WSW	3.7	64.0	ENE	0.2	- -	1.5	297.0	WNW	2.6	310.0	NW	2.3	55.0	NE	2.2	102.0	ESE
02:00 PM - 03:00 PM	1.1	304.0	NW	2.3	6.0	N	0.8	0.0	N	1.9	354.0	N	0.7	326.0	NW	1.3	16.0	NNE	2.0	314.0	NW
03:00 PM - 04:00 PM	1.0	290.0	WNW	1.0	358.0	N	0.4	312.0	NW	2.0	63.0	ENE	3.0	327.0	NNW	1.1	126.0	SE	3.1	96.0	E
04:00 PM - 05:00 PM	0.3	240.0	WSW	3.4	339.0	NNW	1.7	50.0	NE	1.3	52.0	NE	1.4	320.0	NW	2.3	348.0	NNW	3.2	31.0	NNE
05:00 PM - 06:00 PM	1.8	31.0	NNE	2.1	56.0	NE	1.5	29.0	NNE	2.0	42.0	NE	2.6	327.0	NNW	3.2	58.0	ENE	0.7	42.0	NE
06:00 PM - 07:00 PM	0.3	20.0	NNE	1.3	51.0	NE	0.4	16.0	NNE	1.3	52.0	NE	0.3	37.0	NE	2.8	45.0	NE	0.9	0.0	N
07:00 PM - 08:00 PM	0.4	51.0	NE	1.1	43.0	NE	0.5	104.0	ESE	1.4	43.0	NE	1.5	306.0	NW	2.3	53.0	NE	1.5	7.0	N
08:00 PM - 09:00 PM	0.5	35.0	NE	0.5	37.0	NE	0.3	43.0	NE	1.5	46.0	NE	2.1	318.0	NW	1.0	227.0	SW	1.6	301.0	WNW
09:00 PM - 10:00 PM	0.5	327.0	NNW	1.1	42.0	NE	0.9	64.0	ENE	0.2	-	-	0.8	316.0	NW	0.3	229.0	SW	0.9	341.0	NNW
10:00 PM - 11:00 PM	0.5	82.0	E	0.8	71.0	ENE	0.3	77.0	ENE	0.9	63.0	ENE	0.2	-	-	2.4	279.0	W	0.8	24.0	NNE
11:00 PM - 12:00 AM	1.3	321.0	NW	0.2	-	-	1.2	26.0	NNE	0.3	55.0	NE	0.2	-	-	1.0	313.0	NW	1.2	319.0	NW
12:00 AM - 01:00 AM	0.3	334.0	NNW	0.4	25.0	NNE	1.3	312.0	NW	0.6	68.0	ENE	0.3	16.0	NNE	1.3	26.0	NNE	0.7	340.0	NNW
01:00 AM - 02:00 AM	0.2	-	-	2.3	26.0	NNE	1.6	312.0	NW	0.7	46.0	NE	1.2	355.0	N	0.1	-	-	0.7	315.0	NW
02:00 AM - 03:00 AM	0.2	-	-	1.5	16.0	NNE	1.5	16.0	NNE	0.3	359.0	N	1.3	322.0	NW	0.2	-	-	1.5	343.0	NNW
03:00 AM - 04:00 AM	0.2	-	-	1.6	1.0	N	1.6	11.0	N	0.8	347.0	NNW	1.5	294.0	WNW	0.1	-	-	0.4	326.0	NW
04:00 AM - 05:00 AM	1.3	24.0	NNE	1.5	44.0	NE	1.5	303.0	WNW	1.3	6.0	N	0.9	314.0	NW	1.2	300.0	WNW	1.3	37.0	NE
05:00 AM - 06:00 AM	1.2	11.0	N	1.4	350.0	N	0.5	9.0	N	1.5	21.0	NNE	1.8	26.0	NNE	1.3	57.0	ENE	2.5	296.0	WNW
06:00 AM - 07:00 AM	0.2	-	-	1.5	359.0	N	1.6	39.0	NE	1.6	44.0	NE	1.3	336.0	NNW	1.6	75.0	ENE	1.6	20.0	NNE
07:00 AM - 08:00 AM	2.1	54.0	NE	1.5	10.0	N	1.5	340.0	NNW	1.5	61.0	ENE	1.5	6.0	N	1.5	72.0	ENE	1.4	313.0	NW
08:00 AM - 09:00 AM	1.1	356.0	N	1.5	28.0	NNE	1.4	312.0	NW	1.8	41.0	NE	0.5	331.0	NNW	1.4	73.0	ENE	1.2	322.0	NW
09:00 AM - 10:00 AM	0.8	30.0	NNE	1.6	45.0	NE	1.0	292.0	WNW	1.5	17.0	NNE	0.2	- -	1.6	50.0	NE	0.6	346.0	NNW
10:00 AM - 11:00 AM	0.2	-	-	0.8	45.0	NE	1.1	74.0	ENE	1.0	46.0	NE	0.6	174.0	S	1.1	338.0	NNW	0.5	223.0	SW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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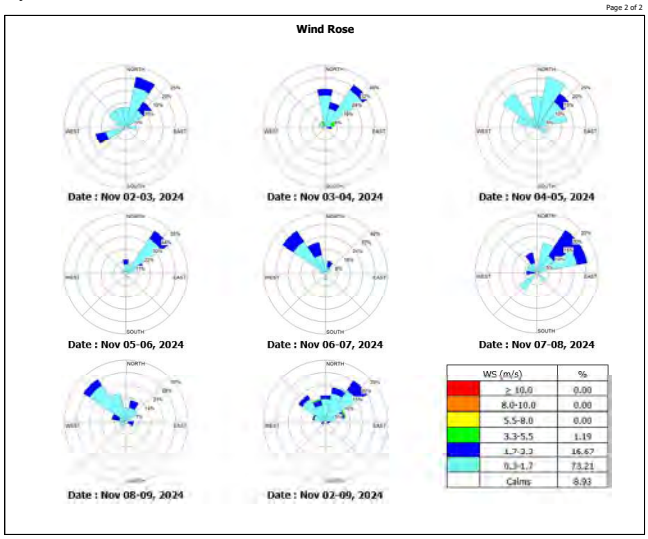
Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew,
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1



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Approved by
Sarayuth Jittranont
Assistant General Manager

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
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P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Sample Number 24122145-22 to 28
Parameter Wind Speed / Wind Direction
Location บริเวณหมู่ 3 เขาคันทรง (A4) (GPS 47P 0732763, 1450289)
Sampling Date Nov 02 - Nov 09, 2024
Sampling by Anuwet Tema

Time	Nov 02 - Nov 03, 2024		Nov 03 - Nov 04, 2024		Nov 04 - Nov 05, 2024		Nov 05 - Nov 06, 2024		Nov 06 - Nov 07, 2024		Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	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)
09:00 AM - 10:00 AM	2.1	42.0	NE	3.3	21.0	NNE	2.5	359.0	N	3.1	9.0	N	1.6	28.0	NNE	3.5	354.0	N	2.1	41.0	NE
10:00 AM - 11:00 AM	1.1	32.0	NNE	1.6	327.0	NNW	2.5	349.0	N	2.2	52.0	NE	2.1	89.0	E	2.5	67.0	ENE	1.0	43.0	NE
11:00 AM - 12:00 PM	0.9	36.0	NE	3.0	13.0	NNE	1.2	0.0	N	1.4	23.0	NNE	1.6	48.0	NE	1.2	89.0	E	1.1	74.0	ENE
12:00 PM - 01:00 PM	1.0	61.0	ENE	4.0	359.0	N	1.3	39.0	NE	1.4	18.0	NNE	2.3	57.0	ENE	1.3	87.0	E	2.9	8.0	N
01:00 PM - 02:00 PM	1.4	131.0	SE	2.5	23.0	NNE	1.7	42.0	NE	1.3	24.0	NNE	1.3	71.0	ENE	1.0	103.0	ESE	1.2	50.0	NE
02:00 PM - 03:00 PM	1.6	4.0	N	1.9	80.0	E	1.3	76.0	ENE	2.4	32.0	NNE	0.8	7.0	N	2.8	355.0	N	2.5	21.0	NNE
03:00 PM - 04:00 PM	0.5	10.0	N	2.2	35.0	NE	1.7	74.0	ENE	0.3	46.0	NE	1.4	336.0	NNW	1.4	115.0	ESE	0.3	0.0	N
04:00 PM - 05:00 PM	0.0	-	-	3.9	31.0	NNE	1.6	54.0	NE	0.4	40.0	NE	1.4	56.0	NE	1.5	110.0	ESE	2.5	41.0	NE
05:00 PM - 06:00 PM	0.4	34.0	NE	1.7	43.0	NE	0.4	49.0	NE	0.0	-	-	0.8	64.0	ENE	1.9	66.0	ENE	0.7	97.0	E
06:00 PM - 07:00 PM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.4	28.0	NNE	0.0	-	-
07:00 PM - 08:00 PM	0.7	71.0	ENE	0.0	-	-	0.9	300.0	WNW	0.3	13.0	NNE	0.2	-	-	0.0	-	-	0.0	-	-
08:00 PM - 09:00 PM	1.3	31.0	NNE	0.0	-	-	0.6	300.0	WNW	0.0	-	-	0.5	338.0	NNW	0.5	62.0	ENE	0.0	-	-
09:00 PM - 10:00 PM	0.9	46.0	NE	0.6	57.0	ENE	0.0	-	-	1.4	21.0	NNE	0.0	-	-	1.6	24.0	NNE	0.4	359.0	N
10:00 PM - 11:00 PM	0.9	41.0	NE	0.0	-	-	2.0	339.0	NNW	0.7	286.0	WNW	0.2	-	-	0.3	19.0	NNE	0.4	7.0	N
11:00 PM - 12:00 AM	0.9	40.0	NE	0.8	9.0	N	0.8	110.0	ESE	0.1	-	-	1.8	33.0	NNE	0.3	37.0	NE	0.6	18.0	NNE
12:00 AM - 01:00 AM	0.5	40.0	NE	0.2	-	-	0.2	-	-	0.5	19.0	NNE	2.9	43.0	NE	0.3	43.0	NE	0.7	40.0	NE
01:00 AM - 02:00 AM	0.8	32.0	NNE	1.0	45.0	NE	0.4	29.0	NNE	1.1	1.0	N	1.1	27.0	NNE	1.9	36.0	NE	1.3	15.0	NNE
02:00 AM - 03:00 AM	3.3	41.0	NE	1.6	359.0	N	2.2	32.0	NNE	0.5	355.0	N	2.9	16.0	NNE	0.9	39.0	NE	1.3	24.0	NNE
03:00 AM - 04:00 AM	3.0	1.0	N	2.7	24.0	NNE	0.2	-	-	0.5	0.0	N	1.7	36.0	NE	2.5	34.0	NE	0.7	40.0	NE
04:00 AM - 05:00 AM	2.3	44.0	NE	2.5	30.0	NNE	1.4	55.0	NE	0.9	42.0	NE	0.4	349.0	N	2.6	20.0	NNE	0.7	326.0	NW
05:00 AM - 06:00 AM	0.7	339.0	NNW	1.3	61.0	ENE	1.8	21.0	NNE	0.6	7.0	N	3.5	46.0	NE	0.6	84.0	E	2.8	321.0	NW
06:00 AM - 07:00 AM	2.3	15.0	NNE	1.0	319.0	NW	4.6	34.0	NE	2.1	32.0	NNE	3.4	36.0	NE	3.4	352.0	N	2.2	44.0	NE
07:00 AM - 08:00 AM	1.3	359.0	N	2.2	45.0	NE	0.2	-	-	0.9	85.0	E	2.0	55.0	NE	1.1	48.0	NE	1.3	284.0	WNW
08:00 AM - 09:00 AM	2.9	31.0	NNE	1.7	343.0	NNW	5.1	2.0	N	0.6	9.0	N	1.1	7.0	N	2.8	56.0	NE	0.9	315.0	NW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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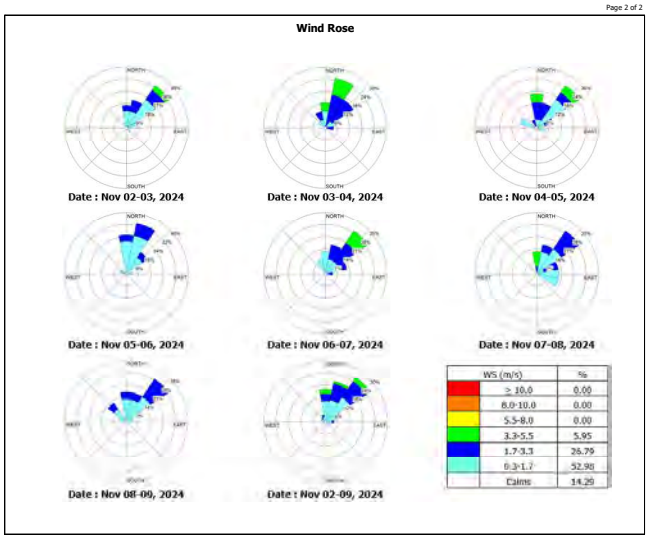
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew,
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Wind Rose



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Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Sample Number 24122145-29 to 35
Parameter Wind Speed / Wind Direction
Location วัดท่องลม (A5) (GPS 47P 0727598, 1455574)
Sampling Date Nov 02 - Nov 09, 2024
Sampling by Anuwet Tema

Time	Nov 02 - Nov 03, 2024		Nov 03 - Nov 04, 2024		Nov 04 - Nov 05, 2024		Nov 05 - Nov 06, 2024		Nov 06 - Nov 07, 2024		Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	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)
09:00 AM - 10:00 AM	0.5	97.0	E	0.2	-	-	4.3	319.0	NW	0.9	68.0	ENE	0.5	67.0	ENE	2.3	85.0	E	0.1	-	-
10:00 AM - 11:00 AM	1.1	63.0	ENE	3.8	68.0	ENE	2.5	72.0	ENE	0.1	-	-	1.2	344.0	NNW	1.7	71.0	ENE	0.3	68.0	ENE
11:00 AM - 12:00 PM	2.3	92.0	E	0.0	-	-	0.9	61.0	ENE	0.7	53.0	NE	3.3	92.0	E	3.1	166.0	SSE	2.0	78.0	ENE
12:00 PM - 01:00 PM	0.0	-	-	1.1	77.0	ENE	5.2	93.0	E	1.7	114.0	ESE	0.0	-	-	1.8	99.0	E	2.4	71.0	ENE
01:00 PM - 02:00 PM	0.0	-	-	0.7	56.0	NE	4.4	88.0	E	0.9	320.0	NW	0.6	69.0	ENE	1.5	74.0	ENE	0.0	-	-
02:00 PM - 03:00 PM	0.5	63.0	ENE	1.1	348.0	NNW	1.4	90.0	E	0.0	-	-	0.4	39.0	NE	3.0	69.0	ENE	1.4	293.0	WNW
03:00 PM - 04:00 PM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.9	7.0	N	0.0	-	-	1.9	73.0	ENE
04:00 PM - 05:00 PM	0.0	-	-	0.5	64.0	ENE	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	1.1	72.0	ENE
05:00 PM - 06:00 PM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.3	60.0	ENE
06:00 PM - 07:00 PM	0.0	-	-	0.0	-	-	0.0	-	-	0.5	70.0	ENE	0.0	-	-	0.8	52.0	NE	0.0	-	-
07:00 PM - 08:00 PM	0.0	-	-	0.3	24.0	NNE	0.0	-	-	2.0	72.0	ENE	0.0	-	-	0.5	61.0	ENE	0.0	-	-
08:00 PM - 09:00 PM	0.0	-	-	0.0	-	-	0.4	359.0	N	1.5	63.0	ENE	0.8	354.0	N	0.0	-	-	0.0	-	-
09:00 PM - 10:00 PM	0.0	-	-	0.0	-	-	0.9	54.0	NE	0.0	-	-	1.2	359.0	N	0.0	-	-	0.0	-	-
10:00 PM - 11:00 PM	0.2	-	-	0.6	54.0	NE	2.5	86.0	E	0.6	78.0	ENE	0.4	71.0	ENE	0.0	-	-	0.7	334.0	NNW
11:00 PM - 12:00 AM	1.0	70.0	ENE	0.2	-	-	0.7	312.0	NW	0.0	-	-	3.2	30.0	NNE	1.1	67.0	ENE	1.1	95.0	E
12:00 AM - 01:00 AM	0.3	50.0	NE	0.9	20.0	NNE	1.4	70.0	ENE	0.8	235.0	SW	5.2	69.0	ENE	0.6	140.0	SE	2.3	67.0	ENE
01:00 AM - 02:00 AM	0.4	63.0	ENE	0.8	4.0	N	0.2	-	-	0.2	-	-	2.4	108.0	ESE	1.4	81.0	E	0.7	25.0	NNE
02:00 AM - 03:00 AM	0.4	78.0	ENE	0.4	8.0	N	2.9	88.0	E	0.2	-	-	1.4	7.0	N	0.9	22.0	NNE	0.2	-	-
03:00 AM - 04:00 AM	1.6	63.0	ENE	1.6	2.0	N	1.0	69.0	ENE	0.0	-	-	0.0	-	-	2.8	40.0	NE	0.4	29.0	NNE
04:00 AM - 05:00 AM	2.3	359.0	N	0.6	59.0	ENE	4.4	71.0	ENE	2.6	62.0	ENE	3.4	54.0	NE	1.7	36.0	NE	0.0	-	-
05:00 AM - 06:00 AM	2.4	53.0	NE	2.0	15.0	NNE	1.2	37.0	NE	3.5	94.0	E	0.7	6.0	N	1.1	103.0	ESE	0.0	-	-
06:00 AM - 07:00 AM	3.1	76.0	ENE	1.2	23.0	NNE	1.4	359.0	N	0.4	88.0	E	0.7	0.0	N	2.9	115.0	ESE	0.2	-	-
07:00 AM - 08:00 AM	5.9	90.0	E	1.2	46.0	NE	1.4	349.0	N	1.6	356.0	N	0.4	0.0	N	0.7	55.0	NE	1.2	21.0	NNE
08:00 AM - 09:00 AM	3.1	94.0	E	2.3	45.0	NE	1.2	96.0	E	0.9	75.0	ENE	1.5	17.0	NNE	0.2	-	-	0.6	8.0	N

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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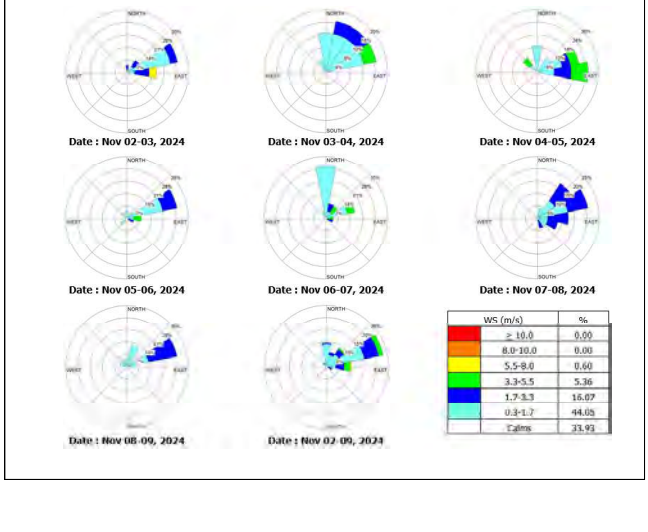
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Wind Rose



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P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Sample Number 24122145-36 to 42
Parameter Wind Speed / Wind Direction
Location บริเวณหมู่ 4 บ้านบางคล้า (A6) (GPS 47P 0737145, 1460076)
Sampling Date Nov 02 - Nov 09, 2024
Sampling by Anuwet Tema

Time	Nov 02 - Nov 03, 2024		Nov 03 - Nov 04, 2024		Nov 04 - Nov 05, 2024		Nov 05 - Nov 06, 2024		Nov 06 - Nov 07, 2024		Nov 07 - Nov 08, 2024		Nov 08 - Nov 09, 2024	
	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)
11:00 AM - 12:00 PM	0.3	322.0 NW	1.5	34.0 NE	2.2	86.0 E	0.0	- -	1.9	75.0 ENE	2.6	77.0 ENE	3.6	71.0 ENE
12:00 PM - 01:00 PM	2.0	315.0 NW	1.9	11.0 N	1.5	74.0 ENE	0.9	80.0 E	2.2	60.0 ENE	2.2	68.0 ENE	1.3	33.0 NNE
01:00 PM - 02:00 PM	0.3	296.0 WNW	3.0	61.0 ENE	1.0	312.0 NW	0.6	52.0 NE	0.9	45.0 NE	2.0	57.0 ENE	2.1	92.0 E
02:00 PM - 03:00 PM	0.4	304.0 NW	1.8	94.0 E	0.6	306.0 NW	1.4	76.0 ENE	2.2	74.0 ENE	1.2	47.0 NE	3.4	59.0 ENE
03:00 PM - 04:00 PM	1.0	263.0 W	1.5	82.0 E	0.7	73.0 ENE	0.0	- -	0.0	- -	3.8	66.0 ENE	1.5	57.0 ENE
04:00 PM - 05:00 PM	2.1	264.0 W	2.1	57.0 ENE	0.0	- -	0.0	- -	1.9	70.0 ENE	1.4	94.0 E	0.7	61.0 ENE
05:00 PM - 06:00 PM	0.0	- -	0.8	43.0 NE	0.3	62.0 ENE	1.0	35.0 NE	0.0	- -	0.0	- -	0.5	74.0 ENE
06:00 PM - 07:00 PM	0.3	126.0 SE	0.0	- -	0.2	- -	0.4	35.0 NE	0.0	- -	0.0	- -	0.0	- -
07:00 PM - 08:00 PM	0.0	- -	0.5	279.0 W	0.0	- -	0.7	35.0 NE	0.1	- -	0.0	- -	0.0	- -
08:00 PM - 09:00 PM	0.3	342.0 NNW	2.0	304.0 NW	0.0	- -	0.4	35.0 NE	0.1	- -	0.0	- -	0.0	- -
09:00 PM - 10:00 PM	0.0	- -	2.2	258.0 WSW	0.4	5.0 N	0.6	35.0 NE	0.0	- -	0.0	- -	0.2	- -
10:00 PM - 11:00 PM	1.1	344.0 NNW	1.5	71.0 ENE	0.7	7.0 N	0.3	34.0 NE	0.4	63.0 ENE	0.1	- -	0.2	- -
11:00 PM - 12:00 AM	0.9	24.0 NNE	0.0	- -	0.0	- -	0.2	- -	0.2	- -	0.2	- -	0.0	- -
12:00 AM - 01:00 AM	1.3	24.0 NNE	0.0	- -	0.6	246.0 WSW	0.0	- -	0.3	349.0 N	0.1	- -	0.0	- -
01:00 AM - 02:00 AM	1.5	103.0 ESE	0.1	- -	0.1	- -	1.6	25.0 NNE	0.0	- -	0.0	- -	0.0	- -
02:00 AM - 03:00 AM	1.0	100.0 E	1.9	65.0 ENE	0.1	- -	0.0	- -	0.0	- -	0.0	- -	0.1	- -
03:00 AM - 04:00 AM	1.2	122.0 ESE	1.1	62.0 ENE	0.1	- -	0.5	359.0 N	0.8	75.0 ENE	0.9	268.0 W	0.0	- -
04:00 AM - 05:00 AM	0.0	- -	2.9	287.0 WNW	0.4	72.0 ENE	0.0	- -	0.7	50.0 NE	0.0	- -	0.0	- -
05:00 AM - 06:00 AM	0.1	- -	1.0	288.0 WNW	0.3	68.0 ENE	0.0	- -	0.7	17.0 NNE	0.3	46.0 NE	0.5	282.0 WNW
06:00 AM - 07:00 AM	0.2	- -	0.0	- -	0.0	- -	1.3	249.0 WSW	0.6	146.0 SE	0.0	- -	0.0	- -
07:00 AM - 08:00 AM	0.3	64.0 ENE	0.0	- -	0.0	- -	1.1	262.0 W	1.2	6.0 N	1.5	48.0 NE	0.3	322.0 NW
08:00 AM - 09:00 AM	0.0	- -	0.6	38.0 NE	1.5	11.0 N	0.2	- -	1.0	31.0 NNE	2.5	287.0 WNW	0.7	295.0 WNW
09:00 AM - 10:00 AM	0.9	47.0 NE	1.3	37.0 NE	0.0	- -	2.9	70.0 ENE	1.8	69.0 ENE	0.9	63.0 ENE	3.1	50.0 NE
10:00 AM - 11:00 AM	1.9	357.0 N	2.2	107.0 ESE	0.0	- -	1.1	58.0 ENE	2.2	81.0 E	3.0	57.0 ENE	1.2	35.0 NE

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analysed/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.

Approved by

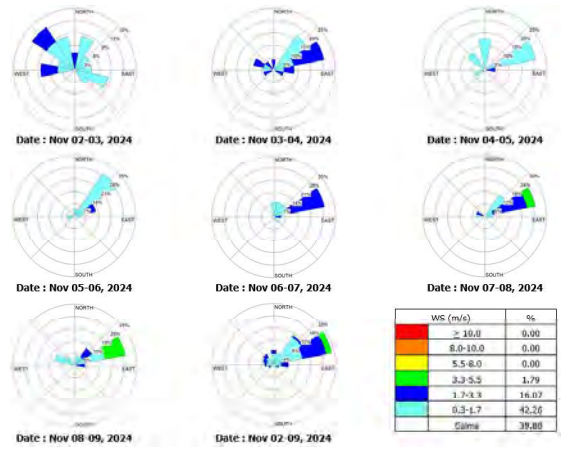
Sarayuth Jittranont
Assistant General Manager

Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew,
Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122145
Date Received :Nov 18, 2024
Date Reported :Nov 25, 2024
Report Number :3146373-1

Wind Rose



WS (m/s)	%
≥ 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	1.79
1.7-3.3	16.07
0.3-1.7	42.26
Calms	39.88

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Sarayuth Jittranont
Assistant General Manager

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ภาคผนวก ค-2

คุณภาพน้ำผิวดิน

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2474069
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3038175-1

Sample Number	2474069-1
Sampled Date	Jul 01, 2024 12:30 PM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุกอนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Colorless, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	Not Detected	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.06	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (F)	Rayong

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Approved by
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Chonticha Subongkoch
Scientist (3)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2474069
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3038175-1

Sample Number	2474069-1
Sampled Date	Jul 01, 2024 12:30 PM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุกอนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Colorless, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.1	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	<0.05	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	<5	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Surawit Narapong , Samart Khumphlee

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.
- [A] Analysis conducted by ALS Laboratory Group (Thailand) Co.,Ltd. Bangkok Branch, DMSc Accreditation No. 1031/47.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2474069
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3038175-1

Sample Number	2474069-2
Sampled Date	Jul 01, 2024 11:00 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปุ ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.002	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.07	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.05	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (F)	Rayong

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by
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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2474069
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3038175-1

Sample Number	2474069-2
Sampled Date	Jul 01, 2024 11:00 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปุ ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.2	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.31	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.7	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	11	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Surawit Narapong , Samart Khumphlee

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.
- [A] Analysis conducted by ALS Laboratory Group (Thailand) Co.,Ltd. Bangkok Branch, DMSc Accreditation No. 1031/47.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2474069

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3038175-1

Sample Number	2474069-3
Sampled Date	Jul 01, 2024 11:26 AM
Sample Description	Surface Water
Location	SW3 : ห่วยบาบปุหลังไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.004	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.001	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.06	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.45	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (F)	Rayong

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2474069

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3038175-1

Sample Number	2474069-3
Sampled Date	Jul 01, 2024 11:26 AM
Sample Description	Surface Water
Location	SW3 : ห่วยบาบปุหลังไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.2	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.34	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.5	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	33	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Surawit Narapong , Samart Khumphlee

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.
- [A] Analysis conducted by ALS Laboratory Group (Thailand) Co.,Ltd. Bangkok Branch, DMSc Accreditation No. 1031/47.
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Analysis / Test Report

TESTING
No.0042

Lot ID: 2482282

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3059245-1

Sample Number	2482282-1
Sampled Date	Aug 02, 2024 11:00 AM
Sample Description	Surface Water
Location	SW1 : ห่วยบาบปุก่อนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Colorless, odourless, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	Not Detected	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.08	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (F)	Rayong

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Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2482282

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3059245-1

Sample Number	2482282-1
Sampled Date	Aug 02, 2024 11:00 AM
Sample Description	Surface Water
Location	SW1 : ห่วยบาบปุก่อนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Colorless, odourless, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.9	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	Not Detected	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	<5	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Nattawut Athompromarat , Kardbundit Kitisupavanit

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.
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Analysis / Test Report

TESTING
No.0042

Lot ID: 2482282

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3059245-1

Sample Number	2482282-2
Sampled Date	Aug 02, 2024 10:25 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.004	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.0005	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.002	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.05	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.12	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (F)	Rayong

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Senior Manager

Analysis / Test Report

TESTING
No.0042

Lot ID: 2482282

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3059245-1

Sample Number	2482282-2
Sampled Date	Aug 02, 2024 10:25 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.3	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.23	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.8	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	11	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

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.
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Senior Manager

Analysis / Test Report

TESTING
No.0042

Lot ID: 2482282

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3059245-1

Sample Number	2482282-3
Sampled Date	Aug 02, 2024 11:25 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปูหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.002	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.03	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.29	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (F)	Rayong

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2482282

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur
Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3059245-1

Sample Number	2482282-3
Sampled Date	Aug 02, 2024 11:25 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปูหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.7	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	2.40	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.7	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	7	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

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.
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Senior Manager

Analysis / Test Report

TESTING
No.0042

Lot ID: 2494261

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

Sample Number	2494261-1
Sampled Date	Sep 19, 2024 10:57 AM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุกอนใหผ่านพื้นที่โครงการ
Date Analysis Commenced	Sep 19, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, odourless, some solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	<0.0005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.01	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.05	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2494261

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

Sample Number	2494261-1
Sampled Date	Sep 19, 2024 10:57 AM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุกอนใหผ่านพื้นที่โครงการ
Date Analysis Commenced	Sep 19, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, odourless, some solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.3	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.10	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C	-	-	-	7.3	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	<5	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Suphanat Sakulk , Pattarapol Sawangjaitam

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

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2494261

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2494261

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

Sample Number	2494261-2
Sampled Date	Sep 19, 2024 12:14 PM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปุ ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Sep 19, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, odourless, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.004	≤0.10	≤0.10	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	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.0006	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.001	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.04	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	<0.05	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by
Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494261
Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

Sample Number	2494261-2
Sampled Date	Sep 19, 2024 12:14 PM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Sep 19, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, odourless, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.7	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.08	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	10	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Suphanat Sakulk , Pattarapol Sawangjaitam

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.
-

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Analysis / Test Report
TESTING No.0042
Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2
Lot ID: 2494261
Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

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

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Analysis / Test Report
TESTING No.0042
Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2
Lot ID: 2494261
Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

Sample Number	2494261-3
Sampled Date	Sep 19, 2024 11:33 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปุหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Sep 19, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, odourless, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.008	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.0009	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.007	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.07	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.21	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Analysis / Test Report
TESTING No.0042
Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2
Lot ID: 2494261
Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

Sample Number	2494261-3
Sampled Date	Sep 19, 2024 11:33 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปุหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Sep 19, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, odourless, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.2	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	2.34	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.4	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	28	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Suphanat Sakulk , Pattarapol Sawangjaitam

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.
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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494261
Date Received : Sep 19, 2024
Date Reported : Sep 26, 2024
Report Number : 3084488-1

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494208
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

Sample Number	2494208-1
Sampled Date	Oct 01, 2024 11:05 AM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุก่อนไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	<0.0005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	<0.0005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	<0.005	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.13	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Dej Changchon
Senior Manager

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494208
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

Sample Number	2494208-1
Sampled Date	Oct 01, 2024 11:05 AM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุก่อนไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.1	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.11	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.7	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	<5	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Paramet Sattayakun

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.
-

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Dej Changchon
Senior Manager

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494208
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

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

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Dej Changchon
Senior Manager

Analysis / Test Report

TESTING
No.0042

Lot ID: 2494208

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

Sample Number	2494208-2
Sampled Date	Oct 01, 2024 10:45 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.002	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.002	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.06	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.11	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2494208

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

Sample Number	2494208-2
Sampled Date	Oct 01, 2024 10:45 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.9	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.17	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C	-	-	-	7.8	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	35	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Paramet Sattayakun

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.
-

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Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2494208

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

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

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2494208

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

Sample Number	2494208-3
Sampled Date	Oct 01, 2024 10:30 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปูหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.002	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.004	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.04	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.20	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494208
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

Sample Number	2494208-3
Sampled Date	Oct 01, 2024 10:30 AM
Sample Description	Surface Water
Location	SW3 : ห่วยบาบปุหลังไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.1	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	2.92	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	26	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Paramet Sattayakun

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.
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Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 2494208
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3084389-1

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P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

Sample Number	24122168-1
Sampled Date	Nov 05, 2024 11:33 AM
Sample Description	Surface Water
Location	SW1 : ห่วยบาบปุก่อนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	<0.0005	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	Not Detected	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.06	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

Sample Number	24122168-1
Sampled Date	Nov 05, 2024 11:33 AM
Sample Description	Surface Water
Location	SW1 : ห่วยบาบปุก่อนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.2	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.20	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	<5	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

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.
-

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TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

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475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

Sample Number	24122168-2
Sampled Date	Nov 05, 2024 11:08 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	<0.0005	≤0.05	≤0.05	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	<0.0005	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.0007	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.04	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.06	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

Sample Number	24122168-2
Sampled Date	Nov 05, 2024 11:08 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปู ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.4	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.19	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.5	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	9	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

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

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

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

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Photchana S.
Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

Sample Number	24122168-3
Sampled Date	Nov 05, 2024 11:51 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปุหลังไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	0.0008	≤0.05	≤0.05	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	<0.0005	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.03	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.16	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Approved by Photchana S.
Photchana Seeda
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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

Sample Number	24122168-3
Sampled Date	Nov 05, 2024 11:51 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปุหลังไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in two BOD bottles, two glass vials and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.7	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	2.17	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.5	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	10	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

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.
-

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No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122168
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3146404-1

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Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

Sample Number	24128888-1
Sampled Date	Dec 05, 2024 10:15 AM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุก่อนไหผ่านพื้นที่โครงการ
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles bottle and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, a lot of solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	Not Detected	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.006	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.10	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

Sample Number	24128888-1
Sampled Date	Dec 05, 2024 10:15 AM
Sample Description	Surface Water
Location	SW1 : ห่วยมาบปุกอนใหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles bottle and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, a lot of solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.2	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.15	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	31	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Nattawut Athomprommarat

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.
-

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Senior Manager

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

Sample Number	24128888-2
Sampled Date	Dec 05, 2024 10:55 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปุ ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles bottle and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.003	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.005	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.04	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.12	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

Sample Number	24128888-2
Sampled Date	Dec 05, 2024 10:55 AM
Sample Description	Surface Water
Location	SW2 : ห่วยมาบปุ ณ จุดระบายน้ำทั้งโครงการ
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles bottle and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	4.8	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	3.22	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	11	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Nattawut Athomprommarat

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.
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No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

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P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

Sample Number	24128888-3
Sampled Date	Dec 05, 2024 11:40 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปุหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles bottle and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Metals Testing								
[A] Copper	mg/L	0.0003	0.0005	0.002	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
[A] Lead	mg/L	0.0003	0.0005	Not Detected	≤0.05	≤0.05	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Mercury	mg/L	0.0001	0.0005	Not Detected	≤0.002	≤0.002	In-house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E	Bangkok
[A] Nickel	mg/L	0.0003	0.0005	0.004	≤0.10	≤0.10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
[A] Zinc	mg/L	0.003	0.005	0.03	≤1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing								
Ammonia Nitrogen *	mg/L	0.02	0.05	0.28	≤0.5	≤0.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (F)	Rayong

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Approved by
Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

Sample Number	24128888-3
Sampled Date	Dec 05, 2024 11:40 AM
Sample Description	Surface Water
Location	SW3 : ห่วยมาบปุหลังไหลผ่านพื้นที่โครงการ
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, two BOD bottles bottle and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Water Testing								
BOD *	mg/L	-	2	<2.0	≤2	≤4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O C	Rayong
Dissolved Oxygen *	mg/L	-	0.1	4.9	≥4	≥2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	3.40	≤5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
pH at 25 degree C		-	-	7.6	5.0-9.0	5.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	5	9	No Standard	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

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

Sampling By : Nattawut Athomprommarat

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.
-

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Approved by
Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name :Monitoring
Project Location :WHA ESIE 2

Lot ID: 24128888
Date Received : Dec 05, 2024
Date Reported : Dec 12, 2024
Report Number : 3162174-1

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Dej Changchon
Senior Manager

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ภาคผนวก ค-3

คุณภาพน้ำจากระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469656
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029356-1

Sample Number	2469656-1
Sampled Date	Jul 01, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	27.2	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	86	≤400	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	6.5	6.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.7	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1790	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	5.7	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	62	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469656
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029356-1

Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-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.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469656
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029356-2

Sample Number	2469656-1
Sampled Date	Jul 01, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 02, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.05	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.001	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.23	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469656
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029356-2

Sample Number	2469656-1
Sampled Date	Jul 01, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 02, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.07	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.54	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-0084

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Technical Management Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469656
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029356-3

Sample Number	2469656-1
Sampled Date	Jul 01, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 02, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	1.14	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.87	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Odour *	-	-		Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong , Samart Khumphlee

Remark :
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Approved by
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484540
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063212-1

Sample Number	2484540-1
Sampled Date	Aug 02, 2024 9:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	15.0	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	91	≤400	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.2	6.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.8	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1420	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	3.5	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	63	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484540
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063212-1

Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484540
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063212-2

Sample Number	2484540-1
Sampled Date	Aug 02, 2024 9:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 05, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.06	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.001	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.23	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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

Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484540
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063212-2

Sample Number	2484540-1
Sampled Date	Aug 02, 2024 9:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 05, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.04	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.42	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484540
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063212-3

Sample Number	2484540-1
Sampled Date	Aug 02, 2024 9:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 03, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	1.20	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	1.46	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

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

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496621
Date Received : Sep 03, 2024
Date Reported : Sep 11, 2024
Report Number : 3089692-1

Sample Number	2496621-1
Sampled Date	Sep 03, 2024 10:25 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 03, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	32.6	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	84	≤400	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	6.2	6.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	788	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	4.1	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	94	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496621
Date Received : Sep 03, 2024
Date Reported : Sep 11, 2024
Report Number : 3089692-1

Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496621
Date Received : Sep 03, 2024
Date Reported : Sep 11, 2024
Report Number : 3089692-2

Sample Number	2496621-1
Sampled Date	Sep 03, 2024 10:25 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 04, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.09	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.003	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.24	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3112	Bangkok

Technical Management
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496621
Date Received : Sep 03, 2024
Date Reported : Sep 11, 2024
Report Number : 3089692-2

Sample Number	2496621-1
Sampled Date	Sep 03, 2024 10:25 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 04, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.04	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	1.70	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496621
Date Received : Sep 03, 2024
Date Reported : Sep 11, 2024
Report Number : 3089692-3

Sample Number	2496621-1
Sampled Date	Sep 03, 2024 10:25 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 04, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	1.52	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	1.84	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Odour *	-	-	Odourless	Non Objectionable	TIS, 257-2549		Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Wasan Kinunti , Kardbundit Kitisupavanit

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.
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Approved by
Chanattagarn Imchom
Section Head

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110336
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119906-1

Sample Number	24110336-1
Sampled Date	Oct 01, 2024 10:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	23.0	≤200	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	69	≤400	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	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		-	-	7.0	6.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.4	≤40	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	756	≤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	4.2	≤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	85	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by
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ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110336
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119906-1

Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110336
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119906-2

Sample Number	24110336-1
Sampled Date	Oct 01, 2024 10:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	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	0.08	≤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	0.002	≤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	0.15	≤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 Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110336
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119906-2

Sample Number	24110336-1
Sampled Date	Oct 01, 2024 10:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.04	≤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	0.83	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110336
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119906-3

Sample Number	24110336-1
Sampled Date	Oct 01, 2024 10:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	1.42	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	1.52	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Paramet Sattayakun , Pattarapol Sawangjaitam

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by Chanattagarn Imchom
Section Head

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

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123285
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149142-1

Sample Number	24123285-1
Sampled Date	Nov 05, 2024 10:31 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	13.4	≤200	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	64	≤400	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	30	≤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	27	≤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		-	-	6.2	6.0-9.0	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	≤40	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	788	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123285
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149142-1

Sample Number	24123285-1
Sampled Date	Nov 05, 2024 10:31 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	5.0	≤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	70	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123285
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149142-2

Sample Number	24123285-1
Sampled Date	Nov 05, 2024 10:31 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 06, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	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	0.11	≤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	0.003	≤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	0.14	≤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	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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

Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123285
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149142-2

Sample Number	24123285-1
Sampled Date	Nov 05, 2024 10:31 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 06, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.03	≤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	0.78	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123285
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149142-3

Sample Number	24123285-1
Sampled Date	Nov 05, 2024 10:31 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 06, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	1.01	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	1.20	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Surawit Narapong , Thanasoun Namakunna

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

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-1

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	35.4	≤200	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	104	≤400	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	30	≤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	30	≤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		-	-	6.4	6.0-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-1

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phenol	mg/L	0.005	0.01	<0.010	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 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	-	-	29.5	≤40	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	704	≤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	13.5	≤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	87	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-1

- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-2

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤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	0.12	≤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	0.15	≤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	0.002	≤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	0.17	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-2

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
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
Nickel	mg/L	0.0003	0.0005	0.04	≤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
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	2.76	≤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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-2

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-2

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-2

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
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 : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-3

Sample Number	24133443-1
Sampled Date	Dec 05, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Influent (น้ำเสียก่อนผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	1.06	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	1.20	≤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							
Odour *		-	-	Odourless		TIS, 257-2549	Rayong

Guideline : Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

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Approved by
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133443
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175424-3

Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

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

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Approved by
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469661
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029361-1

Sample Number	2469661-1
Sampled Date	Jul 01, 2024 10:53 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 01, 2024
Condition of Sample	one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	6.0	≤15	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	35	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	868	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	1.8	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	12	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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. 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

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469661
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029361-1

Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-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.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by Dej
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ต-9442

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469661
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029361-2

Sample Number	2469661-1
Sampled Date	Jul 01, 2024 10:53 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 02, 2024
Condition of Sample	one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.002	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	Not Detected	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.12	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ต-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469661
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029361-2

Sample Number	2469661-1
Sampled Date	Jul 01, 2024 10:53 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 02, 2024
Condition of Sample	one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.03	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.03	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	3.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-0084

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ต-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469661
Date Received : Jul 01, 2024
Date Reported : Jul 08, 2024
Report Number : 3029361-3

Sample Number	2469661-1
Sampled Date	Jul 01, 2024 10:53 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 02, 2024
Condition of Sample	one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.07	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.14	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.3	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	13.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong , Samart Khumphlee

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469663
Date Received : Jul 16, 2024
Date Reported : Jul 24, 2024
Report Number : 3029365-1

Sample Number	2469663-1
Sampled Date	Jul 16, 2024 10:36 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and a lot of turbid

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	≤15	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	43	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	910	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	1.6	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	21	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Chonticha Subongkoch, Scientist (3), ทะเบียนเลขที่ ว-323-จ-9449

Approved by Dej Changchon, Senior Manager, ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469663
Date Received : Jul 16, 2024
Date Reported : Jul 24, 2024
Report Number : 3029365-1

Sampling By : Suphanat Sakulk ทะเบียนเลขที่ ว-323-จ-0021 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Chonticha Subongkoch, Scientist (3), ทะเบียนเลขที่ ว-323-จ-9449

Approved by Dej Changchon, Senior Manager, ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469663
Date Received : Jul 16, 2024
Date Reported : Jul 24, 2024
Report Number : 3029365-2

Sample Number	2469663-1
Sampled Date	Jul 16, 2024 10:36 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	Not Detected	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.11	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3112	Bangkok

Technical Management Sawitree Noisangiam, Manager, ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469663
Date Received : Jul 16, 2024
Date Reported : Jul 24, 2024
Report Number : 3029365-2

Sample Number	2469663-1
Sampled Date	Jul 16, 2024 10:36 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.03	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	3.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulk ทะเบียนเลขที่ ว-323-จ-0021 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Sawitree Noisangiam, Manager, ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2469663
Date Received : Jul 16, 2024
Date Reported : Jul 24, 2024
Report Number : 3029365-3

Sample Number	2469663-1
Sampled Date	Jul 16, 2024 10:36 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Jul 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.05	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.16	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.2	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	10.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulk , Pattarapol Sawangjaitam

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

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by
Sawitree Noisangiam
Manager

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484544
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063241-1

Sample Number	2484544-1
Sampled Date	Aug 02, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	7.0	≤15	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	39	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1260	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	1.6	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	17	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484544
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063241-1

Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484544
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063241-2

Sample Number	2484544-1
Sampled Date	Aug 02, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 05, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.002	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	Not Detected	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.09	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484544
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063241-2

Sample Number	2484544-1
Sampled Date	Aug 02, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 05, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	4.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484544
Date Received : Aug 02, 2024
Date Reported : Aug 09, 2024
Report Number : 3063241-3

Sample Number	2484544-1
Sampled Date	Aug 02, 2024 10:05 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.02	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.10	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	<0.1	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	12.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 23, 2024
Report Number : 3063247-1

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

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	≤15	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	28	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1260	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	2.4	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	16	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. 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

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 23, 2024
Report Number : 3063247-1

Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 23, 2024
Report Number : 3063247-2

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.002	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	Not Detected	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.10	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 23, 2024
Report Number : 3063247-2

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.006	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
W ater Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	4.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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S317-67/ EMAIL S:\Reports_All_GL.rpt (6:45PM)

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 27, 2024
Report Number : 3063247-3

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.03	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.09	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.2	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	10.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Wasan Kinunti , Kardbundit Kitisupavanit

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

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 26, 2024
Report Number : 3063247-2

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.002	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	Not Detected	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.10	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 26, 2024
Report Number : 3063247-2

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.006	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	4.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2484548
Date Received : Aug 16, 2024
Date Reported : Aug 26, 2024
Report Number : 3063247-3

Sample Number	2484548-1
Sampled Date	Aug 16, 2024 11:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Aug 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.03	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.09	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.2	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	10.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Wasan Kinunti , Kardbundit Kitisupavanit

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

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496624
Date Received : Sep 03, 2024
Date Reported : Sep 09, 2024
Report Number : 3089704-1

Sample Number	2496624-1
Sampled Date	Sep 03, 2024 10:47 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 03, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	7.6	≤15	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	39	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.1	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1140	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	1.9	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	21	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. 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

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496624
Date Received : Sep 03, 2024
Date Reported : Sep 09, 2024
Report Number : 3089704-1

Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496624
Date Received : Sep 03, 2024
Date Reported : Sep 10, 2024
Report Number : 3089704-2

Sample Number	2496624-1
Sampled Date	Sep 03, 2024 10:47 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 04, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.006	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.001	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.10	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3112	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496624
Date Received : Sep 03, 2024
Date Reported : Sep 10, 2024
Report Number : 3089704-2

Sample Number	2496624-1
Sampled Date	Sep 03, 2024 10:47 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 04, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, 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, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.08	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	4.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496624
Date Received : Sep 03, 2024
Date Reported : Sep 10, 2024
Report Number : 3089704-3

Sample Number	2496624-1
Sampled Date	Sep 03, 2024 10:47 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 03, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.07	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.22	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.3	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	12.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Wasan Kinunti , Kardbundit Kitisupavanit

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

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496628
Date Received : Sep 17, 2024
Date Reported : Sep 24, 2024
Report Number : 3089703-1

Sample Number	2496628-1
Sampled Date	Sep 17, 2024 2:33 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 17, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	4.6	≤15	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	41	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	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	-	-	31.1	≤40	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	1220	≤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	1.7	≤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	24	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. 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

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496628
Date Received : Sep 17, 2024
Date Reported : Sep 24, 2024
Report Number : 3089703-1

Sampling By : Suphanat Sakulk ทะเบียนเลขที่ ว-323-จ-0021 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496628
Date Received : Sep 17, 2024
Date Reported : Sep 24, 2024
Report Number : 3089703-2

Sample Number	2496628-1
Sampled Date	Sep 17, 2024 2:33 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 18, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	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	0.005	≤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	Not Detected	≤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	0.15	≤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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496628
Date Received : Sep 17, 2024
Date Reported : Sep 24, 2024
Report Number : 3089703-2

Sample Number	2496628-1
Sampled Date	Sep 17, 2024 2:33 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 18, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	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
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	0.03	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	4.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulk ทะเบียนเลขที่ ว-323-จ-0021 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 2496628
Date Received : Sep 17, 2024
Date Reported : Sep 24, 2024
Report Number : 3089703-3

Sample Number	2496628-1
Sampled Date	Sep 17, 2024 2:33 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Sep 18, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.07	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.19	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	10.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulk , Pattarapol Sawangjaitam

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

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

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110339
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119908-1

Sample Number	24110339-1
Sampled Date	Oct 01, 2024 10:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

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	≤15	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	40	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	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	-	-	30.3	≤40	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	1220	≤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	1.8	≤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	18	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management — Photchana Seeda, Scientist (4), ทะเบียนเลขที่ ว-323-จ-0028

Approved by — Dej Changchon, Senior Manager, ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110339
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119908-1

Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management — Photchana Seeda, Scientist (4), ทะเบียนเลขที่ ว-323-จ-0028

Approved by — Dej Changchon, Senior Manager, ทะเบียนเลขที่ ว-323-ค-0001

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S317-67/ EMAIL S:\Reports\MixRef_All_GL.rpt (11:43AM)

Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110339
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119908-2

Sample Number	24110339-1
Sampled Date	Oct 01, 2024 10:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	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	0.005	≤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	Not Detected	≤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	0.13	≤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 — Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008

Approved by — Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110339
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119908-2

Sample Number	24110339-1
Sampled Date	Oct 01, 2024 10:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	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
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	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	3.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management — Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008

Approved by — Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110339
Date Received : Oct 01, 2024
Date Reported : Oct 08, 2024
Report Number : 3119908-3

Sample Number	24110339-1
Sampled Date	Oct 01, 2024 10:35 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 01, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	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
Iron	mg/L	0.003	0.005	0.14	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	16.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Paramet Sattayakun , Pattarapol Sawangjaitam

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by
Chanattagarn Imchom
Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110343
Date Received : Oct 16, 2024
Date Reported : Oct 22, 2024
Report Number : 3119911-1

Sample Number	24110343-1
Sampled Date	Oct 16, 2024 11:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 16, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	7.2	≤15	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	36	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	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	≤40	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	990	≤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	2.1	≤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	19	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110343
Date Received : Oct 16, 2024
Date Reported : Oct 22, 2024
Report Number : 3119911-1

Sampling By : Suphanat Sakulk ทะเบียนเลขที่ ว-323-จ-0021 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-0084

Remark :
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Technical Management
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110343
Date Received : Oct 16, 2024
Date Reported : Oct 23, 2024
Report Number : 3119911-2

Sample Number	24110343-1
Sampled Date	Oct 16, 2024 11:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 17, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	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	0.005	≤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	0.001	≤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	0.10	≤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	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110343
Date Received : Oct 16, 2024
Date Reported : Oct 23, 2024
Report Number : 3119911-2

Sample Number	24110343-1
Sampled Date	Oct 16, 2024 11:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 17, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	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
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	0.05	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	3.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulk ทะเบียนเลขที่ ว-323-จ-0021 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-0084

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24110343
Date Received : Oct 16, 2024
Date Reported : Oct 23, 2024
Report Number : 3119911-3

Sample Number	24110343-1
Sampled Date	Oct 16, 2024 11:15 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Oct 17, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	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
Iron	mg/L	0.003	0.005	0.24	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	5.21	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulk , Samart Khumphlee

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

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123296
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149158-1

Sample Number	24123296-1
Sampled Date	Nov 05, 2024 10:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	3.6	≤15	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	38	≤120	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	27	≤300	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	26	≤300	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	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.4	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	-	-	29.6	≤40	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	796	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123296
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149158-1

Sample Number	24123296-1
Sampled Date	Nov 05, 2024 10:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 05, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	2.0	≤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	25	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123296
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149158-2

Sample Number	24123296-1
Sampled Date	Nov 05, 2024 10:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 06, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	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	0.004	≤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	Not Detected	≤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	0.11	≤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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123296
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149158-2

Sample Number	24123296-1
Sampled Date	Nov 05, 2024 10:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 06, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	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
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	0.02	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	3.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123296
Date Received : Nov 05, 2024
Date Reported : Nov 12, 2024
Report Number : 3149158-3

Sample Number	24123296-1
Sampled Date	Nov 05, 2024 10:50 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 06, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.04	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.19	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	15.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Surawit Narapong , Thanasoun Namakunna

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

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123305
Date Received : Nov 18, 2024
Date Reported : Nov 25, 2024
Report Number : 3149172-1

Sample Number	24123305-1
Sampled Date	Nov 18, 2024 2:00 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 18, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	6.0	≤15	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	51	≤120	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	21	≤300	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	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	≤5	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	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	29.5	≤40	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	800	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123305
Date Received : Nov 18, 2024
Date Reported : Nov 25, 2024
Report Number : 3149172-1

Sample Number	24123305-1
Sampled Date	Nov 18, 2024 2:00 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 18, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	3.0	≤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	28	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Amonwich Wongsachai ทะเบียนเลขที่ ว-323-จ-0040 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by Dej
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ต-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123305
Date Received : Nov 18, 2024
Date Reported : Nov 25, 2024
Report Number : 3149172-2

Sample Number	24123305-1
Sampled Date	Nov 18, 2024 2:00 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 19, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤0.25	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	0.006	≤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	0.001	≤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	0.12	≤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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ต-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123305
Date Received : Nov 18, 2024
Date Reported : Nov 25, 2024
Report Number : 3149172-2

Sample Number	24123305-1
Sampled Date	Nov 18, 2024 2:00 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 19, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	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
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	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	3.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Amonwich Wongsachai ทะเบียนเลขที่ ว-323-จ-0040 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ต-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24123305
Date Received : Nov 18, 2024
Date Reported : Nov 25, 2024
Report Number : 3149172-3

Sample Number	24123305-1
Sampled Date	Nov 18, 2024 2:00 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Nov 19, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.07	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.26	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	10.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Amonwich Wongsachai , Kardbundit Kitisupavanit

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

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-1

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

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	≤15	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	53	≤120	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	28	≤300	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	24	≤300	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	<0.005	≤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	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	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 Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-1

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 05, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	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	-	-	27.4	≤40	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	804	≤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	2.1	≤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	30	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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

Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-1

- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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

Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-2

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.003	≤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	0.04	≤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	0.004	≤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	Not Detected	≤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	0.14	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-2

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
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
Nickel	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
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
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	0.06	≤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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-2

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-2

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
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 Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-2

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
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
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	4.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-3

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	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
Iron	mg/L	0.003	0.005	0.23	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							
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							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133478
Date Received : Dec 05, 2024
Date Reported : Dec 13, 2024
Report Number : 3175447-3

Sample Number	24133478-1
Sampled Date	Dec 05, 2024 10:40 AM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 06, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles and ten plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Nitrate as N *	mg/L	0.015	0.05	15.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133481
Date Received : Dec 19, 2024
Date Reported : Dec 25, 2024
Report Number : 3175450-1

Sample Number	24133481-1
Sampled Date	Dec 19, 2024 2:25 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 19, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

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	≤15	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	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	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	-	-	28.3	≤40	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	186	≤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	2.3	≤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	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING No.0042

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133481
Date Received : Dec 19, 2024
Date Reported : Dec 25, 2024
Report Number : 3175450-1

Sampling By : Suphanat Sakulkittimasak ทะเบียนเลขที่ ว-323-จ-0021 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133481
Date Received : Dec 19, 2024
Date Reported : Dec 26, 2024
Report Number : 3175450-2

Sample Number	24133481-1
Sampled Date	Dec 19, 2024 2:25 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 20, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.002	≤0.25	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	0.004	≤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	Not Detected	≤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	0.17	≤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	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133481
Date Received : Dec 19, 2024
Date Reported : Dec 26, 2024
Report Number : 3175450-2

Sample Number	24133481-1
Sampled Date	Dec 19, 2024 2:25 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 20, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Nickel	mg/L	0.0003	0.0005	0.001	≤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	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulkittimasak ทะเบียนเลขที่ ว-323-จ-0021 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

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

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
475/3 Moo 7, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O :
Project Name :
Project Location: WHA ESIE 2

Lot ID: 24133481
Date Received : Dec 19, 2024
Date Reported : Dec 26, 2024
Report Number : 3175450-3

Sample Number	24133481-1
Sampled Date	Dec 19, 2024 2:25 PM
Sample Description	Wastewater
Location	WHA ESIE2 : Effluent_Holding Pond (น้ำเสียหลังผ่านระบบบำบัดน้ำเสียส่วนกลางทางชีวภาพ)
Date Analysis Commenced	Dec 19, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Aluminium	mg/L	0.003	0.005	0.07	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Iron	mg/L	0.003	0.005	0.91	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.61	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Odour *		-	-	Odourless	Non Objectionable	TIS, 257-2549	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment.
BOD guideline set by Amendment details report of Environmental Impact Assessment Report of WHA Eastern Seaboard Industrial Estate 2.
Sampling By : Suphanat Sakulkittimasak , Pattarapol Sawangjaitam

Remark :
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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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ภาคผนวก ค-4

ระดับเสียงโดยทั่วไป

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174594-1

Sample Number 24122158-1
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 02 - Nov 03, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	57.5	75.8	41.3
12:00 PM - 01:00 PM	59.4	79.5	53.8
01:00 PM - 02:00 PM	59.2	80.4	41.9
02:00 PM - 03:00 PM	66.4	76.2	53.8
03:00 PM - 04:00 PM	65.6	78.3	50.5
04:00 PM - 05:00 PM	60.6	74.1	42.7
05:00 PM - 06:00 PM	43.2	61.5	39.1
06:00 PM - 07:00 PM	44.3	62.3	41.8
07:00 PM - 08:00 PM	42.8	60.0	39.9
08:00 PM - 09:00 PM	40.6	60.0	37.8
09:00 PM - 10:00 PM	44.5	66.3	37.0
10:00 PM - 11:00 PM	40.0	58.9	37.2
11:00 PM - 12:00 AM	38.0	49.2	35.8
12:00 AM - 01:00 AM	39.7	53.2	35.3
01:00 AM - 02:00 AM	38.8	50.4	35.9
02:00 AM - 03:00 AM	39.2	50.3	36.2
03:00 AM - 04:00 AM	44.0	60.4	36.9
04:00 AM - 05:00 AM	51.2	70.0	40.8
05:00 AM - 06:00 AM	60.6	74.2	50.5
06:00 AM - 07:00 AM	58.4	74.3	47.9
07:00 AM - 08:00 AM	56.4	77.7	48.8
08:00 AM - 09:00 AM	59.7	79.8	54.1
09:00 AM - 10:00 AM	64.7	77.8	47.2
10:00 AM - 11:00 AM	62.1	70.8	51.9
Leq Average 24 hrs. (dB(A))	59.1		
Lmax (dB(A))		80.4	
L90 (dB(A))			41.3
Ldn (dB(A))	62.0		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174595-1

Sample Number 24122158-2
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 03 - Nov 04, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	60.5	79.0	50.1
12:00 PM - 01:00 PM	53.7	71.2	43.4
01:00 PM - 02:00 PM	56.7	75.0	40.5
02:00 PM - 03:00 PM	50.8	61.6	39.5
03:00 PM - 04:00 PM	51.5	62.1	38.7
04:00 PM - 05:00 PM	54.4	64.9	40.1
05:00 PM - 06:00 PM	41.5	56.9	38.8
06:00 PM - 07:00 PM	43.4	53.2	40.3
07:00 PM - 08:00 PM	41.5	48.2	39.9
08:00 PM - 09:00 PM	41.4	61.6	37.6
09:00 PM - 10:00 PM	39.7	54.5	36.9
10:00 PM - 11:00 PM	38.4	47.1	36.0
11:00 PM - 12:00 AM	37.9	48.6	35.4
12:00 AM - 01:00 AM	37.5	47.7	35.2
01:00 AM - 02:00 AM	37.3	45.1	35.4
02:00 AM - 03:00 AM	39.5	50.5	36.7
03:00 AM - 04:00 AM	40.7	58.1	37.4
04:00 AM - 05:00 AM	41.8	55.7	39.4
05:00 AM - 06:00 AM	48.5	70.1	42.8
06:00 AM - 07:00 AM	49.5	62.7	44.7
07:00 AM - 08:00 AM	49.7	68.3	43.0
08:00 AM - 09:00 AM	61.0	84.6	41.2
09:00 AM - 10:00 AM	57.8	82.0	39.6
10:00 AM - 11:00 AM	51.4	68.0	40.7
Leq Average 24 hrs. (dB(A))	53.0		
Lmax (dB(A))		84.6	
L90 (dB(A))			39.5
Ldn (dB(A))	54.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174596-1

Sample Number 24122158-3
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 04 - Nov 05, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	55.4	61.6	50.5
12:00 PM - 01:00 PM	54.2	77.7	50.0
01:00 PM - 02:00 PM	52.1	63.0	49.9
02:00 PM - 03:00 PM	54.4	63.7	50.7
03:00 PM - 04:00 PM	53.7	64.4	50.7
04:00 PM - 05:00 PM	56.7	80.3	50.4
05:00 PM - 06:00 PM	53.5	71.3	50.3
06:00 PM - 07:00 PM	52.2	57.3	50.2
07:00 PM - 08:00 PM	53.3	56.9	50.0
08:00 PM - 09:00 PM	53.2	58.0	49.9
09:00 PM - 10:00 PM	51.8	55.4	50.1
10:00 PM - 11:00 PM	52.3	55.2	50.3
11:00 PM - 12:00 AM	56.3	73.0	51.3
12:00 AM - 01:00 AM	53.5	71.2	51.4
01:00 AM - 02:00 AM	53.0	55.8	50.5
02:00 AM - 03:00 AM	53.5	58.8	50.5
03:00 AM - 04:00 AM	53.6	59.8	50.7
04:00 AM - 05:00 AM	53.3	57.8	50.5
05:00 AM - 06:00 AM	53.2	63.2	51.3
06:00 AM - 07:00 AM	53.8	60.4	52.0
07:00 AM - 08:00 AM	53.6	63.1	52.0
08:00 AM - 09:00 AM	53.5	65.8	51.3
09:00 AM - 10:00 AM	54.3	62.1	51.2
10:00 AM - 11:00 AM	53.9	62.2	49.9
Leq Average 24 hrs. (dB(A))	53.8		
Lmax (dB(A))		80.3	
L90 (dB(A))			50.5
Ldn (dB(A))	60.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174597-1

Sample Number 24122158-4
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 05 - Nov 06, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	55.1	63.1	48.9
12:00 PM - 01:00 PM	53.8	61.1	48.0
01:00 PM - 02:00 PM	50.6	59.8	49.2
02:00 PM - 03:00 PM	51.5	67.6	50.0
03:00 PM - 04:00 PM	51.7	68.2	49.9
04:00 PM - 05:00 PM	52.6	60.0	49.6
05:00 PM - 06:00 PM	51.8	57.0	49.7
06:00 PM - 07:00 PM	51.7	61.7	50.3
07:00 PM - 08:00 PM	52.4	54.6	50.2
08:00 PM - 09:00 PM	52.1	56.5	50.0
09:00 PM - 10:00 PM	52.0	54.8	49.9
10:00 PM - 11:00 PM	51.7	54.1	50.0
11:00 PM - 12:00 AM	51.7	57.4	50.0
12:00 AM - 01:00 AM	51.7	53.8	50.0
01:00 AM - 02:00 AM	51.5	53.5	50.1
02:00 AM - 03:00 AM	51.5	54.8	50.1
03:00 AM - 04:00 AM	51.6	59.5	50.0
04:00 AM - 05:00 AM	51.5	53.9	49.8
05:00 AM - 06:00 AM	52.8	66.3	51.1
06:00 AM - 07:00 AM	52.4	62.3	51.0
07:00 AM - 08:00 AM	52.4	67.2	50.5
08:00 AM - 09:00 AM	52.8	71.8	50.2
09:00 AM - 10:00 AM	54.2	64.9	50.1
10:00 AM - 11:00 AM	51.3	64.6	49.1
Leq Average 24 hrs. (dB(A))	52.3		
Lmax (dB(A))		71.8	
L90 (dB(A))			50.0
Ldn (dB(A))	58.4		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174598-1

Sample Number 24122158-5
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 06 - Nov 07, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.4	61.2	50.3
12:00 PM - 01:00 PM	52.3	59.9	49.8
01:00 PM - 02:00 PM	51.3	61.0	49.4
02:00 PM - 03:00 PM	52.5	60.6	50.3
03:00 PM - 04:00 PM	51.2	59.8	49.8
04:00 PM - 05:00 PM	55.3	60.7	50.7
05:00 PM - 06:00 PM	51.2	57.5	49.9
06:00 PM - 07:00 PM	50.8	55.8	49.8
07:00 PM - 08:00 PM	50.8	53.3	49.9
08:00 PM - 09:00 PM	51.0	53.4	50.1
09:00 PM - 10:00 PM	51.3	53.5	50.1
10:00 PM - 11:00 PM	50.9	53.8	49.7
11:00 PM - 12:00 AM	50.9	53.1	49.7
12:00 AM - 01:00 AM	50.6	52.9	49.7
01:00 AM - 02:00 AM	50.7	55.4	49.6
02:00 AM - 03:00 AM	50.8	53.6	49.7
03:00 AM - 04:00 AM	50.4	61.9	49.6
04:00 AM - 05:00 AM	50.6	55.3	49.6
05:00 AM - 06:00 AM	51.9	62.5	50.5
06:00 AM - 07:00 AM	52.4	60.9	51.1
07:00 AM - 08:00 AM	51.5	56.9	50.3
08:00 AM - 09:00 AM	52.3	68.3	50.2
09:00 AM - 10:00 AM	55.3	61.4	49.4
10:00 AM - 11:00 AM	52.4	68.4	50.3
Leq Average 24 hrs. (dB(A))	52.0		
Lmax (dB(A))		68.4	
L90 (dB(A))			49.8
Ldn (dB(A))	57.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174599-1

Sample Number 24122158-6
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 07 - Nov 08, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	52.9	68.0	49.1
12:00 PM - 01:00 PM	54.6	61.8	48.0
01:00 PM - 02:00 PM	50.9	63.1	47.8
02:00 PM - 03:00 PM	51.5	62.6	48.1
03:00 PM - 04:00 PM	55.6	61.8	49.4
04:00 PM - 05:00 PM	55.4	61.4	49.8
05:00 PM - 06:00 PM	51.7	66.6	49.7
06:00 PM - 07:00 PM	50.9	58.0	50.1
07:00 PM - 08:00 PM	50.9	55.3	50.1
08:00 PM - 09:00 PM	50.8	54.3	49.9
09:00 PM - 10:00 PM	51.3	53.3	50.0
10:00 PM - 11:00 PM	51.3	53.4	49.8
11:00 PM - 12:00 AM	51.6	53.7	49.9
12:00 AM - 01:00 AM	51.7	53.9	50.3
01:00 AM - 02:00 AM	50.4	53.3	49.7
02:00 AM - 03:00 AM	51.1	55.0	49.8
03:00 AM - 04:00 AM	51.8	61.1	50.2
04:00 AM - 05:00 AM	51.7	58.1	50.6
05:00 AM - 06:00 AM	52.4	66.0	50.9
06:00 AM - 07:00 AM	52.6	64.2	51.3
07:00 AM - 08:00 AM	52.4	62.3	50.8
08:00 AM - 09:00 AM	52.0	64.5	50.1
09:00 AM - 10:00 AM	53.2	62.5	47.9
10:00 AM - 11:00 AM	49.7	56.9	48.2
Leq Average 24 hrs. (dB(A))	52.3		
Lmax (dB(A))		68.0	
L90 (dB(A))			49.8
Ldn (dB(A))	58.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174600-1

Sample Number 24122158-7
Parameter Noise (Leq 24 hrs)
Location บริเวณหมู่ 7 บ้านมาบลำบิด (N1)
Measurement Date Nov 08 - Nov 09, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 900071

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	50.4	65.7	47.9
12:00 PM - 01:00 PM	54.3	60.4	48.1
01:00 PM - 02:00 PM	50.0	58.9	47.6
02:00 PM - 03:00 PM	49.9	60.2	48.4
03:00 PM - 04:00 PM	51.2	58.0	49.3
04:00 PM - 05:00 PM	54.9	60.3	50.2
05:00 PM - 06:00 PM	51.6	55.0	49.7
06:00 PM - 07:00 PM	52.5	62.1	50.0
07:00 PM - 08:00 PM	52.1	54.2	50.2
08:00 PM - 09:00 PM	52.2	57.5	50.2
09:00 PM - 10:00 PM	51.2	54.1	49.8
10:00 PM - 11:00 PM	51.2	54.1	49.5
11:00 PM - 12:00 AM	51.1	54.3	49.6
12:00 AM - 01:00 AM	50.9	56.4	49.3
01:00 AM - 02:00 AM	50.8	53.9	49.4
02:00 AM - 03:00 AM	51.1	57.2	49.7
03:00 AM - 04:00 AM	51.9	64.1	50.3
04:00 AM - 05:00 AM	51.6	53.9	50.6
05:00 AM - 06:00 AM	52.1	56.8	51.1
06:00 AM - 07:00 AM	52.8	63.7	51.3
07:00 AM - 08:00 AM	52.2	60.4	50.6
08:00 AM - 09:00 AM	52.4	67.0	49.9
09:00 AM - 10:00 AM	51.9	62.1	49.0
10:00 AM - 11:00 AM	52.0	60.2	50.4
Leq Average 24 hrs. (dB(A))	51.9		
Lmax (dB(A))		67.0	
L90 (dB(A))			49.7
Ldn (dB(A))	58.0		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174601-1

Sample Number 24122158-8
Parameter Noise (Leq 24 hrs)
Location โรงพยาบาลส่งเสริมสุขภาพตำบลเฉลิมพระเกียรติ 60 พรรษานวมินทราชินี (N2)
Measurement Date Nov 02 - Nov 03, 2024
Measurement by Anuwet Tema
Sound Level meter Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	58.3	73.7	54.7
10:00 AM - 11:00 AM	59.4	79.3	56.8
11:00 AM - 12:00 PM	58.4	69.6	55.8
12:00 PM - 01:00 PM	58.4	74.1	55.2
01:00 PM - 02:00 PM	58.3	69.0	55.2
02:00 PM - 03:00 PM	58.9	85.7	55.8
03:00 PM - 04:00 PM	58.8	70.3	56.0
04:00 PM - 05:00 PM	60.0	79.0	57.2
05:00 PM - 06:00 PM	58.6	76.3	55.8
06:00 PM - 07:00 PM	58.9	73.3	56.1
07:00 PM - 08:00 PM	57.6	78.9	53.9
08:00 PM - 09:00 PM	55.9	74.3	52.1
09:00 PM - 10:00 PM	54.9	70.3	51.0
10:00 PM - 11:00 PM	54.1	73.6	49.4
11:00 PM - 12:00 AM	52.9	65.8	48.7
12:00 AM - 01:00 AM	51.9	68.7	47.5
01:00 AM - 02:00 AM	51.6	66.7	47.1
02:00 AM - 03:00 AM	51.6	69.6	46.5
03:00 AM - 04:00 AM	52.4	69.7	47.3
04:00 AM - 05:00 AM	54.9	79.5	51.1
05:00 AM - 06:00 AM	57.6	71.4	53.8
06:00 AM - 07:00 AM	59.0	71.8	56.3
07:00 AM - 08:00 AM	58.4	70.6	55.4
08:00 AM - 09:00 AM	58.0	71.9	55.4
Leq Average 24 hrs. (dB(A))	57.3		
Lmax (dB(A))		85.7	
L90 (dB(A))			54.7
Ldn (dB(A))	62.0		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174602-1

Sample Number	24122158-9
Parameter	Noise (Leq 24 hrs)
Location	โรงพยาบาลส่งเสริมสุขภาพตำบลเจเล็มพระเกียรติ 60 พรรษาเวฬินทราชินี (N2)
Measurement Date	Nov 03 - Nov 04, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	58.7	72.6	55.5
10:00 AM - 11:00 AM	57.8	74.2	54.5
11:00 AM - 12:00 PM	57.5	71.0	54.5
12:00 PM - 01:00 PM	57.4	71.4	54.3
01:00 PM - 02:00 PM	57.6	73.1	54.7
02:00 PM - 03:00 PM	58.6	75.2	54.9
03:00 PM - 04:00 PM	58.1	73.9	55.2
04:00 PM - 05:00 PM	58.5	72.0	55.6
05:00 PM - 06:00 PM	58.5	76.1	54.7
06:00 PM - 07:00 PM	59.0	80.4	54.6
07:00 PM - 08:00 PM	56.8	71.6	53.8
08:00 PM - 09:00 PM	55.4	76.0	52.3
09:00 PM - 10:00 PM	55.3	70.3	52.0
10:00 PM - 11:00 PM	53.4	66.2	49.8
11:00 PM - 12:00 AM	53.7	71.1	48.5
12:00 AM - 01:00 AM	52.0	66.7	47.3
01:00 AM - 02:00 AM	52.1	68.3	47.1
02:00 AM - 03:00 AM	53.1	73.4	47.1
03:00 AM - 04:00 AM	53.5	69.6	48.1
04:00 AM - 05:00 AM	56.0	72.1	51.7
05:00 AM - 06:00 AM	59.7	73.5	56.2
06:00 AM - 07:00 AM	60.6	73.3	58.1
07:00 AM - 08:00 AM	59.1	81.2	56.2
08:00 AM - 09:00 AM	59.1	71.5	56.6
Leq Average 24 hrs. (dB(A))	57.4		
Lmax (dB(A))		81.2	
L90 (dB(A))			54.5
Ldn (dB(A))	62.8		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

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Life Sciences www.alsglobal.com
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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174603-1

Sample Number	24122158-10
Parameter	Noise (Leq 24 hrs)
Location	โรงพยาบาลส่งเสริมสุขภาพตำบลเจเล็มพระเกียรติ 60 พรรษาเวฬินทราชินี (N2)
Measurement Date	Nov 04 - Nov 05, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	61.2	85.8	56.5
10:00 AM - 11:00 AM	59.3	76.3	56.2
11:00 AM - 12:00 PM	58.8	72.2	55.9
12:00 PM - 01:00 PM	58.2	69.8	55.4
01:00 PM - 02:00 PM	58.8	71.0	56.2
02:00 PM - 03:00 PM	58.8	72.6	55.9
03:00 PM - 04:00 PM	59.0	71.7	56.0
04:00 PM - 05:00 PM	59.2	74.2	56.0
05:00 PM - 06:00 PM	57.6	75.7	54.5
06:00 PM - 07:00 PM	57.5	70.5	54.3
07:00 PM - 08:00 PM	57.5	75.7	54.2
08:00 PM - 09:00 PM	55.6	71.3	51.9
09:00 PM - 10:00 PM	54.3	70.9	50.6
10:00 PM - 11:00 PM	54.7	66.4	49.3
11:00 PM - 12:00 AM	59.1	71.6	48.9
12:00 AM - 01:00 AM	52.6	70.2	47.9
01:00 AM - 02:00 AM	51.7	67.0	46.6
02:00 AM - 03:00 AM	52.7	78.5	47.8
03:00 AM - 04:00 AM	53.2	70.8	48.4
04:00 AM - 05:00 AM	55.6	74.4	51.6
05:00 AM - 06:00 AM	59.0	73.4	54.9
06:00 AM - 07:00 AM	60.7	74.2	58.4
07:00 AM - 08:00 AM	59.2	75.8	56.6
08:00 AM - 09:00 AM	59.5	69.1	57.2
Leq Average 24 hrs. (dB(A))	57.9		
Lmax (dB(A))		85.8	
L90 (dB(A))			54.5
Ldn (dB(A))	63.4		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174604-1

Sample Number	24122158-11
Parameter	Noise (Leq 24 hrs)
Location	โรงพยาบาลส่งเสริมสุขภาพตำบลเจเล็มพระเกียรติ 60 พรรษาเวฬินทราชินี (N2)
Measurement Date	Nov 05 - Nov 06, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	59.3	72.5	56.8
10:00 AM - 11:00 AM	59.1	76.0	56.5
11:00 AM - 12:00 PM	58.4	68.6	55.4
12:00 PM - 01:00 PM	58.4	79.9	55.4
01:00 PM - 02:00 PM	59.0	82.5	56.5
02:00 PM - 03:00 PM	59.5	73.6	57.0
03:00 PM - 04:00 PM	59.6	82.2	56.8
04:00 PM - 05:00 PM	59.7	81.1	56.6
05:00 PM - 06:00 PM	58.1	72.3	55.1
06:00 PM - 07:00 PM	59.4	84.9	55.0
07:00 PM - 08:00 PM	57.5	74.4	54.3
08:00 PM - 09:00 PM	56.3	73.2	52.7
09:00 PM - 10:00 PM	55.4	72.7	51.9
10:00 PM - 11:00 PM	53.8	68.1	49.7
11:00 PM - 12:00 AM	53.9	71.7	49.9
12:00 AM - 01:00 AM	51.9	65.2	47.4
01:00 AM - 02:00 AM	52.4	67.8	47.6
02:00 AM - 03:00 AM	53.2	70.5	48.2
03:00 AM - 04:00 AM	54.4	76.4	49.0
04:00 AM - 05:00 AM	55.5	70.9	51.4
05:00 AM - 06:00 AM	59.2	74.9	55.7
06:00 AM - 07:00 AM	60.8	72.8	58.1
07:00 AM - 08:00 AM	59.3	74.7	56.4
08:00 AM - 09:00 AM	59.1	72.2	56.4
Leq Average 24 hrs. (dB(A))	57.9		
Lmax (dB(A))		84.9	
L90 (dB(A))			55.1
Ldn (dB(A))	63.0		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174605-1

Sample Number	24122158-12
Parameter	Noise (Leq 24 hrs)
Location	โรงพยาบาลส่งเสริมสุขภาพตำบลเจเล็มพระเกียรติ 60 พรรษาเวฬินทราชินี (N2)
Measurement Date	Nov 06 - Nov 07, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	59.1	69.6	56.5
10:00 AM - 11:00 AM	58.9	70.2	56.0
11:00 AM - 12:00 PM	58.8	72.4	55.9
12:00 PM - 01:00 PM	58.3	72.6	55.6
01:00 PM - 02:00 PM	58.4	70.0	55.8
02:00 PM - 03:00 PM	58.9	69.6	56.2
03:00 PM - 04:00 PM	59.3	71.5	56.6
04:00 PM - 05:00 PM	59.4	72.4	56.7
05:00 PM - 06:00 PM	58.5	74.3	55.8
06:00 PM - 07:00 PM	58.2	74.0	55.4
07:00 PM - 08:00 PM	57.4	71.3	54.3
08:00 PM - 09:00 PM	55.9	68.8	52.3
09:00 PM - 10:00 PM	54.7	69.0	50.9
10:00 PM - 11:00 PM	54.8	74.7	49.4
11:00 PM - 12:00 AM	53.1	73.8	48.7
12:00 AM - 01:00 AM	51.9	65.5	46.6
01:00 AM - 02:00 AM	52.4	66.0	47.0
02:00 AM - 03:00 AM	53.3	72.1	48.0
03:00 AM - 04:00 AM	54.6	71.7	48.9
04:00 AM - 05:00 AM	56.6	73.9	52.3
05:00 AM - 06:00 AM	59.8	73.5	56.3
06:00 AM - 07:00 AM	61.0	76.8	58.3
07:00 AM - 08:00 AM	59.5	77.0	56.7
08:00 AM - 09:00 AM	58.8	71.0	56.4
Leq Average 24 hrs. (dB(A))	57.8		
Lmax (dB(A))		77.0	
L90 (dB(A))			55.6
Ldn (dB(A))	63.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

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Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174606-1

Sample Number	24122158-13
Parameter	Noise (Leq 24 hrs)
Location	โรงพยาบาลส่งเสริมสุขภาพตำบลเฉลิมพระเกียรติ 60 พรรษาเวฬินทราชินี (N2)
Measurement Date	Nov 07 - Nov 08, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	58.6	72.3	55.1
10:00 AM - 11:00 AM	59.2	80.6	56.3
11:00 AM - 12:00 PM	58.7	73.8	55.7
12:00 PM - 01:00 PM	58.3	76.3	55.3
01:00 PM - 02:00 PM	58.5	71.6	55.5
02:00 PM - 03:00 PM	58.8	69.4	56.0
03:00 PM - 04:00 PM	59.3	74.4	56.5
04:00 PM - 05:00 PM	59.7	73.5	57.2
05:00 PM - 06:00 PM	59.0	72.9	56.3
06:00 PM - 07:00 PM	58.4	73.5	55.5
07:00 PM - 08:00 PM	58.4	71.2	55.5
08:00 PM - 09:00 PM	56.8	74.3	53.1
09:00 PM - 10:00 PM	55.9	75.8	52.2
10:00 PM - 11:00 PM	54.9	70.8	51.0
11:00 PM - 12:00 AM	53.1	65.3	48.3
12:00 AM - 01:00 AM	54.2	70.9	48.5
01:00 AM - 02:00 AM	52.5	67.8	47.9
02:00 AM - 03:00 AM	53.0	64.0	48.4
03:00 AM - 04:00 AM	53.6	68.2	48.9
04:00 AM - 05:00 AM	55.5	71.7	51.1
05:00 AM - 06:00 AM	57.4	74.1	53.5
06:00 AM - 07:00 AM	60.3	76.2	57.7
07:00 AM - 08:00 AM	60.2	72.6	57.6
08:00 AM - 09:00 AM	59.4	73.7	56.9
Leq Average 24 hrs. (dB(A))	57.8		
Lmax (dB(A))		80.6	
L90 (dB(A))			55.3
Ldn (dB(A))	62.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174607-1

Sample Number	24122158-14
Parameter	Noise (Leq 24 hrs)
Location	โรงพยาบาลส่งเสริมสุขภาพตำบลเฉลิมพระเกียรติ 60 พรรษาเวฬินทราชินี (N2)
Measurement Date	Nov 08 - Nov 09, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 296518

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	59.4	77.1	56.9
10:00 AM - 11:00 AM	59.2	79.0	56.2
11:00 AM - 12:00 PM	58.6	74.2	55.8
12:00 PM - 01:00 PM	58.3	80.9	55.2
01:00 PM - 02:00 PM	58.3	74.9	55.4
02:00 PM - 03:00 PM	59.1	73.6	56.3
03:00 PM - 04:00 PM	59.5	78.6	56.4
04:00 PM - 05:00 PM	59.5	73.0	57.0
05:00 PM - 06:00 PM	59.0	74.4	56.1
06:00 PM - 07:00 PM	58.4	73.1	55.8
07:00 PM - 08:00 PM	57.7	78.1	54.7
08:00 PM - 09:00 PM	56.8	69.6	53.2
09:00 PM - 10:00 PM	55.5	68.0	52.4
10:00 PM - 11:00 PM	54.7	67.5	50.5
11:00 PM - 12:00 AM	53.3	66.9	49.0
12:00 AM - 01:00 AM	54.4	71.9	50.0
01:00 AM - 02:00 AM	53.3	71.1	48.8
02:00 AM - 03:00 AM	53.2	71.1	48.4
03:00 AM - 04:00 AM	54.2	76.0	49.2
04:00 AM - 05:00 AM	55.4	70.2	50.9
05:00 AM - 06:00 AM	58.2	73.6	54.6
06:00 AM - 07:00 AM	60.4	73.9	57.7
07:00 AM - 08:00 AM	60.0	74.0	57.0
08:00 AM - 09:00 AM	59.8	73.8	56.8
Leq Average 24 hrs. (dB(A))	57.9		
Lmax (dB(A))		80.9	
L90 (dB(A))			55.2
Ldn (dB(A))	62.9		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174608-1

Sample Number	24122158-15
Parameter	Noise (Leq 24 hrs)
Location	บริเวณหมู่ 3 เขาคันทรง (N3)
Measurement Date	Nov 02 - Nov 03, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	56.7	80.7	52.7
10:00 AM - 11:00 AM	54.5	67.9	51.8
11:00 AM - 12:00 PM	54.9	71.5	51.6
12:00 PM - 01:00 PM	55.6	77.4	52.2
01:00 PM - 02:00 PM	55.4	66.8	52.4
02:00 PM - 03:00 PM	56.3	68.9	53.6
03:00 PM - 04:00 PM	56.0	68.0	53.5
04:00 PM - 05:00 PM	57.6	75.7	53.9
05:00 PM - 06:00 PM	57.2	77.2	54.7
06:00 PM - 07:00 PM	56.5	80.5	52.5
07:00 PM - 08:00 PM	56.8	70.2	54.1
08:00 PM - 09:00 PM	56.1	72.7	52.8
09:00 PM - 10:00 PM	55.3	77.1	51.9
10:00 PM - 11:00 PM	55.6	67.0	52.6
11:00 PM - 12:00 AM	54.8	67.4	52.1
12:00 AM - 01:00 AM	53.7	65.7	51.2
01:00 AM - 02:00 AM	54.4	72.5	50.7
02:00 AM - 03:00 AM	51.7	62.4	49.0
03:00 AM - 04:00 AM	51.9	69.7	49.2
04:00 AM - 05:00 AM	52.1	66.5	49.0
05:00 AM - 06:00 AM	52.9	76.6	46.0
06:00 AM - 07:00 AM	55.5	69.2	52.8
07:00 AM - 08:00 AM	56.4	70.3	53.8
08:00 AM - 09:00 AM	54.9	68.0	52.1
Leq Average 24 hrs. (dB(A))	55.4		
Lmax (dB(A))		80.7	
L90 (dB(A))			52.2
Ldn (dB(A))	60.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174609-1

Sample Number	24122158-16
Parameter	Noise (Leq 24 hrs)
Location	บริเวณหมู่ 3 เขาคันทรง (N3)
Measurement Date	Nov 03 - Nov 04, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	56.0	78.1	52.7
10:00 AM - 11:00 AM	54.1	72.7	50.1
11:00 AM - 12:00 PM	56.9	69.8	53.5
12:00 PM - 01:00 PM	56.4	71.0	53.3
01:00 PM - 02:00 PM	57.3	80.4	55.1
02:00 PM - 03:00 PM	56.5	77.0	53.8
03:00 PM - 04:00 PM	54.2	68.4	52.1
04:00 PM - 05:00 PM	54.5	67.7	51.4
05:00 PM - 06:00 PM	56.2	70.4	54.1
06:00 PM - 07:00 PM	54.7	71.6	51.3
07:00 PM - 08:00 PM	53.3	67.4	51.5
08:00 PM - 09:00 PM	53.6	72.0	51.1
09:00 PM - 10:00 PM	52.2	65.8	50.5
10:00 PM - 11:00 PM	51.2	67.0	49.1
11:00 PM - 12:00 AM	50.8	75.3	48.2
12:00 AM - 01:00 AM	53.5	70.3	51.1
01:00 AM - 02:00 AM	53.1	69.1	50.9
02:00 AM - 03:00 AM	54.1	71.0	50.9
03:00 AM - 04:00 AM	52.1	66.1	49.6
04:00 AM - 05:00 AM	51.2	66.9	48.5
05:00 AM - 06:00 AM	51.0	61.7	48.3
06:00 AM - 07:00 AM	50.9	68.7	48.2
07:00 AM - 08:00 AM	54.7	73.5	50.6
08:00 AM - 09:00 AM	55.7	70.3	52.6
Leq Average 24 hrs. (dB(A))	54.4		
Lmax (dB(A))		80.4	
L90 (dB(A))			51.1
Ldn (dB(A))	59.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174610-1

Sample Number	24122158-17
Parameter	Noise (Leq 24 hrs)
Location	บริเวณหมู่ 3 เขาคันทรง (N3)
Measurement Date	Nov 04 - Nov 05, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	55.6	65.5	52.8
10:00 AM - 11:00 AM	57.5	81.2	50.6
11:00 AM - 12:00 PM	56.0	69.7	53.3
12:00 PM - 01:00 PM	57.1	71.0	54.5
01:00 PM - 02:00 PM	56.4	69.5	53.6
02:00 PM - 03:00 PM	56.2	78.3	52.9
03:00 PM - 04:00 PM	54.7	73.3	50.7
04:00 PM - 05:00 PM	57.5	70.4	54.1
05:00 PM - 06:00 PM	57.0	71.6	53.9
06:00 PM - 07:00 PM	57.9	81.0	55.7
07:00 PM - 08:00 PM	53.0	66.6	51.3
08:00 PM - 09:00 PM	52.0	67.8	49.9
09:00 PM - 10:00 PM	51.6	76.1	49.0
10:00 PM - 11:00 PM	53.8	69.8	51.6
11:00 PM - 12:00 AM	54.8	71.7	51.6
12:00 AM - 01:00 AM	52.8	66.8	50.3
01:00 AM - 02:00 AM	51.9	67.6	49.2
02:00 AM - 03:00 AM	51.7	62.4	49.0
03:00 AM - 04:00 AM	51.6	69.4	48.9
04:00 AM - 05:00 AM	52.2	66.6	49.1
05:00 AM - 06:00 AM	52.4	70.2	49.7
06:00 AM - 07:00 AM	51.6	64.8	48.5
07:00 AM - 08:00 AM	52.9	70.5	49.8
08:00 AM - 09:00 AM	54.9	80.9	51.7
Leq Average 24 hrs. (dB(A))	54.9		
Lmax (dB(A))		81.2	
L90 (dB(A))			50.7
Ldn (dB(A))	59.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174611-1

Sample Number	24122158-18
Parameter	Noise (Leq 24 hrs)
Location	บริเวณหมู่ 3 เขาคันทรง (N3)
Measurement Date	Nov 05 - Nov 06, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	54.4	73.7	51.8
10:00 AM - 11:00 AM	54.0	78.5	51.4
11:00 AM - 12:00 PM	54.5	66.3	52.7
12:00 PM - 01:00 PM	56.5	78.6	53.2
01:00 PM - 02:00 PM	54.6	73.2	50.6
02:00 PM - 03:00 PM	57.4	70.3	54.0
03:00 PM - 04:00 PM	56.9	71.5	53.8
04:00 PM - 05:00 PM	57.8	80.9	55.6
05:00 PM - 06:00 PM	54.1	72.7	50.1
06:00 PM - 07:00 PM	54.4	68.8	50.5
07:00 PM - 08:00 PM	53.0	65.9	49.6
08:00 PM - 09:00 PM	52.3	66.7	49.2
09:00 PM - 10:00 PM	52.5	70.3	49.8
10:00 PM - 11:00 PM	51.7	64.9	48.6
11:00 PM - 12:00 AM	56.4	70.3	53.8
12:00 AM - 01:00 AM	55.7	68.8	52.9
01:00 AM - 02:00 AM	55.5	77.6	52.2
02:00 AM - 03:00 AM	53.4	72.0	49.4
03:00 AM - 04:00 AM	52.5	68.3	50.4
04:00 AM - 05:00 AM	52.1	76.6	49.5
05:00 AM - 06:00 AM	52.9	66.1	49.8
06:00 AM - 07:00 AM	54.2	71.8	51.1
07:00 AM - 08:00 AM	56.2	82.2	53.0
08:00 AM - 09:00 AM	55.6	75.1	52.8
Leq Average 24 hrs. (dB(A))	54.9		
Lmax (dB(A))		82.2	
L90 (dB(A))			51.1
Ldn (dB(A))	60.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174612-1

Sample Number	24122158-19
Parameter	Noise (Leq 24 hrs)
Location	บริเวณหมู่ 3 เขาคันทรง (N3)
Measurement Date	Nov 06 - Nov 07, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	57.1	80.2	54.9
10:00 AM - 11:00 AM	56.9	73.1	54.5
11:00 AM - 12:00 PM	55.9	76.4	53.2
12:00 PM - 01:00 PM	54.0	65.8	52.2
01:00 PM - 02:00 PM	53.5	67.7	51.4
02:00 PM - 03:00 PM	53.7	71.3	50.6
03:00 PM - 04:00 PM	55.7	81.7	52.5
04:00 PM - 05:00 PM	55.2	74.5	52.6
05:00 PM - 06:00 PM	54.8	79.3	52.2
06:00 PM - 07:00 PM	55.3	67.1	53.5
07:00 PM - 08:00 PM	53.9	71.7	51.2
08:00 PM - 09:00 PM	53.1	71.7	49.1
09:00 PM - 10:00 PM	52.9	65.8	49.5
10:00 PM - 11:00 PM	52.2	75.3	50.0
11:00 PM - 12:00 AM	52.6	62.5	49.8
12:00 AM - 01:00 AM	53.9	67.0	51.1
01:00 AM - 02:00 AM	51.4	67.4	49.2
02:00 AM - 03:00 AM	51.7	73.8	48.4
03:00 AM - 04:00 AM	52.3	66.9	49.2
04:00 AM - 05:00 AM	54.9	67.8	51.5
05:00 AM - 06:00 AM	53.8	67.4	49.7
06:00 AM - 07:00 AM	54.1	72.7	50.1
07:00 AM - 08:00 AM	55.4	75.9	52.7
08:00 AM - 09:00 AM	54.6	66.4	52.8
Leq Average 24 hrs. (dB(A))	54.4		
Lmax (dB(A))		81.7	
L90 (dB(A))			51.2
Ldn (dB(A))	59.9		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174613-1

Sample Number	24122158-20
Parameter	Noise (Leq 24 hrs)
Location	บริเวณหมู่ 3 เขาคันทรง (N3)
Measurement Date	Nov 07 - Nov 08, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	54.4	71.3	51.0
10:00 AM - 11:00 AM	54.5	74.2	50.3
11:00 AM - 12:00 PM	55.3	68.4	51.5
12:00 PM - 01:00 PM	55.3	79.7	50.8
01:00 PM - 02:00 PM	55.3	77.5	51.6
02:00 PM - 03:00 PM	56.1	71.3	53.1
03:00 PM - 04:00 PM	57.2	77.6	54.2
04:00 PM - 05:00 PM	56.8	79.8	53.1
05:00 PM - 06:00 PM	58.4	72.1	53.6
06:00 PM - 07:00 PM	55.4	69.7	52.9
07:00 PM - 08:00 PM	54.4	70.2	51.6
08:00 PM - 09:00 PM	53.9	70.7	51.5
09:00 PM - 10:00 PM	53.5	69.5	51.3
10:00 PM - 11:00 PM	54.5	71.4	51.3
11:00 PM - 12:00 AM	52.5	66.5	50.0
12:00 AM - 01:00 AM	51.6	67.3	48.9
01:00 AM - 02:00 AM	51.4	62.1	48.7
02:00 AM - 03:00 AM	51.3	69.1	48.6
03:00 AM - 04:00 AM	51.9	66.3	48.8
04:00 AM - 05:00 AM	57.2	80.9	50.3
05:00 AM - 06:00 AM	55.7	69.4	53.0
06:00 AM - 07:00 AM	56.8	70.7	54.2
07:00 AM - 08:00 AM	56.1	69.2	53.3
08:00 AM - 09:00 AM	55.9	78.0	52.6
Leq Average 24 hrs. (dB(A))	55.2		
Lmax (dB(A))		80.9	
L90 (dB(A))			51.5
Ldn (dB(A))	60.9		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบาน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 24122158
Date Received : Nov 18, 2024
Date Reported : Nov 23, 2024
Report Number: 3174614-1

Sample Number	24122158-21
Parameter	Noise (Leq 24 hrs)
Location	บริเวณเหนุ่ 3 เขาคันทรง (N3)
Measurement Date	Nov 08 - Nov 09, 2024
Measurement by	Anuwet Tema
Sound Level meter	Serial No. 623393

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	53.8	72.4	49.8
10:00 AM - 11:00 AM	54.1	68.5	50.2
11:00 AM - 12:00 PM	52.7	65.6	49.3
12:00 PM - 01:00 PM	53.7	67.3	49.6
01:00 PM - 02:00 PM	55.1	73.9	51.0
02:00 PM - 03:00 PM	56.1	70.7	53.0
03:00 PM - 04:00 PM	56.0	65.9	53.2
04:00 PM - 05:00 PM	55.9	75.4	53.1
05:00 PM - 06:00 PM	57.4	80.5	55.2
06:00 PM - 07:00 PM	57.2	73.4	54.8
07:00 PM - 08:00 PM	56.2	76.7	53.5
08:00 PM - 09:00 PM	54.3	66.1	52.5
09:00 PM - 10:00 PM	53.8	68.0	51.7
10:00 PM - 11:00 PM	53.6	67.7	51.8
11:00 PM - 12:00 AM	53.9	72.3	51.4
12:00 AM - 01:00 AM	52.5	66.1	50.8
01:00 AM - 02:00 AM	51.5	67.3	49.4
02:00 AM - 03:00 AM	51.1	75.6	48.5
03:00 AM - 04:00 AM	51.9	65.1	48.8
04:00 AM - 05:00 AM	53.2	70.8	50.1
05:00 AM - 06:00 AM	55.2	81.2	52.0
06:00 AM - 07:00 AM	54.7	74.0	52.1
07:00 AM - 08:00 AM	54.3	78.8	51.7
08:00 AM - 09:00 AM	54.8	66.6	53.0
Leq Average 24 hrs. (dB(A))	54.6		
Lmax (dB(A))		81.2	
L90 (dB(A))			51.7
Ldn (dB(A))	60.0		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน 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 Salamteh
Section Head

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ภาคผนวก ค-5

คุณภาพดิน

Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location: WHA ESIE 2

Lot ID: 2494282
Date Received : Sep 17, 2024
Date Reported : Sep 25, 2024
Report Number : 3084492-1

Sample Number	2494282-1
Sampled Date	Sep 17, 2024 4:17 PM
Sample Description	Soil (Dry Basis)
Location	บริเวณจุดพื้นที่สีเขียวที่มีการบ่าน้ำทิ้งไปใช้รดน้ำต้นไม้ จุดที่1
Date Analysis Commenced	Sep 18, 2024
Condition of Sample	Packed in one plastic bag and one glass bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/kg	-	0.50	17.1	≤25	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Cadmium	mg/kg	-	0.50	<0.50	≤762	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Hexavalent Chromium	mg/kg	-	0.25	<0.25	≤212	United States Environmental Protection Agency, EPA Method 3060 A and 7196 A	Bangkok
Lead	mg/kg	-	1.00	12.0	≤800	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Manganese	mg/kg	-	1.00	137	≤19640	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Mercury	mg/kg	-	0.10	<0.10	≤263	United States Environmental Protection Agency, EPA Method 7473	Bangkok
Nickel	mg/kg	-	1.00	2.87	≤5205	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Selenium	mg/kg	-	0.50	<0.50	≤4380	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Physical Parameters							
Moisture	%	-	0.1	5.3	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 G	Bangkok

Guideline : Notification of National Environmental Board B.E. 2564 (2021), published in the Royal Government Gazette No. 138 Special Part 54 D dated March 11, B.E.2564
Class 2: Soil usage for commercial, agricultural and others.
Note : Analysis Results expressed on dry basis.

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. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by
Sawitree Noisangiam
Manager

Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location: WHA ESIE 2

Lot ID: 2494282
Date Received : Sep 17, 2024
Date Reported : Sep 25, 2024
Report Number : 3084492-1

Sampling By : Pattarapol Sawangjaitam

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

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location: WHA ESIE 2

Lot ID: 2494282
Date Received : Sep 17, 2024
Date Reported : Sep 25, 2024
Report Number : 3084492-1

Sample Number	2494282-2
Sampled Date	Sep 17, 2024 2:14 PM
Sample Description	Soil (Dry Basis)
Location	บริเวณจุดพื้นที่สีเขียวที่มีการบ่าน้ำทิ้งไปใช้รดน้ำต้นไม้ จุดที่2
Date Analysis Commenced	Sep 18, 2024
Condition of Sample	Packed in one plastic bag and one glass bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/kg	-	0.50	2.22	≤25	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Cadmium	mg/kg	-	0.50	<0.50	≤762	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Hexavalent Chromium	mg/kg	-	0.25	<0.25	≤212	United States Environmental Protection Agency, EPA Method 3060 A and 7196 A	Bangkok
Lead	mg/kg	-	1.00	8.71	≤800	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Manganese	mg/kg	-	1.00	44.6	≤19640	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Mercury	mg/kg	-	0.10	<0.10	≤263	United States Environmental Protection Agency, EPA Method 7473	Bangkok
Nickel	mg/kg	-	1.00	2.59	≤5205	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Selenium	mg/kg	-	0.50	<0.50	≤4380	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Physical Parameters							
Moisture	%	-	0.1	6.4	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 G	Bangkok

Guideline : Notification of National Environmental Board B.E. 2564 (2021), published in the Royal Government Gazette No. 138 Special Part 54 D dated March 11, B.E.2564
Class 2: Soil usage for commercial, agricultural and others.
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Approved by
Sawitree Noisangiam
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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location: WHA ESIE 2

Lot ID: 2494282
Date Received : Sep 17, 2024
Date Reported : Sep 25, 2024
Report Number : 3084492-1

Sampling By : Pattarapol Sawangjaitam

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

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Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 2494282
Date Received : Sep 17, 2024
Date Reported : Sep 25, 2024
Report Number : 3084492-1

Sample Number	2494282-3
Sampled Date	Sep 17, 2024 4:40 PM
Sample Description	Soil (Dry Basis)
Location	บริเวณจุดที่นที่สีเขียวที่มีการบ่าน้ำทิ้งไปไร่รดน้ำต่นไม้ จุดที่3
Date Analysis Commenced	Sep 18, 2024
Condition of Sample	Packed in one plastic bag and one glass bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/kg	-	0.50	2.64	≤25	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Cadmium	mg/kg	-	0.50	<0.50	≤762	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Hexavalent Chromium	mg/kg	-	0.25	<0.25	≤212	United States Environmental Protection Agency, EPA Method 3060 A and 7196 A	Bangkok
Lead	mg/kg	-	1.00	12.9	≤800	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Manganese	mg/kg	-	1.00	166	≤19640	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Mercury	mg/kg	-	0.10	<0.10	≤263	United States Environmental Protection Agency, EPA Method 7473	Bangkok
Nickel	mg/kg	-	1.00	4.93	≤5205	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Selenium	mg/kg	-	0.50	<0.50	≤4380	United States Environmental Protection Agency, EPA Method 3050 B and 6010 D	Bangkok
Physical Parameters							
Moisture	%	-	0.1	3.6	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 G	Bangkok

Guideline : Notification of National Environmental Board B.E. 2564 (2021), published in the Royal Government Gazette No. 138 Special Part 54 D dated March 11, B.E.2564
Class 2: Soil usage for commercial, agricultural and others.
Note : Analysis Results expressed on dry basis.

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Approved by Sawitree N.
Sawitree Noisangiam
Manager

Analysis / Test Report

Client : WHA Industrial Development Public Company Limited
475/5 Moo 7 WHA City Park, Room no. 11-12, 2nd Floor, Tumbol Klong Kiew, Amphur Ban Bueng, Chonburi Thailand 20220
P/O : 54240202
Project Name : Monitoring
Project Location : WHA ESIE 2

Lot ID: 2494282
Date Received : Sep 17, 2024
Date Reported : Sep 25, 2024
Report Number : 3084492-1

Sampling By : Pattarapol Sawangjaitam

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

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Approved by Sawitree N.
Sawitree Noisangiam
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เอกสารการสอบเทียบเครื่องมือตรวจวิเคราะห์

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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	RYG_FS0665	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0189	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0666	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0397	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0294	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0191	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	22-Feb-24	22-Feb-25	12
Ambient	Total Suspended Particulate	High Volume	RYG_FS0661	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0179	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0662	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0393	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0291	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0181	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RYG_EN0001	22-Feb-24	22-Feb-25	12
Ambient	Nitrogen Dioxide	NO_2 Analyzer	RYG_FS0261	2-Jul-24	2-Jan-25	6
Ambient	Nitrogen Dioxide	NO_2 Analyzer	RYG_FS0461	3-Jul-24	3-Jan-25	6
Ambient	Nitrogen Dioxide	NO_2 Analyzer	BKK_FS1064	2-Jul-24	2-Jan-25	6
Ambient	Nitrogen Dioxide	NO_2 Analyzer	RYG_FS0455	3-Jul-24	3-Jan-25	6
Ambient	Nitrogen Dioxide	NO_2 Analyzer	RYG_FS0457	3-Jul-24	3-Jan-25	6
Ambient	Nitrogen Dioxide	NO_2 Analyzer	BKK_FS0797	2-Jul-24	2-Jan-25	6
Ambient	Sulfur Dioxide	SO_2 Analyzer	RYG_FS0260	4-Jul-24	4-Jan-25	6
Ambient	Sulfur Dioxide	SO_2 Analyzer	RYG_FS0460	5-Jul-24	5-Jan-25	6
Ambient	Sulfur Dioxide	SO_2 Analyzer	RYG_FS0266	4-Jul-24	4-Jan-25	6
Ambient	Sulfur Dioxide	SO_2 Analyzer	RYG_FS0454	5-Jul-24	5-Jan-25	6
Ambient	Sulfur Dioxide	SO_2 Analyzer	RYG_FS0456	5-Jul-24	5-Jan-25	6
Ambient	Sulfur Dioxide	SO_2 Analyzer	BKK_FS0796	4-Jul-24	4-Jan-25	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0649	20-Jun-23	20-Dec-24	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0328	18-Aug-23	18-Feb-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0611	26-Jun-24	26-Dec-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BKK_FS0143	20-Aug-24	20-Feb-26	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0545	21-Jul-23	21-Jan-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0724	18-Sep-24	18-Mar-26	18
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	26-Jan-24	25-Jan-25	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0492	23-Feb-24	22-Feb-25	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0431	22-Feb-24	21-Feb-25	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0618	12-Jan-24	11-Jan-25	12
Rayong Lab	pH at 25 ^{o}C	pH meter	RYG_EN0183	19-Jan-24	19-Jul-25	18
Rayong Lab	Nitrate	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Ammonia Nitrogen	SPECTROPHOTOMETER	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Dissolved Oxygen	Chamber (Cold Room)	RYG_EN0184	11-Jun-24	11-Dec-25	18
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	24-Jul-23	24-Jan-25	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	COD	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Color (at Original pH)	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Color (at pH 7.0)	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	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	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Dissolved Solids 180°C	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0213	21-Mar-24	21-Mar-25	12
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	21-Mar-24	21-Sep-25	18
Rayong Lab	Temperature	pH meter	RYG_FS0596	1-Jul-24	1-Jul-25	12
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	Cyanide	SPECTROPHOTOMETER	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Formaldehyde	SPECTROPHOTOMETER	RYG_EN0037	18-Sep-23	18-Mar-25	18

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Water Lab	Hexavalent Chromium	Spectrophotometer	BKK_EN0018	13-Sep-24	13-Sep-25	12
Water Lab	Lead	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Lead	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Lead	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Copper	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Copper	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Copper	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Nickel	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Nickel	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Nickel	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Zinc	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Zinc	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Zinc	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Mercury	Mercury Analyzer	BKK_EL0128	6-Dec-24	6-Dec-25	12
Water Lab	Aluminium	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Aluminium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Aluminium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Iron	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Iron	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Iron	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Trivalent Chromium	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Trivalent Chromium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Trivalent Chromium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Manganese	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Manganese	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Manganese	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Arsenic	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Arsenic	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Arsenic	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Barium	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Barium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Barium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Cadmium	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Cadmium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Cadmium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Selenium	ICP-MS	BKK_EL0026	12-Dec-23	13-Jun-25	18
Water Lab	Selenium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Selenium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Water Lab	Total Phosphorus	Digestion Unit	BKK_EN0366	21-Apr-24	21-Apr-25	12
Water Lab	Total Phosphorus	Discrete analyzer	BKK_EN0037	16-Aug-24	16-Aug-25	12
Water Lab	Organochlorine Pesticide	GC MSMS	BKK_EN0284	21-Nov-24	21-May-26	18
Soil	Arsenic	ICP-OES	BKK_EL0037	29-Feb-24	28-Feb-25	12
Soil	Arsenic	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Soil	Arsenic	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Soil	Cadmium	ICP-OES	BKK_EL0037	29-Feb-24	28-Feb-25	12
Soil	Cadmium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Soil	Cadmium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Soil	Hexavalent Chromium	Spectrophotometer	BKK_EN0018	13-Sep-24	13-Sep-25	12
Soil	Lead	ICP-OES	BKK_EL0037	29-Feb-24	28-Feb-25	12
Soil	Lead	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Soil	Lead	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Soil	Manganese	ICP-OES	BKK_EL0037	29-Feb-24	28-Feb-25	12
Soil	Manganese	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Soil	Manganese	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18

right solutions.
right partner.

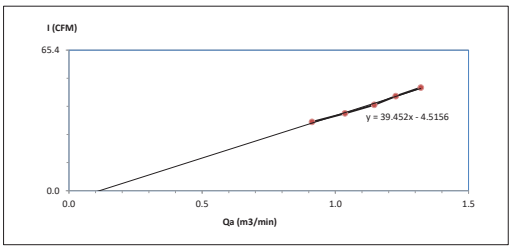
รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Soil	Mercury	Mercury Analyzer	BKK_EL0128	6-Dec-23	6-Dec-24	12
Soil	Nickel	ICP-OES	BKK_EL0037	29-Feb-24	28-Feb-25	12
Soil	Nickel	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Soil	Nickel	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Soil	Selenium	ICP-OES	BKK_EL0037	29-Feb-24	28-Feb-25	12
Soil	Selenium	Hot Block	BKK_EL0054	22-Sep-23	22-Mar-25	18
Soil	Selenium	Chamber (Cooling Room)	BKK_EN0167	6-Dec-23	6-Jun-25	18
Soil	Moisture	Electronic Top-Loading Balance	BKK_EN0003	2-Aug-24	2-Aug-25	12

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	โรงเรียนบ้านมาบลำบิด (A1)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0665
CalibrationSheet No.:	**C-021124-RYG_FS0665**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	6264
Calibrator Model :	TE-5028A	**Calibrator Slope :**	0.92987
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01578

Test No.	Delta H_2O (inch)	Qa (m^3/min)	I : Chart (CFM)	Linear Regression	
1	1.7	0.913	32	Slope :	39.4521
2	2.2	1.036	36	Intercept :	-4.5156
3	2.7	1.146	40	Correlation Coefficient :	0.9967
4	3.1	1.227	44		
5	3.6	1.321	48		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

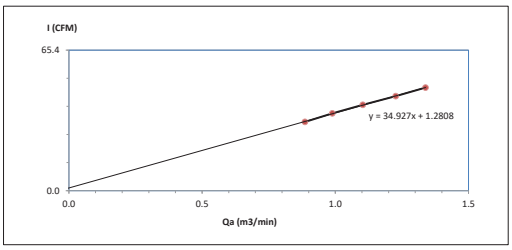
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณพื้นที่โครงการ (A2)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0189
CalibrationSheet No.:	**C-021124-RYG_FS0189**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	4797
Calibrator Model :	TE-5028A	**Calibrator Slope :**	0.92987
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01578

Test No.	Delta H_2O (inch)	Qa (m^3/min)	I : Chart (CFM)	Linear Regression	
1	1.6	0.886	32	Slope :	34.9273
2	2.0	0.988	36	Intercept :	1.2808
3	2.5	1.103	40	Correlation Coefficient :	0.9996
4	3.1	1.227	44		
5	3.7	1.339	48		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

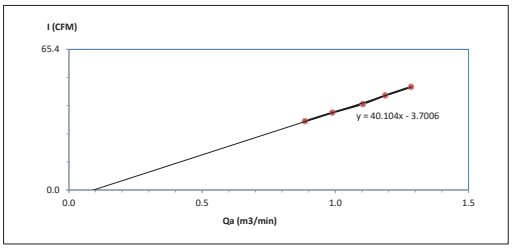
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณหมู่7 บ้านมาบลำบิด (A3)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0666
CalibrationSheet No.:	**C-021124-RYG_FS0666**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	6265
Calibrator Model :	TE-5028A	**Calibrator Slope :**	0.92987
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01578

Test No.	Delta H_2O (inch)	Qa (m^3/min)	I : Chart (CFM)	Linear Regression	
1	1.6	0.886	32	Slope :	40.1044
2	2.0	0.988	36	Intercept :	-3.7006
3	2.5	1.103	40	Correlation Coefficient :	0.9988
4	2.9	1.187	44		
5	3.4	1.284	48		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

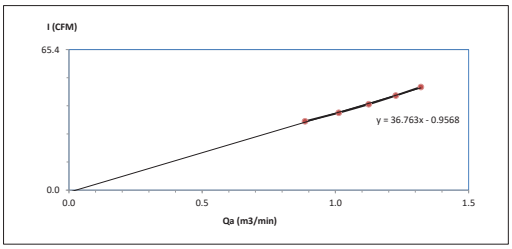
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณหมู่ 3 เขาคันทรง (A4)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0397
CalibrationSheet No.:	**C-021124-RYG_FS0397**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5687
Calibrator Model :	TE-5028A	**Calibrator Slope :**	0.92987
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01578

Test No.	Delta H_2O (inch)	Qa (m^3/min)	I : Chart (CFM)	Linear Regression	
1	1.6	0.886	32	Slope :	36.7630
2	2.1	1.012	36	Intercept :	-0.9568
3	2.6	1.125	40	Correlation Coefficient :	0.9982
4	3.1	1.227	44		
5	3.6	1.321	48		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

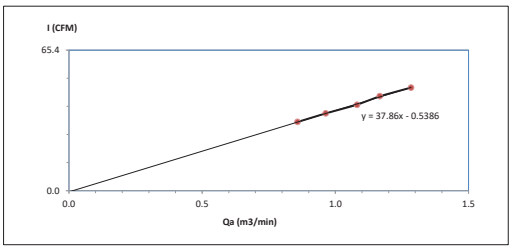
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	วัดช่องลม (A5)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0294
CalibrationSheet No.:	**C-021124-RYG_FS0294**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5501
Calibrator Model :	TE-5028A	**Calibrator Slope :**	0.92987
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01578

Test No.	Delta H_2O (inch)	Qa (m^3/min)	I : Chart (CFM)	Linear Regression
1	1.5	0.858	32	Slope : 37.8600
2	1.9	0.964	36	Intercept : -0.5386
3	2.4	1.081	40	Correlation Coefficient : 0.9990
4	2.8	1.167	44	
5	3.4	1.284	48	



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

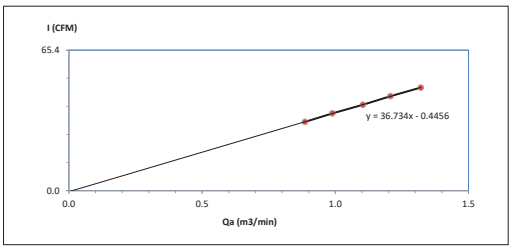
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณหมู่4 ป่านมาบคลำ (A6)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0191
CalibrationSheet No.:	**C-021124-RYG_FS0191**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5330
Calibrator Model :	TE-5028A	**Calibrator Slope :**	0.92987
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01578

Test No.	Delta H_2O (inch)	Qa (m^3/min)	I : Chart (CFM)	Linear Regression
1	1.6	0.886	32	Slope : 36.7345
2	2.0	0.988	36	Intercept : -0.4456
3	2.5	1.103	40	Correlation Coefficient : 0.9998
4	3.0	1.207	44	
5	3.6	1.321	48	



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6 , e-mail: service.thailand@sartorius.com

NSC-TISI-TIS 17025
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

Model Number :	LA130S-F	Certificate No. :	24BCI0068
Description :	Analytical Balance	Issued Date :	Friday, February 23, 2024
Serial Number :	25409864	Reference No. :	229196
ID No. :	RYG_EN0001		
Manufacturer :	Sartorius	Page No. :	1 Of 2

REVIEW BY Thanitch
APPROVED BY
NEXT CAL. DATE 08/02/2025

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.Pluak Daeng, Rayong 21140, Thailand.

Calibrated By : Mr.Chonchai Intrhana
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 : 150 g Readability : 0.0001 g

Ambients Conditions:
Temperature : 23.6 °C ± 5.0 °C
Humidity : 54.0 % RH ± 10.0 % RH
Pressure ±

Reasons for calibration
☐ New Installation ☐ Service / Repaired ☑ Re-calibration/ Maintenance

Equipment Condition: ☑ Good Operate ☐ Fair

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 form list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Cetificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2,YCS011-522-00	TCS	M23081975	23-Aug-2025
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19231845	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 Intrhana(Technical Manager)

STAMP

SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number :	LA130S-F	Certificate No. :	24BCI0068
Description :	Analytical Balance	Issued Date :	Friday, February 23, 2024
Serial Number :	25409864	Reference No. :	229196
ID No. :	RYG_EN0001		
Manufacturer :	Sartorius	Page No. :	2 of 2

Calibration Results : Without Adjustment

Repeatability

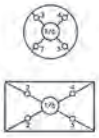
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	10.0000	99.9999
10 g	10.0000	100.0000
Tolerance	10.0000	100.0001
0.0001 g	10.0000	100.0001
	9.9999	100.0000
Nominal Value : (High Load)	10.0000	100.0001
100 g	10.0000	100.0000
Tolerance	10.0000	100.0001
0.0001 g	9.9999	100.0002
	9.9999	100.0001
Standard Deviation	0.00005	0.00008

Eccentricity (Off-center loading error)

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 R76).

Nominal value : 50 g
Tolerance 0.0004 g



	Difference
1	--
2	-0.0001
3	0.0001
4	0.0002
5	0.0000
6	-

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 (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00020
0.05	0.0500	0.0500	0.0000	0.00021
0.1	0.1000	0.1000	0.0000	0.00021
0.5	0.5000	0.5000	0.0000	0.00021
1	1.0000	1.0000	0.0000	0.00021
2	2.0000	2.0000	0.0000	0.00021
5	5.0000	5.0000	0.0000	0.00021
10	10.0000	10.0001	0.0001	0.00024
20	20.0000	20.0001	0.0001	0.00021
100	100.0000	99.9999	-0.0001	0.00024

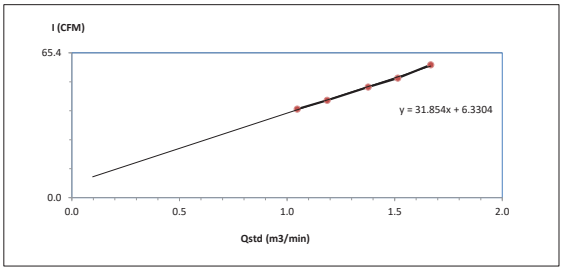
End of Report

SOP FM 33 03 February 2022

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	โรงเรียนบ้านมาบลำบัด (A1)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0661
CalibrationSheet No.:	**C-021124-RYG_FS0661**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	6258
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.48469
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.02523

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression	
1	2.4	1.0469	40	Slope :	31.8539
2	3.1	1.1864	44	Intercept :	6.3304
3	4.2	1.3768	50	Correlation Coefficient :	0.9984
4	5.1	1.5145	54		
5	6.2	1.6673	60		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

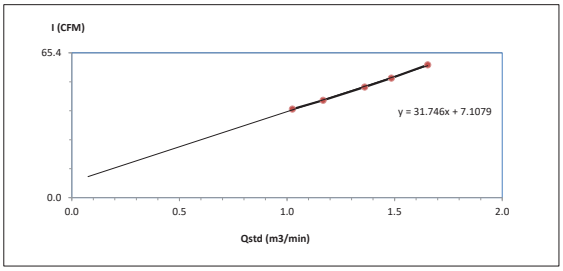
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณเพิ่มที่โครงการ (A2)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0179
CalibrationSheet No.:	**C-021124-RYG_FS0179**	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	4805
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.48469
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.02523

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression	
1	2.3	1.0254	40	Slope :	31.7460
2	3.0	1.1675	44	Intercept :	7.1079
3	4.1	1.3606	50	Correlation Coefficient :	0.9991
4	4.9	1.4850	54		
5	6.1	1.6540	60		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

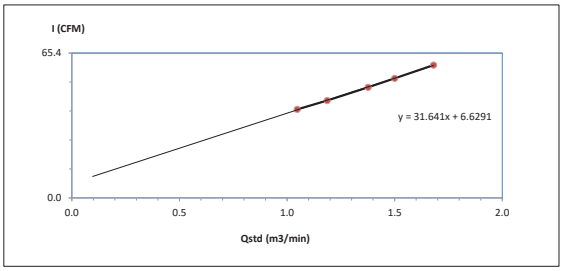
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณหมู่7 บ้านมาบลำบัด (A3)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0662
CalibrationSheet No.:	**C-021124-RYG_FS0662**	**High Volume Model :**	TE-5009X
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	6259
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.48469
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.02523

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression	
1	2.4	1.0469	40	Slope :	31.6410
2	3.1	1.1864	44	Intercept :	6.6291
3	4.2	1.3768	50	Correlation Coefficient :	0.9997
4	5.0	1.4999	54		
5	6.3	1.6805	60		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

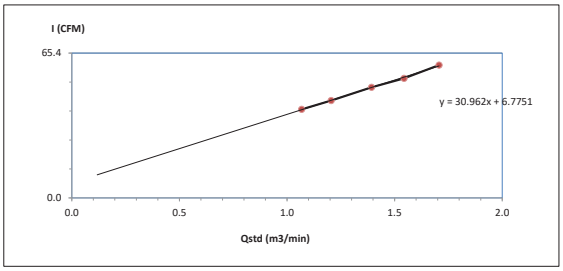
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณหมู่ 3 เขาคันทรง (A4)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0393
CalibrationSheet No.:	**C-021124-RYG_FS0393**	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5682
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.48469
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.02523

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression	
1	2.5	1.0680	40	Slope :	30.9621
2	3.2	1.2049	44	Intercept :	6.7751
3	4.3	1.3928	50	Correlation Coefficient :	0.9990
4	5.3	1.5435	54		
5	6.5	1.7066	60		



Calibrated by _____ (Mr.Anuwet Tema) RYG-Field Services Scientist (1)

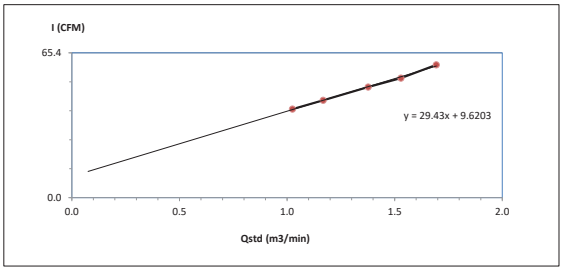
Approved by : _____ (Mr. Supot Salamteh) RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	วัดช่องลม (A5)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0291
CalibrationSheet No.:	C-021124-RYG_FS0291	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5333
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.48469
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.02523

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression
1	2.3	1.0254	40	Slope : 29.4302
2	3.0	1.1675	44	Intercept : 9.6203
3	4.2	1.3768	50	Correlation Coefficient : 0.9985
4	5.2	1.5291	54	
5	6.4	1.6936	60	



Calibrated by _____ (Mr.Anuwet Tema)
RYG-Field Services Scientist (1)

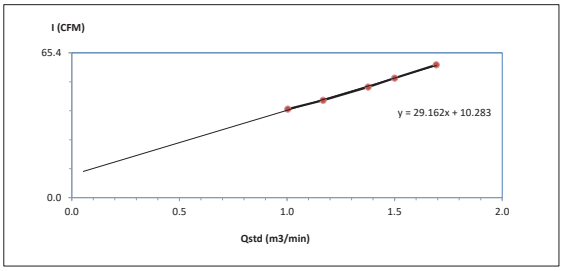
Approved by : _____ (Mr. Supot Salamteh)
RYG- Field Services Section Head

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

High Volume Air Sampler Calibration Worksheet

Project Site :	WHA Industrial Development Public Company Limited	**Barometric Pressure (mm Hg) :**	746.7
Calibrate Location :	บริเวณหมู่ 4 บ้านบางคล้า (A6)	**Temperature (°C) :**	32.4
Calibrate Date :	2-Nov-24	**High Volume ID :**	RYG_FS0181
CalibrationSheet No.:	C-021124-RYG_FS0181	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5334
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.48469
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.02523

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression
1	2.2	1.0034	40	Slope : 29.1619
2	3.0	1.1675	44	Intercept : 10.2834
3	4.2	1.3768	50	Correlation Coefficient : 0.9988
4	5.0	1.4999	54	
5	6.4	1.6936	60	



Calibrated by _____ (Mr.Anuwet Tema)
RYG-Field Services Scientist (1)

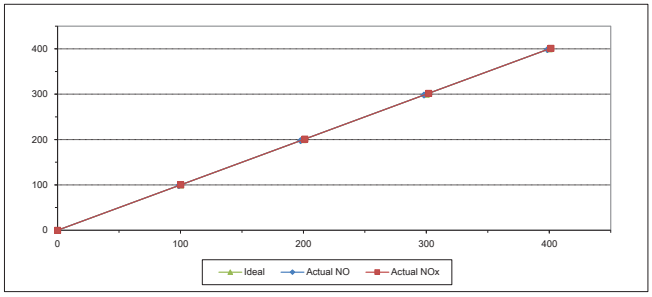
Approved by : _____ (Mr. Supot Salamteh)
RYG- Field Services Section Head

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-24	**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 (psi)	1800	**Certified By**	Airgas Inc.
Certified Date	9-Feb-22	**Expired Date**	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	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	302.00	2.00	0.67
4	400.00	398.50	-1.50	-0.38	401.40	1.40	0.35
AVERAGE (%)				-0.67			0.38



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

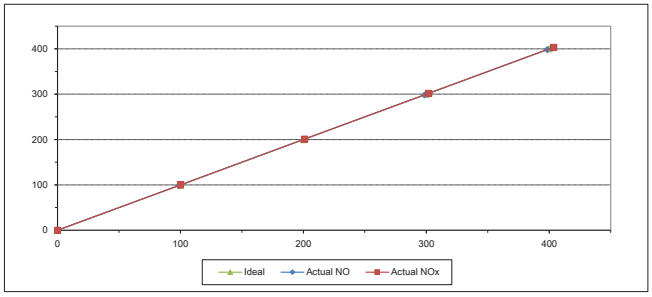
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	3-Jul-24	**Equipment Name**	NOx Analyzer
Manufacturer	HORIBA	**Model**	APNA-370
Serial No.	T95HWM41	**Equipment ID**	RYG_FS0461
Calibrator Manufacturer	Teledyne API	**Model**	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	**Cylinder No.**	GN0027222
Cylinder Pressure (psi)	1800	**Certified By**	Airgas Inc.
Certified Date	9-Feb-22	**Expired Date**	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.70	-1.30	-1.30	100.10	0.10	0.10
2	200.00	201.00	1.00	0.50	201.10	1.10	0.55
3	300.00	298.70	-1.30	-0.43	302.10	2.10	0.70
4	400.00	398.40	-1.60	-0.40	403.70	3.70	0.92
AVERAGE (%)				-0.31			0.47



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

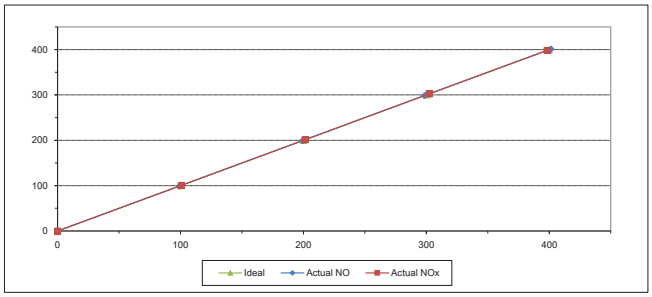
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-24	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	148EH0E0	Equipment ID	BKK_FS1064
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90	100.70	0.70	0.70
2	200.00	199.30	-0.70	-0.35	201.40	1.40	0.70
3	300.00	298.50	-1.50	-0.50	302.30	2.30	0.77
4	400.00	401.40	1.40	0.35	398.30	-1.70	-0.42
AVERAGE (%)				-0.26			0.37



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

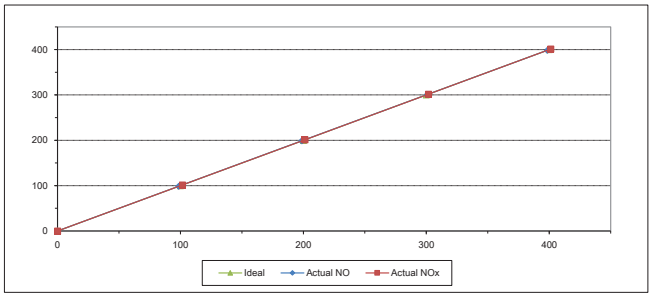
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	3-Jul-24	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	ALP0V0WY	Equipment ID	RYG_FS0455
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.60	-1.40	-1.40	101.60	1.60	1.60
2	200.00	198.80	-1.20	-0.60	201.30	1.30	0.65
3	300.00	301.00	1.00	0.33	301.80	1.80	0.60
4	400.00	398.50	-1.50	-0.38	401.30	1.30	0.33
AVERAGE (%)				-0.39			0.66



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

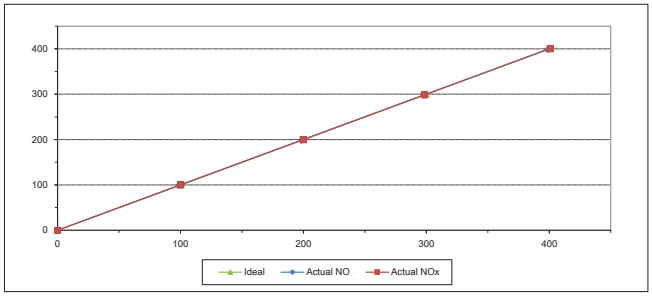
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	3-Jul-24	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	T2T8YRLL	Equipment ID	RYG_FS0457
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.30	-1.70	-1.70	100.30	0.30	0.30
2	200.00	198.40	-1.60	-0.80	199.80	-0.20	-0.10
3	300.00	297.90	-2.10	-0.70	298.50	-1.50	-0.50
4	400.00	398.60	-1.40	-0.35	400.80	0.80	0.20
AVERAGE (%)				-0.69			0.00



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

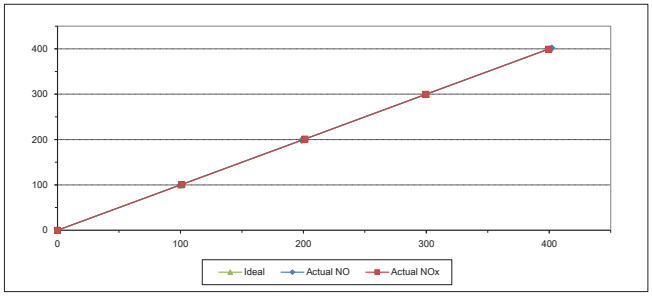
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-24	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	H73KYD1M	Equipment ID	BKK_FS0797
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30	101.00	1.00	1.00
2	200.00	198.60	-1.40	-0.70	201.30	1.30	0.65
3	300.00	299.10	-0.90	-0.30	299.70	-0.30	-0.10
4	400.00	402.10	2.10	0.53	399.50	-0.50	-0.13
AVERAGE (%)				-0.13			0.31



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

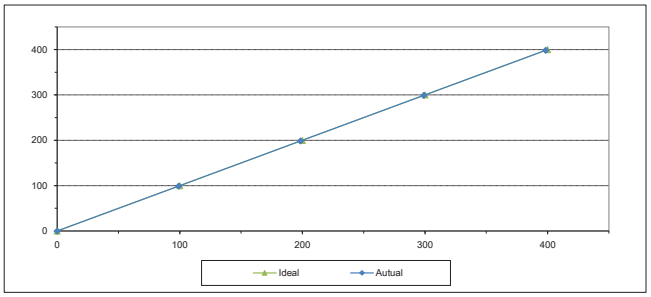
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	8HC0DGJF	Equipment ID	RYG_FS0260
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	Autual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90
2	200.00	198.50	-1.50	-0.75
3	300.00	299.10	-0.90	-0.30
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.45



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

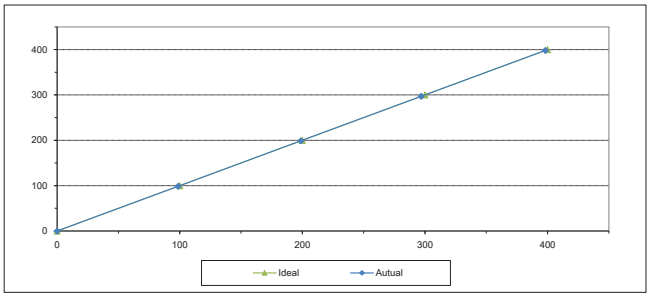
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	VABF9LSH	Equipment ID	RYG_FS0460
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	Autual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.70	-1.30	-1.30
2	200.00	198.80	-1.20	-0.60
3	300.00	296.90	-3.10	-1.03
4	400.00	398.20	-1.80	-0.45
AVERAGE (%)				-0.66



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

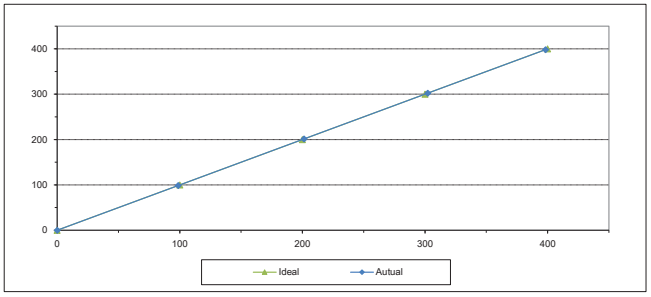
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	NM3M2D5M	Equipment ID	RYG_FS0266
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	Autual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.70	-1.30	-1.30
2	200.00	201.40	1.40	0.70
3	300.00	302.30	2.30	0.77
4	400.00	398.30	-1.70	-0.42
AVERAGE (%)				-0.03



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

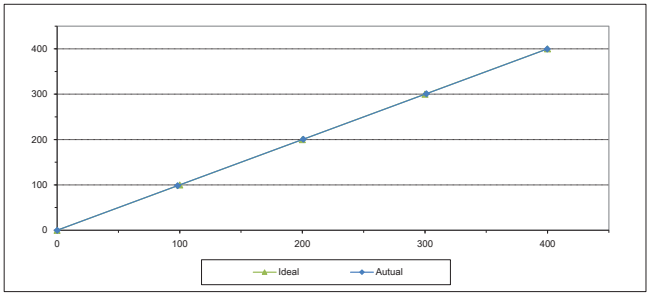
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	H0S3D9FA	Equipment ID	RYG_FS0454
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	Autual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.30	-1.70	-1.70
2	200.00	200.80	0.80	0.40
3	300.00	301.20	1.20	0.40
4	400.00	399.70	-0.30	-0.08
AVERAGE (%)				-0.18



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

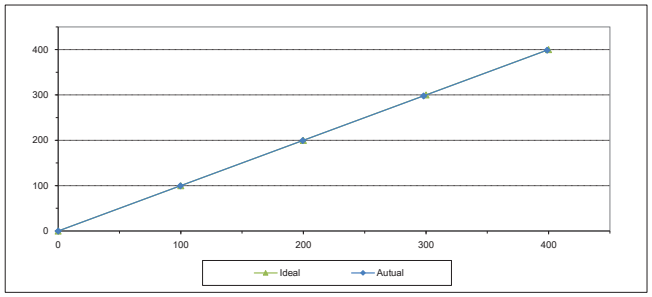
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	R0HWYDVW	Equipment ID	RYG_FS0456
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	Autual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30
2	200.00	199.50	-0.50	-0.25
3	300.00	298.00	-2.00	-0.67
4	400.00	398.80	-1.20	-0.30
AVERAGE (%)				-0.28



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

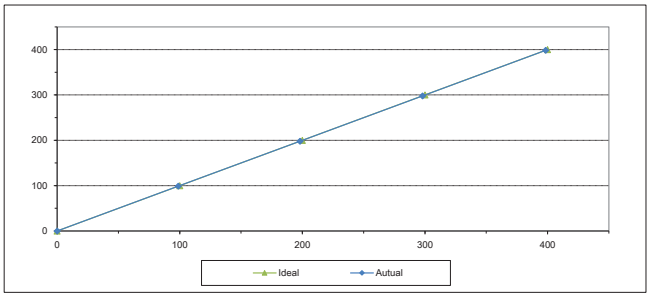
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	G2CH436B	Equipment ID	BKK_FS0796
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	Autual	Error	%Error
ZERO	0.00	0.05	0.05	0.05
1	100.00	98.91	-1.09	-1.09
2	200.00	198.10	-1.90	-0.95
3	300.00	298.00	-2.00	-0.67
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.61



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

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

JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
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Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

REVIEW BY Morakom P.
APPROVED BY
NEXT CAL. DATE 20/12/24

Certificate Number
CC-015-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM	: Cup anemometer
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02FA Data logger: 110-WS-2SDL-D
SERIAL NUMBER	: Sensor: WSD-A5980 Data logger: A5980
ID NUMBER	: RYG_FS0649
CONDITION AS-RECEIVED	: New Item
CUSTOMER	: ALS laboratory group (Thailand) Co., Ltd. 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.
RECEIVED DATE	: 16 Jun 2023
MEASUREMENT DATE	: 20 Jun 2023
ISSUE DATE	: 20 Jun 2023

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 ± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS	: Wind tunnel cross-section area[1]	900	cm^2
	Win direction frontal area[2]	100	cm^2
	Diameter of mounting pipe[3]	-	mm
	Blockage ratio of test object[4]	0.111	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.4) °C, (41.8) %RH and (1011.5) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

NAC JIRANATE ASSOCIATES CO.

Approved signatory:
Mr. Parinya Boonchareon
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [1] to [2]

Calibration procedure:
The cup anemometer was calibrated against Standard air velocity transducer model: 8455-12 and pitot tube with precision differential pressure meter model: DPM2500 in an open test section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0052-21 and MW-0066-22

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'

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

Certificate Number
CC-015-66

Page 2 of 2 Pages

MEASUREMENT RESULTS [5]

The cup anemometer, Unit Under Calibration (UUC) was exercise 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 and above 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 40 mm and 300 mm respectively away from wind tunnel nozzle, UUC was installed at center of the 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 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

v_{std}[2] (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	v_{uuc}[3] (m/s)	Error (m/s)	U (k=2) (m/s)
1.023	24.30	24.40	0.9	-0.1	0.31
2.025	24.50	24.40	1.9	-0.1	0.31
2.999	24.40	24.40	2.9	-0.1	0.31
4.109	24.34	24.40	4.0	-0.1	0.31
5.03	24.32	24.40	4.9	-0.1	0.31
6.01	24.32	24.40	5.9	-0.1	0.31
7.05	24.24	24.40	7.0	-0.1	0.31
8.17	24.14	24.40	8.0	-0.2	0.31
9.10	24.20	24.40	9.0	-0.1	0.31
10.08	24.10	24.40	9.9	-0.1	0.31
11.14	24.20	24.40	11.0	-0.1	0.31
12.13	24.10	24.40	12.0	-0.2	0.31
13.19	24.14	24.40	13.0	-0.2	0.31
14.23	24.10	24.40	14.0	-0.2	0.31
15.33	24.10	24.40	15.1	-0.2	0.31
16.29	24.10	24.40	16.1	-0.2	0.32

Remark:
[1] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[2] Velocity of standard
[3] Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP

Calibration set-up of the cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set- up is not true to scale due to inaccurate geometry.

End of Certificate Calibration

NAC JIRANATE ASSOCIATES CO.

Jiranatee Associates Co., Ltd.

JNAC
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Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

Certificate Number
CD-015-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	: Wind Direction Sensor
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02FA Data logger: 110-WS-25DL-D
SERIAL NUMBER	: Sensor: WSD-A5980 Data logger: A5980
ID NUMBER	: RYG_FS0649
CONDITION AS-RECEIVED	: New item
CUSTOMER	: ALS laboratory group (Thailand) Co., Ltd. 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.
RECEIVED DATE	: 16 Jun 2023
MEASUREMENT DATE	: 20 Jun 2023
ISSUE DATE	: 20 Jun 2023

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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

: Wind tunnel cross-section area[1]	900	cm^2
Win direction frontal area[2]	129	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.143	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.3)°C, (47.4) %RH and (1010.9) hPa.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model: AX400YTS-DM04-P3-S-U0 in an close test section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0043-22

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'

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

Approved signatory:
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Certificate Number
CD-015-66

MEASUREMENT RESULTS [5]

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 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	D'_{std}	D'_{uuc}	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
	0.000	0	0	1.0
	45.000	43	-2	1.0
	90.000	87	-3	1.0
5.02	135.000	133	-2	1.0
	180.000	180	0	1.0
	225.000	226	1	1.0
	270.000	272	2	1.0
	315.000	318	3	1.0

Remark:
[1] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[2] Direction of standard
[3] Direction of Unit Under Calibration

End of Certificate of Calibration

Jiranatee Associates Co., Ltd.

JNAC
63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
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NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CT-025-66

Equipment Name: Data Logger with Temperature sensor
Manufacturer: Novalynx
Model: 110-WS-25DL-D
Serial No.: A5980
ID No.: RYG_FS0649

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

Received date: 16 Jun 2023
Calibration date: 20 Jun 2023
Issue date: 22 Jun 2023

Reference Used During Calibration
1.Standard Temperature Probe Model: STS-100 A500, Serial No.: 667682-09, Due date: 28 Mar 2024
2.Digital Temperature Indicator Model: DTI-1000-A MK II, Serial No.: 671407-00591 Due date: 22 July 2023

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

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

Traceability
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0038-23, Certificate number: ER-0092-22

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

Calibrated by
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

Approved Signatory:
Mr. Parinya Boonchaoen
Calibration Department Manager

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CALIBRATION 0367

Certificate No. : CT-025-66

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

Function:
This equipment was connected with temperature sensor Model: HMP60 S/N: V1920214.

Dimension : Diameter 12 mm. Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.057	20.0	-0.1	0.099
70	25.051	24.9	-0.2	0.099
70	30.044	29.8	-0.2	0.099
70	35.039	34.8	-0.2	0.099
70	40.034	39.7	-0.3	0.099

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

★ End of Certificate ★

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Watthapra, Bangkokyai,Bangkok 10600 Thailand.
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CERTIFICATE OF CALIBRATION

Calibration No. : RH-08062023
Page 1 of 1 Pages

Measurement Item : Relative humidity with data logger
Manufacturer : Novalynx
Model/Type : 110-WS-25DL-D
Serial Number : A5980
ID No. : RYG_FS0649
Customer : ALS laboratory group (Thailand) Co., Ltd.
: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Environmental Condition:
The measurement was carried out in an ambient temperature of (25±3)°C, and relative humidity of (50±15)%.

Measurement Method:
Unit Under Calibration (UUC) was calibrated by comparison method with standard chilled mirror hygrometer model: 1860-3 in the humidity generator chamber to determine the errors.

Traceability:
This instrument was calibrated using standard equipment whose accuracy is traceability through National Institute of Standards and Technology to the international system of units (SI) via MCS Calibration, Inc. Certificate number: 20926-601. Due date: Sep 26, 2024.

Measurement Date : Jun 20, 2023
Issued Date : Jun 22, 2023

Measurement Results:
This equipment was connected with indoor air quality probe and Displayed (UR) on display. Model: HMP60, Serial number: V1920214.
Calibration was performed in the range of 20%RH to 80%RH
The results of calibration are reported in table below.

Determined (%RH)	Standard (Reading) (%RH)	UUC (Reading) (%RH)	Error (%RH)	Uncertainty ±(%RH)
20	20.04	19.3	-0.7	0.52
50	50.25	49.5	-0.8	0.52
80	80.33	80.5	0.2	0.52

Performed by
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol
☐ Miss Ruangrumpai Phoommil

Approved Signatory:
Mr. Parinya Boonchoroen.
Calibration Department Manager

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

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Jiranatee Associates Co.,Ltd
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NSC-TISI-TIS 17025
CALIBRATION 0367

Pressure measurement laboratory
Calibration services department.

NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CP-009-66

MEASUREMENT ITEM : Digital barometer
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: 110-WS-25BP
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: BP-A5980
Data logger: A5980
ID NUMBER : RYG_FS0649
CONDITION AS-RECEIVED : New item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 16 Jun 2023
MEASUREMENT DATE : 20 Jun 2023
ISSUE DATE : 20 Jun 2023

Calibration procedure:
The pressure calibration was done by in-house calibration method as WI-CL-003 according to comparison method with Digital pressure calibrator based on DKD-R 6-1

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-0205-22

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

CONDITION OF THIS RESULT OF CALIBRATION:
1. Reference Standard Instrument:

Instrument	Model	Serial No.	Certificate No.	Due Date
Absolute Pressure Transducer	CPG2500	4100126P	MP-0205-22	02 Dec 2023

1. Calibration effort for calibration sequence C
2. The UUC* was installed in vertical orientation above reference standard instrument and center of UUC* was used as the reference level.
3. Calibration conditions:
4. Condition : ☑ Normal ☐ Abnormal
Pressure transmitting medium : Air
ρ_N (20°C, 1 bar) : 1.19 kg/m^3
H_{amb} : (55±15) %
t_{amb} : (23±3) °C
p_{amb} : (1010±10) mbar
5. The certificate is valid only to the item calibrated on date and place of calibration

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

Approved signatory:
Mr. Parinya Boonchoroen
Calibration Department Manager

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CALIBRATION 0367

Pressure measurement laboratory
Calibration services department.

NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CP-009-66

MEASUREMENT RESULTS : ☑ Without adjustment ☐ With adjustment
CALIBRATION IN THE RANGE OF : 950 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)
950.13	950.8	0.6	0.84
970.04	970.4	0.4	0.60
990.10	990.3	0.2	0.46
1010.08	1010.1	0.0	0.37
1030.10	1029.8	-0.3	0.50
1050.08	1049.5	-0.5	0.73

Note: UUC* Unit Under Calibration
: To convert the result in report unit to Pa should be multiply by 100

End of certificate

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Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

REVIEW BY Nualoon P.
APPROVED BY
NEXT CAL. DATE 18/2/25

Certificate Number
CWS-004-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25LB
SERIAL NUMBER : Sensor: WSD-A5191
Data logger: A5191
ID NUMBER : RYG_FS0328
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 Aug 2023
MEASUREMENT DATE : 18 Aug 2023
ISSUE DATE : 21 Aug 2023

Calibration procedure:
The cup anemometer was calibrated against Standard air velocity transducer model: 8455-12 and pilot tube with precision differential pressure meter model: DPM2500 in an close test section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0052-21 and MW-0066-22

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"

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 ± 10 hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS : Wind tunnel cross-section area[1] 900 cm^2
Win direction frontal area[2] 100 cm^2
Diameter of mounting pipe[3] - mm
Blockage ratio of test object[4] 0.111 [-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.1) °C, (44.3) %RH and (1005.44) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

Approved signatory:
Mr. Parinya Boonchoroen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

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CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

Certificate Number
CWD-004-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25LB
SERIAL NUMBER : Sensor: WSD-A5191
Data logger: A5191
ID NUMBER : RYG_FS0328
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 Aug 2023
MEASUREMENT DATE : 18 Aug 2023
ISSUE DATE : 21 Aug 2023

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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

: Wind tunnel cross-section area[1]	900	cm^2
Win direction frontal area[2]	129	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.143	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.9)°C, (41.2) %RH and (1009.3) hPa.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model: AX4009TS-DM04-P3-5-U0 in an close test-section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0043-22

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"

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: ....
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Jiranatee Associates Co., Ltd.

Certificate Number
CWD-004-66

MEASUREMENT RESULTS [5]

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 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'_{std} Degree (°)	D'_{uuc} Degree (°)	Error Degree (°)	*U (k=2)* Degree (°)
5.01	45.000	42	-3	1.0
	90.000	87	-3	1.0
	135.000	133	-2	1.0
	180.000	182	2	1.0
	225.000	229	4	1.0
	270.000	275	5	1.0
	315.000	320	5	1.0
	360.000	359	-1	1.0

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Direction of standard
[7] Direction of Unit Under Calibration

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

JIRANATEE ASSOCIATES CO.,LTD.

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Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

ilac-MRA THAILAND
NSC – TISI – TIS 17025
CALIBRATION 0367

Certificate Number
CWS-017-67

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02F
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: WSD-A5912
Data logger: A5912
ID NUMBER : RYG_FS0611
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 : 10 Jun 2024
MEASUREMENT DATE : 26 Jun 2024
ISSUE DATE : 26 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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS

: Wind tunnel cross-section area[1]	900	cm^2
Wind direction frontal area[2]	100	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.111	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.0) °C, (44.0) %RH and (1003.0) hPa.

Calibration procedure:
The Cup anemometer was calibrated against Standard air velocity transducer model: 8455-12 and pitot tube with precision differential pressure meter model: DPM2500 in an close test-section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0007-24 and MW-0055-23

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'

REVIEW BY ... Marelan P
APPROVED BY ...
26/12/25

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: ....
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Certificate Number
CWS-017-67

MEASUREMENT RESULTS [5]

The Cup anemometer, Unit Under Calibration (UUC) was exercise 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 top of the test section and the standard air velocity 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top 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 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

v_{std}[6] (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	v_{uuc}[7] (m/s)	Error (m/s)	*U (k=2)* (m/s)
1.000	24.00	24.00	0.8	-0.2	0.31
1.993	24.08	24.00	1.7	-0.3	0.31
2.971	24.00	24.00	2.8	-0.2	0.31
4.094	24.00	24.00	3.8	-0.3	0.31
4.99	23.82	24.00	5.0	0.0	0.31
6.03	24.22	24.00	6.0	0.0	0.31
7.04	23.80	24.00	7.0	0.0	0.31
7.97	24.18	24.00	8.0	0.0	0.31
8.99	23.54	24.00	9.1	0.1	0.31
9.99	23.98	24.00	10.1	0.1	0.31
11.00	23.80	24.00	11.2	0.2	0.31
11.99	23.92	24.00	12.2	0.2	0.31
13.00	23.80	24.00	13.3	0.3	0.31
14.06	23.82	24.00	14.4	0.4	0.31
15.04	23.80	24.00	15.4	0.4	0.31
15.99	23.80	24.00	16.4	0.4	0.31

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Velocity of standard
[7] Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP

Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set- up is not true to scale due to imaging geometry.

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

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CALIBRATION 0367

Wind direction measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

Certificate Number
CWD-017-67

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02F
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: WSD-A5912
Data logger: A5912
ID NUMBER : RYG_FS0611
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 : 10 Jun 2024
MEASUREMENT DATE : 26 Jun 2024
ISSUE DATE : 26 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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

: Wind tunnel cross-section area[1]	900	cm^2
Wind direction frontal area[2]	129	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.143	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.9)°C, (52.6) %RH and (1005.3) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model: AX4009TS-DM04-P3-S-U0 in an close test-section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the International system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0036-23.

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'

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittrapom Lertsomphol

Approved signatory:
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Certificate Number
CWD-017-67

MEASUREMENT RESULTS [5]

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 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	D'_{std}	D'_{unc}	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
	0.000	0	0	0.80
	45.000	43	-2	0.80
	90.000	87	-3	0.80
5.01	135.000	131	-4	0.80
	180.000	177	-3	0.80
	225.000	225	0	0.80
	270.000	271	1	0.80
	315.000	318	3	0.80

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Direction of standard
[7] Direction of Unit Under Calibration

End of Certificate of Calibration

JIRANATEE ASSOCIATES CO.,LTD.
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CALIBRATION 0367

Pressure measurement laboratory
Calibration services department.

NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CPR-007-67

MEASUREMENT ITEM : Digital barometer
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: 110-WS-25BP
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: BP-A5912
Data logger: A5912
ID NUMBER : RYG_FS0611
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 : 10 Jun 2024
MEASUREMENT DATE : 26 Jun 2024
ISSUE DATE : 26 Jun 2024

Calibration procedure:
The Digital barometer was calibrated against Digital pressure calibrator, The WI-CL-003 was used as a calibration guideline.

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-0009-24

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 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	Model	Serial No.	Certificate No.	Due Date
Absolute Pressure Transducer	CPG2500	4100126P	MP-0009-24	27 Dec 2024

1. Calibration effort for calibration sequence B
2. The UUC* was installed in vertical orientation above reference standard instrument and center of UUC* was used as the reference level.
3. Calibration conditions:
4. Condition : ☑ Normal ☐ Abnormal
Pressure transmitting medium : Air
ρ_N (20°C, 1 bar) : 1.19 kg/m^3
H_{amb} : (55±15) %
t_{amb} : (23±3) °C
P_{amb} : (1010±10) mbar
5. The certificate is valid only to the item calibrated on date and place of calibration

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittrapom Lertsomphol

Approved signatory:
Mr. Parinya Booncharoen
Calibration Department Manager

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

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CALIBRATION 0367

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Calibration services department.

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CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CPR-007-67

MEASUREMENT RESULTS : ☐ Without adjustment ☑ With adjustment
CALIBRATION IN THE RANGE OF : 950 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

STD	UUC*	Error	Uncertainty (k=2)
(mbar)	(mbar)	(mbar)	(mbar)
950.11	951.9	1.8	0.37
970.08	971.3	1.2	0.37
990.08	991.0	0.9	0.37
1010.09	1010.4	0.3	0.37
1030.05	1029.9	-0.2	0.37
1050.08	1049.3	-0.8	0.37

Note: UUC* Unit Under Calibration
: To convert the result in report unit to Pa should be multiply by 100

End of certificate

Jiranatee Associates Co., Ltd.

JIRANATEE ASSOCIATES CO.,LTD.

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CALIBRATION 0367

Temperature measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : **CDT-104-67**

MEASUREMENT ITEM : Data Logger with Temperature sensor
MANUFACTURER : Novalynx
MODEL/TYPE : 110-WS-25DL-D
SERIAL NUMBER : A5912
ID NUMBER : RYG_FS0611
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 : 10 Jun 2024
MEASUREMENT DATE : 26 Jun 2024
ISSUE DATE : 26 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 as WI-CL-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0047-24, Certificate number: ER-0101-23

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.: 671407-00591 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'

Calibrated by:
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

Approved signatory:
Mr. Parinya Booncharoen
Calibration Department Manager

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

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number CDT-104-67

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/N: U3911247. Dimension: Diameter 12 mm. Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.065	19.6	-0.5	0.099
80	25.058	24.6	-0.5	0.099
80	30.048	29.7	-0.3	0.099
80	35.033	34.7	-0.4	0.14
80	40.045	39.5	-0.5	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*****

JIRANATEE ASSOCIATES CO.,LTD.

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CALIBRATION 0367

Relative humidity and Air Temperature measurement laboratory
Calibration services department.

CERTIFICATE OF CALIBRATION

Certificate No. : **CRT-016-67**

MEASUREMENT ITEM : Relative humidity with data logger
MANUFACTURER : Novalynx
MODEL/TYPE : Data Logger: 110-WS-25DL-D
Sensor: HMP60
SERIAL NUMBER : Data Logger: A5912
Sensor: U3911247
ID NUMBER : RYG_FS0611
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 : 10 Jun 2024
MEASUREMENT DATE : 26 Jun 2024
ISSUE DATE : 26 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 as WI-CL-009 and WI-CL-010 according to comparison method with Standard Chilled 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-0079-23 and through Jiranatee Associates Co., Ltd. Certificate number: CDT-001-67.

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'

Calibrated by:
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

Approved signatory:
Mr. Parinya Booncharoen
Calibration Department Manager

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

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number: CRT-016-67

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 (%RH)	UUC Reading (%RH)	Error (%RH)	Uncertainty ±(%RH)
29.80	19.60	18.6	-1.0	0.83
29.80	50.55	48.0	-2.6	1.3
29.81	81.61	77.8	-3.8	2.3

UUC*: Unit Under Calibration

*****End of Certificate of Calibration*****

Jiranatee Associates Co.,Ltd.

JIRANATEE ASSOCIATES CO.,LTD.

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Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

Certificate Number
CWS-030-67

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	: Cup anemometer
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02F Data logger: WS-25DL
SERIAL NUMBER	: Sensor: WSD-A4562 Data logger: A4562
ID NUMBER	: BKK_FS0143
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	: 08 Aug 2024
MEASUREMENT DATE	: 20 Aug 2024
ISSUE DATE	: 20 Aug 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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS			
	: Wind tunnel cross-section area[1]	900	cm²
	Wind direction frontal area[2]	100	cm²
	Diameter of mounting pipe[3]	–	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, (41.9) %RH and (1007.9) hPa.

Calibration procedure:
The Cup anemometer was calibrated against Standard air velocity transducer model: 8455-12 and pitot tube with precision differential pressure meter model: DPM2500 in an close test-section of Eiffel-type wind tunnel with 900 cm² cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0007-24 and MW-0055-23

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'

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: ....
Mr. Parinya Booncharoen
Calibration Department Manager

REVIEW BY ...... Nanakorn P
APPROVED BY ......
NEXT CAL. DATE 20/2/26

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Jiranatee Associates Co., Ltd.

Certificate Number
CWS-030-67

MEASUREMENT RESULTS [5]

The Cup anemometer, Unit Under Calibration (UUC) was exercise 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 top of the test section and the standard air velocity 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top 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 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

v_{std}[6] (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	v_{uuc}[7] (m/s)	Error (m/s)	*U (k=2)* (m/s)
0.999	23.98	24.20	0.9	-0.1	0.31
2.043	24.42	24.20	1.8	-0.2	0.31
2.982	23.80	24.20	2.9	-0.1	0.31
4.108	23.82	24.20	3.8	-0.3	0.31
4.97	23.62	24.20	4.9	-0.1	0.31
5.95	23.94	24.20	6.0	0.0	0.31
7.01	23.46	24.20	7.0	0.0	0.31
7.96	23.80	24.20	8.0	0.0	0.31
8.98	23.90	24.20	9.1	0.1	0.31
9.96	23.74	24.20	10.1	0.1	0.31
10.94	24.00	24.20	11.1	0.2	0.31
12.01	23.82	24.20	12.2	0.2	0.31
12.92	24.00	24.20	13.1	0.2	0.31
14.06	23.86	24.20	14.2	0.2	0.31
15.00	24.00	24.20	15.2	0.2	0.31
15.93	23.96	24.20	16.2	0.2	0.31

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Velocity of standard
[7] Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP

Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set- up is not true to scale due to imaging geometry.

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
63/14-15, 67/35-36
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Bangkok 10600 (Thailand)
Tel: +6608680812
Mobile: +66863999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Wind direction measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

Certificate Number
CWD-030-67

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	: Wind Direction Sensor
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02F Data logger: WS-25DL
SERIAL NUMBER	: Sensor: WSD-A4562 Data logger: A4562
ID NUMBER	: BKK_FS0143
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	: 08 Aug 2024
MEASUREMENT DATE	: 20 Aug 2024
ISSUE DATE	: 20 Aug 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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd

CALIBRATION CONDITION			
	: Wind tunnel cross-section area[1]	900	cm²
	Wind direction frontal area[2]	129	cm²
	Diameter of mounting pipe[3]	-	mm
	Blockage ratio of test object[4]	0.143	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.7)°C, (42.6) %RH and (1007.9) hPa.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model: AX4009TS-DM04-P3-5-U0 in an close test-section of Eiffel-type wind tunnel with 900 cm² cross test section area. The WI-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0036-23.

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'

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: ....
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Certificate Number
CWD-030-67

MEASUREMENT RESULTS [5]

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 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_{std}[6] Degree (°)	D_{uuc}[7] Degree (°)	Error Degree (°)	*U (k=2)* Degree (°)
5.01	45.000	41	-4	0.80
	90.000	87	-3	0.80
	135.000	132	-3	0.80
	180.000	181	1	0.80
	225.000	229	4	0.80
	270.000	275	5	0.80
	315.000	320	5	0.80
	360.000	359	-1	0.80

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Direction of standard
[7] Direction of Unit Under Calibration

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

JNAC
JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
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E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

REVIEW BY Mmakorn P
APPROVED BY [signature]
NEXT CAL. DATE 21/1/25

Certificate Number
CWS-002-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	: Cup anemometer
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02F Data logger: 110-WS-25DL-D
SERIAL NUMBER	: Sensor: WSD-A5816 Data logger: A5816
ID NUMBER	: RYG_FS0545
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 Jul 2023
MEASUREMENT DATE	: 21 Jul 2023
ISSUE DATE	: 21 Jul 2023

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 ± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS

: Wind tunnel cross-section area[1]	900	cm^2
Win direction frontal area[2]	100	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.111	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.9) °C, (45.7) %RH and (1008.2) hPa.

Calibration procedure:
The cup anemometer was calibrated against Standard air velocity transducer model: 8455-12 and pitot tube with precision differential pressure meter model: DPM2500 in an close test-section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0052-21 and MW-0066-22

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'

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: [signature]
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Jiranatee Associates Co., Ltd.

Certificate Number
CWS-002-66

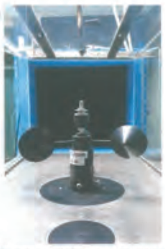
MEASUREMENT RESULTS [5]

The cup anemometer, Unit Under Calibration (UUC) was exercise 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 and above 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 40 mm and 300 mm respectively away from wind tunnel nozzle, UUC was installed at center of the 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 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

V_{std}[6] (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{uuc}[7] (m/s)	Error (m/s)	*U (k=2)* (m/s)
1.023	23.80	23.90	0.8	-0.2	0.31
2.078	24.00	23.90	1.8	-0.2	0.31
3.021	23.78	23.90	2.8	-0.2	0.31
4.148	23.92	23.90	3.9	-0.2	0.31
5.00	23.60	23.90	4.8	-0.2	0.31
5.99	23.68	23.90	5.8	-0.2	0.31
7.03	23.50	23.90	6.8	-0.2	0.31
8.16	23.60	23.90	7.9	-0.3	0.31
9.08	23.50	23.90	8.9	-0.2	0.31
10.06	23.78	23.90	9.8	-0.3	0.31
11.13	23.50	23.90	10.9	-0.2	0.31
12.11	23.78	23.90	12.0	-0.1	0.31
13.16	23.50	23.90	12.9	-0.3	0.31
14.21	23.66	23.90	14.0	-0.2	0.31
15.18	23.50	23.90	15.0	-0.2	0.31
16.26	23.58	23.90	16.0	-0.3	0.31

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Velocity of standard
[7] Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



Calibration set-up of the cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set- up is not true to scale due to imaging geometry.

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co., Ltd.

JNAC
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Jiranatee Associates Co.,Ltd
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Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

Certificate Number
CWD-002-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM	: Wind Direction Sensor
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02F Data logger: 110-WS-25DL-D
SERIAL NUMBER	: Sensor: WSD-A5816 Data logger: A5816
ID NUMBER	: RYG_FS0545
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 Jul 2023
MEASUREMENT DATE	: 21 Jul 2023
ISSUE DATE	: 21 Jul 2023

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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

: Wind tunnel cross-section area[1]	900	cm^2
Win direction frontal area[2]	129	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.143	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.8)°C, (46.9) %RH and (1012.4) hPa.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model: AX4009TS-DM04-P3-5-U0 in an close test-section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of The measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0043-22

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'

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

Approved signatory: [signature]
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Jiranatee Associates Co., Ltd.

Certificate Number
CWD-002-66

MEASUREMENT RESULTS [5]

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 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'_{std} Degree (°)	D'_{uuc} Degree (°)	Error Degree (°)	*U (k=2)* Degree (°)
5.00	45.000	42	-3	1.0
	90.000	87	-3	1.0
	135.000	133	-2	1.0
	180.000	181	1	1.0
	225.000	229	4	1.0
	270.001	273	3	1.0
	315.000	317	2	1.0
	360.000	359	-1	1.0

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Direction of standard
[7] Direction of Unit Under Calibration

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co., Ltd.

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wathapra, Bangkokyai, Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

NSC - TISI - TIS 17025 CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-038-66
Page 1 of 2

Equipment Name: Data Logger with Temperature sensor
Manufacturer: Novalynx
Model: 110-WS-25DL-D
Serial No.: A5816
ID No.: RYG_FS0545

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

Received date: 11 Jul 2023
Calibration date: 21 Jul 2023
Issue date: 21 Jul 2023

Reference Used During Calibration
1.Standard Temperature Probe Model: STS-100 A500, Serial No.: 667682-09, Due date: 28 Mar 2024
2.Digital Temperature Indicator Model: DTI-1000-A MK II, Serial No.: 671407-00591 Due date: 22 July 2023

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

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

Traceability
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0038-23, Certificate number: ER-0092-22

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

Calibrated by
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

J NAC JIRANATEE ASSOCIATES CO.,LTD.

Approved Signatory: .....
Mr. Parinya Boonchareon
Calibration Department Manager

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

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wathapra, Bangkokyai, Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

NSC - TISI - TIS 17025 CALIBRATION 0367

Result of Calibration:- ☑ Without Adjustment ☐ With Adjustment
Calibration Range: 20~40 ˚C

Function:
This equipment was connected with temperature sensor Model: HMP60 S/N: T2320595.

Dimension : Diameter 12 mm. Length 80 mm.

Immersion Depth (mm)	Standard Reading (˚C)	UUC Reading (˚C)	Error (˚C)	Uncertainty (˚C)
70	20.060	19.6	-0.5	0.099
70	25.055	24.6	-0.4	0.14
70	30.050	29.7	-0.4	0.099
70	35.043	34.5	-0.5	0.099
70	40.036	39.5	-0.5	0.099

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

★ End of Certificate ★

J NAC JIRANATEE ASSOCIATES CO.,LTD.

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wathapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

CERTIFICATE OF CALIBRATION

Calibration No. : RH-02072023
Page 1 of 1 Pages

Measurement Item : Relative humidity with data logger
Manufacturer : Novalynx
Model/Type : 110-WS-25DL-D
Serial Number : A5816
ID No. : RYG_FS0545
Customer : ALS laboratory group (Thailand) Co., Ltd.
: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Environmental Condition:
The measurement was carried out in an ambient temperature of (25±3)˚C, and relative humidity of (50±15)%.

Measurement Method:
Unit Under Calibration (UUC) was calibrated by comparison method with standard chilled mirror hygrometer model: 1860-3 in the humidity generator chamber to determine the errors.

Traceability:
This instrument was calibrated using standard equipment whose accuracy is traceability through National Institute of Standards and Technology to the international system of units (SI) via MCS Calibration, Inc. Certificate number: 20926-601. Due date: Sep 26, 2024.

Measurement Date : Jul 21, 2023
Issued Date : Jul 21, 2023

Measurement Results:
This equipment was connected with Indoor air quality probe and Displayed (UR) on display. Model: HMP60, Serial number: T2320595.
Calibration was performed in the range of 20%RH to 80%RH
The results of calibration are reported in table below.

Determined (%RH)	Standard (Reading) (%RH)	UUC (Reading) (%RH)	Error (%RH)	Uncertainty ±(%RH)
20	20.05	17.5	-2.6	0.52
50	50.23	46.5	-3.7	0.51
80	80.25	75.5	-4.8	0.51

Performed by
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

J NAC JIRANATEE ASSOCIATES CO.,LTD.

Approved Signatory: .....
Mr. Parinya Boonchareon.
Calibration Department Manager

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

J NAC
JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd.
63/14-15, 67/35-36
Pet(Khaem 7, 7/1, Rd.Wathapra, Bangkokyai,
Bangkok 10600(Thailand)
Tel: +6680868812
Mobile: +6681/9819453
E-mail: jnac.calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

Certificate Number
CWS-046-67

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02FA
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: WS0-A6069
Data logger: A6069
ID NUMBER : RYG_FS0724
CONDITION AS-RECEIVED : New item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 12 Sep 2024
MEASUREMENT DATE : 18 Sep 2024
ISSUE DATE : 01 Oct 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± 10	hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS

Wind tunnel cross-section area[1]	900	cm^2
Wind direction frontal area[2]	100	cm^2
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.111	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.9) ˚C, (47.4) %RH and (1009.5) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

J NAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: .....
Mr. Parinya Boonchareon
Calibration Department Manager

REVIEW BY .....
APPROVED BY .....
NEXT CAL DATE 18 Mar 2026

Calibration procedure:
The Cup anemometer was calibrated against Standard air velocity transducer model: 8455-02 and pitot tube with precision of differential pressure meter model: DPM2500 in an open test section of Eiffel-type wind tunnel with 900 cm² cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0007-24 and MW-0055-24

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 in accordance with the GUM "Evaluation of measurement data – Guide to the expression of uncertainty in measurement"

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Jiranatee Associates Co.,Ltd.

Certificate Number
CWS-046-67

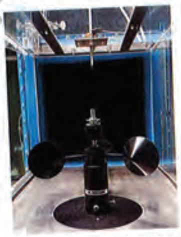
MEASUREMENT RESULTS [5]

The Cup anemometer, Unit Under Calibration (UUC) was exercise 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 top of the test section and the standard air velocity 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top 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 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

V_{std} [6] (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{uuc} [7] (m/s)	Error (m/s)	U (k=2) (m/s)
1.138	25.30	25.25	1.0	-0.1	0.31
2.149	25.24	25.25	2.0	-0.2	0.31
3.085	25.18	25.25	3.0	-0.1	0.31
4.221	25.22	25.25	4.0	-0.2	0.31
5.01	25.18	25.25	5.0	0.0	0.31
6.03	24.90	25.25	6.0	-0.1	0.31
6.95	25.10	25.25	7.0	0.0	0.31
7.94	25.00	25.25	8.0	0.1	0.31
9.02	25.12	25.25	8.9	-0.1	0.31
10.00	24.74	25.25	10.1	0.1	0.31
10.99	24.96	25.25	11.0	0.0	0.31
12.00	24.62	25.25	12.0	0.0	0.31
12.99	24.58	25.25	13.1	0.1	0.36
13.97	24.50	25.25	14.0	0.0	0.32
14.96	24.50	25.25	14.9	0.0	0.42
15.90	24.50	25.25	16.0	0.1	0.42

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Velocity of standard
[7] Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
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CALIBRATION 0367

Wind direction measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

Certificate Number
CWD-046-67

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02FA
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: WSD-A6069
Data logger: A6069
ID NUMBER : RYG_FS0724
CONDITION AS-RECEIVED : New item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 12 Sep 2024
MEASUREMENT DATE : 18 Sep 2024
ISSUE DATE : 01 Oct 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± 10 hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION : Wind tunnel cross-section area[1] 900 cm^2
Wind direction frontal area[2] 129 cm^2
Diameter of mounting pipe[3] - mm
Blockage ratio of test object[4] 0.143 [-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (22.9)°C, (52.1) %RH and (1000.5) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model AX400915-DM04-P3-S-U0 in an close test-section of Eiffel-type wind tunnel with 900 cm^2 cross test section area. The WI-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0036-23.

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'

Calibrated by:
☒ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: ....
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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Certificate Number
CWD-046-67

MEASUREMENT RESULTS [5]

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 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'_{std} Degree (°)	D'_{uuc} Degree (°)	Error Degree (°)	U (k=2) Degree (°)
5.02	45.000	42	-3	0.80
	90.000	87	-3	0.80
	135.000	132	-3	0.80
	180.000	180	0	0.80
	225.000	227	2	0.80
	270.000	273	3	0.80
	315.000	319	4	0.80
	360.000	359	-1	0.80

Remark:
[5] Calibration results only count for the tested circumstances and environmental conditions during which calibration took place
[6] Direction of standard
[7] Direction of Unit Under Calibration

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

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Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Temperature measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-172-67

MEASUREMENT ITEM : Data Logger with Temperature sensor
MANUFACTURER : Novalynx
MODEL/TYPE : 110-WS-25DL-D
SERIAL NUMBER : A6069
ID NUMBER : RYG_FS0724
CONDITION AS-RECEIVED : New item
CUSTOMER : ALS laboratory group (thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 12 Sep 2024
MEASUREMENT DATE : 14 Sep 2024
ISSUE DATE : 01 Oct 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 WI-CT-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0047-24, Certificate number: ER-0101-23

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.: 671407-00591 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'

Calibrated by:
☐ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol
☑ Miss Ruangrumpai Phoommit

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: ....
Mr. Parinya Booncharoen
Calibration Department Manager

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JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number CDT-172-67

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: HMP60S/N: W2920792.
Dimension: Diameter 12 mm. Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.061	19.9	-0.2	0.099
80	25.054	24.8	-0.3	0.099
80	30.049	29.8	-0.2	0.099
80	35.028	34.8	-0.2	0.099
80	40.025	39.8	-0.2	0.099

UUC*: Unit Under Calibration

End of Certificate of Calibration

Jiranatee Associates Co.,Ltd.

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Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Relative humidity and Air Temperature measurement laboratory
Calibration services department.

CERTIFICATE OF CALIBRATION

Certificate No. : CRT-041-67

MEASUREMENT ITEM : Relative humidity with data logger
MANUFACTURER : Novalynx
MODEL/TYPE : Data Logger: 110-WS-25DL-D
Sensor: HMP60
SERIAL NUMBER : Data Logger: A6069
Sensor: W2920792
ID NUMBER : RYG_FS0724
CONDITION AS-RECEIVED : New item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 12 Sep 2024
MEASUREMENT DATE : 18 Sep 2024
ISSUE DATE : 01 Oct 2024

Calibration procedure:
The Relative humidity and Air Temperature calibration was done by the house calibration method as WI-CL-009 and WI-CL-010 according to comparison method with Standard Chilled 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 (NMIT). Certificate number: TH-0079-23 and through Jiranatee Associates Co., Ltd. Certificate number: CDT-001-67.

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"

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.

Calibrated by:
☐ Mr. Sorawit Thachalad
☐ Miss Jittrapern Lertsumphol
☑ Miss Kuangrungai Phomwill

Approved signatory: Mr. Parinya Boonchareon
Calibration Department Manager

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

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number: CRT-041-67

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 (%RH)	UUC Reading (%RH)	Error (%RH)	Uncertainty (%RH)
29.82	19.50	17.3	-2.2	0.85
29.83	50.35	47.8	-2.6	1.4
29.82	81.53	77.2	-4.4	2.3

UUC*: Unit Under Calibration

End of Certificate of Calibration

Jiranatee Associates Co.,Ltd.

JIRANATEE ASSOCIATES CO.,LTD.

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CALIBRATION 0367

Pressure measurement laboratory
Calibration services department.

NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CPR-019-67

MEASUREMENT ITEM : Digital barometer
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: 110-WS-25BP
Data logger: 110-WS-25DL-D
SERIAL NUMBER : Sensor: BP-A6069
Data logger: A6069
ID NUMBER : RYG_FS0724
CONDITION AS-RECEIVED : New item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd,
Khwaeng Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand.

RECEIVED DATE : 12 Sep 2024
MEASUREMENT DATE : 26 Sep 2024
ISSUE DATE : 01 Oct 2024

Calibration procedure:
The Digital barometer was calibrated against Digital pressure calibrator. The WI-CL-003 was used as a calibration guideline.

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-0009-24

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 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	Model	Serial No.	Certificate No.	Due Date
Absolute Pressure Transducer	CPG2500	41001268	MP-0009-24	27 Dec 2024

2. Calibration effort for calibration sequence C
3. The UUC* was installed in vertical orientation above reference standard instrument and meter of UUC* was used as the reference level
4. Calibration conditions:
4. Condition : ☑ Normal ☐ Abnormal
Pressure transmitting medium : Air
ρ_N (20°C, 1 bar) : 1.10 kg/m³
H_{rel} : (55±15) %
t_{amb} : (23±3) °C
p_{amb} : (1010±10) mbar
5. The certificate is valid only to the item calibrated on date and place of calibration

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittrapern Lertsumphol

Approved signatory: Mr. Parinya Boonchareon
Calibration Department Manager

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

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CALIBRATION 0367

Pressure measurement laboratory
Calibration services department.

NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CPR-019-67

MEASUREMENT RESULTS : ☐ Without adjustment ☑ With adjustment

CALIBRATION IN THE RANGE OF : 950 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)
950.06	950.8	0.7	0.37
970.05	970.7	0.6	0.37
990.05	990.5	0.4	0.37
1010.04	1010.0	0.0	0.37
1030.02	1029.8	-0.2	0.37
1050.02	1049.7	-0.3	0.37

Note: UUC* Unit Under Calibration
: To convert the result in report unit to Pa should be multiply by 100

End of certificate

JNAC
JIRANATEE ASSOCIATES CO.,LTD

Jiranatee Associates Co.,Ltd.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
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SITHIPORN Associates
NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACC24008
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 35002736
ID No.: RYG_FS0496

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) %

Nanakorn P.
APPROVED BY
CAL DATE 29 / 1 / 25

Received Date : 19 JANUARY 2024
Calibration Date : 26 JANUARY 2024
Date of Issue : 29 JANUARY 2024

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.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
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SITHIPORN associates
NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACC24008
Job No. : VC67AC0058
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :
This equipment was calibrated by follow on IEC-60942-2003 Standard.
The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphone.

Condition of this result of calibration :
1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL.BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL.BP 30/0267	13-FEB-24
Digital Multimeter	33461A	MY60024273	EEL.BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAI	34560495	AA-3002-23	14-FEB-24
Audio Analyzer	AVR-3360A	V744B6069	EF-0012-23	10-FEB-24

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

SITHIPORN associates
NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACC24008
Job No. : VC67AC0058
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.98	-0.02	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1000.0	0.0	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
0.83	0.10	3.0

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

End of Calibration Certificate

T. Petch.

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

CALIBRATION CERTIFICATE

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

Address : 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter
Manufacturer : Rion
Model : NL-42
Serial No. : 00900071 (ID:RYG_FS0492)
Microphone : UC-52 No.188464
Preamplifier : NH-24 No.01733

Ambient Environment

Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325±1.5) kPa

REVIEW BY Anakarn P.
APPROVED BY
ISSUE DATE 22/2/25

Standards used :

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Date of Receipt : 24 Jan. 2024

Date of Calibration : 23 Feb.2024-1 Mar.2024

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Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2013). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

Date of Calibration : 23 Feb.2024-1 Mar.2024

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Measured value (dB)		Deviation value (dB)	Acceptance limit Class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	Before adjust	After adjust				
113.94	113.7	113.9	0.0	1.0	0.30	N/A

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 124.2 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
17.3	0.10	N/A

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

Frequency Weighting	Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-Weight	12.4	0.10	N/A
C-Weight	18.1	0.10	N/A
Flat	23.9	0.10	N/A

Date of Calibration : 23 Feb.2024-1 Mar.2024

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Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response (dB)			Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
125	0.1	0.2	0.2	1.5	0.45	0.6
1 000	-0.1	-0.1	-0.1	1.0	0.45	0.6
8 000	0.3	0.3	0.2	5.0	0.45	0.7

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response (dB)			Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
63	-0.1	0.0	0.0	2.0	0.20	0.6
125	0.0	0.0	0.0	1.5	0.20	0.6
250	0.0	0.0	0.0	1.5	0.20	0.6
500	0.0	0.0	0.0	1.5	0.20	0.6
1 000	0.0	0.0	0.0	1.0	0.20	0.6
2 000	0.0	0.0	0.0	2.0	0.20	0.6
4 000	0.0	0.0	0.0	3.0	0.20	0.6
8 000	0.0	0.0	0.0	5.0	0.20	0.7

Date of Calibration : 23 Feb.2024-1 Mar.2024

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Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

5. Long-term stability

Time	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	94.0	0.0	0.3	0.10	0.1
End	94.0				

6. Frequency and time weightings at 1 kHz

6.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-weight	94.0	0.0	0.2	0.20	0.2
C-weight	94.0	0.0	0.2	0.20	0.2
Flat	94.0	0.0	0.2	0.20	0.2

6.2 Time weightings at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	94.0	0.0	0.1	0.20	0.2
Slow	94.0	0.0	0.1	0.20	0.2
Leq	94.0	0.0	0.1	0.20	0.2

Date of Calibration : 23 Feb.2024-1 Mar.2024

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Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

7. Level linearity on the reference level range

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
136	136.0	0.0	1.1	0.30	0.3
135	135.0	0.0	1.1	0.30	0.3
134	134.0	0.0	1.1	0.30	0.3
133	133.0	0.0	1.1	0.30	0.3
132	132.0	0.0	1.1	0.30	0.3
131	131.0	0.0	1.1	0.30	0.3
130	130.0	0.0	1.1	0.30	0.3
129	129.0	0.0	1.1	0.30	0.3
124	124.0	0.0	1.1	0.30	0.3
119	119.0	0.0	1.1	0.30	0.3
114	114.0	0.0	1.1	0.30	0.3
109	109.0	0.0	1.1	0.30	0.3
104	104.0	0.0	1.1	0.30	0.3
99	99.0	0.0	1.1	0.30	0.3
94	94.0	0.0	1.1	0.30	0.3
89	89.0	0.0	1.1	0.30	0.3
84	84.1	0.1	1.1	0.30	0.3
79	79.0	0.0	1.1	0.30	0.3
74	74.0	0.0	1.1	0.30	0.3
69	69.0	0.0	1.1	0.30	0.3

Date of Calibration : 23 Feb.2024-1 Mar.2024

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FM.BL.MTC.002 Rev.4

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NSC-TISI-TIS 17025
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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

7. Level linearity on the reference level range (cont.)

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
64	64.0	0.0	1.1	0.30	0.3
59	59.0	0.0	1.1	0.30	0.3
54	53.9	-0.1	1.1	0.30	0.3
49	49.0	0.0	1.1	0.30	0.3
44	44.0	0.0	1.1	0.30	0.3
39	38.9	-0.1	1.1	0.30	0.3
34	33.9	-0.1	1.1	0.30	0.3
29	28.9	-0.1	1.1	0.30	0.3
28	27.9	-0.1	1.1	0.30	0.3
27	26.9	-0.1	1.1	0.30	0.3
26	25.9	-0.1	1.1	0.30	0.3
25	24.8	-0.2	1.1	0.30	0.3

8. Level linearlity including the level range control

At reference sound level on the reference level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
30-130	94.0	94.0	0.0	1.1	0.30	0.3

Date of Calibration : 23 Feb.2024-1 Mar.2024

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Request No. 21-67/0232 **MTC No.** EEL. BP. 176/0167

8. Level linearlity including the level range control

At reference level at 5 dB greater than the under-range on a level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
30-130	35.0	35.0	0.0	1.1	0.30	0.3

9. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	200	126.0	0.0	±1.0	0.20	0.3
	2	108.9	-0.1	+1.0; -2.5	0.20	0.3
	0.25	99.9	-0.1	+1.5; -5.0	0.20	0.3
Slow	200	119.6	0.0	±1.0	0.20	0.3
	2	100.0	0.0	+1.0; -5.0	0.20	0.3
SEL	200	120.0	0.0	±1.0	0.20	0.3
	2	100.0	0.0	+1.0; -2.5	0.20	0.3
	0.25	90.8	-0.2	+1.5; -5.0	0.20	0.3

Date of Calibration : 23 Feb.2024-1 Mar.2024

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10. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Complete cycle	125.4	125.2	-0.2	3.0	0.20	0.35
Positive half cycle	124.4	124.2	-0.2	2.0	0.20	0.35
Negative half cycle	124.4	124.2	-0.2	2.0	0.20	0.35

11. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Positive one-half cycle	Negative one-half cycle				
135.0	135.0	0.0	1.5	0.20	0.25

12. High-level stability

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	129.0	0.0	0.3	0.10	0.1
End	129.0				

Calibrated by :

(Mr. Tawikiat Iamsamran)

Approved by :

(Mr. Prawate Kluaypa)
Director
Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 23 Feb.2024-1 Mar.2024

Date of Issue : 1 Mar. 2024

Ref : 2011267012400347006

End of Certificate

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CALIBRATION CERTIFICATE

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

Address : 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phattankan, Khet Suan Luang, Bangkok 10250.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter
Manufacturer : Rion
Model : NL-42
Serial No. : 00296518 (ID: RYG_FS0431)
Microphone : Type UC-52 No.66239
Preamplifier : Type NH-24 No.34375

Ambient Environment

Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325±1.5) kPa

REVIEW BY
APPROVED BY
NEXT CAL DATE 21/2/25

Standards used :

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Date of Receipt : 24 Jan. 2024

Date of Calibration : 22-28 Feb. 2024

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E-mail : sumalee@tistr.or.th

9. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2013). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

Date of Calibration : 22-28 Feb. 2024

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1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Measured value (dB)		Deviation value (dB)	Acceptance limit Class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	Before adjust	After adjust				
113.96	114.3	113.9	-0.1	1.0	0.30	N/A

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 125.1 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
20.2	0.10	N/A

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

Frequency Weighting	Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-Weight	14.4	0.10	N/A
C-Weight	19.9	0.10	N/A
Flat	25.3	0.10	N/A

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3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response (dB) A-weight	C-weight	Flat	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
125	-0.1	0.2	0.1	1.5	0.45	0.6
1 000	0.0	0.0	0.0	1.0	0.45	0.6
8 000	-1.7	-1.7	-1.7	5.0	0.45	0.7

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response (dB) A-weight	C-weight	Flat	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
63	-0.1	-0.1	-0.1	2.0	0.20	0.6
125	-0.1	0.0	0.0	1.5	0.20	0.6
250	-0.1	0.0	0.0	1.5	0.20	0.6
500	-0.1	0.0	0.0	1.5	0.20	0.6
1 000	0.0	0.0	0.0	1.0	0.20	0.6
2 000	-0.1	0.0	-0.1	2.0	0.20	0.6
4 000	-0.1	0.0	0.0	3.0	0.20	0.6
8 000	0.0	0.0	0.0	5.0	0.20	0.7

Date of Calibration : 22-28 Feb. 2024

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5. Long-term stability

Time	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	94.0	0.0	0.3	0.10	0.1
End	94.0				

6. Frequency and time weightings at 1 kHz

6.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-weight	94.0	0.0	0.2	0.20	0.2
C-weight	94.0	0.0	0.2	0.20	0.2
Flat	94.1	0.1	0.2	0.20	0.2

6.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	94.0	0.0	0.1	0.20	0.2
Slow	94.0	0.0	0.1	0.20	0.2
Leq	94.0	0.0	0.1	0.20	0.2

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7. Level linearity on the reference level range

Anticipated value (dB)	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
137	137.0	0.0	1.1	0.30	0.3
136	136.0	0.0	1.1	0.30	0.3
135	135.0	0.0	1.1	0.30	0.3
133	133.0	0.0	1.1	0.30	0.3
132	132.0	0.0	1.1	0.30	0.3
131	131.0	0.0	1.1	0.30	0.3
130	130.0	0.0	1.1	0.30	0.3
129	129.0	0.0	1.1	0.30	0.3
124	124.0	0.0	1.1	0.30	0.3
119	119.0	0.0	1.1	0.30	0.3
114	114.0	0.0	1.1	0.30	0.3
109	109.0	0.0	1.1	0.30	0.3
104	104.0	0.0	1.1	0.30	0.3
99	99.0	0.0	1.1	0.30	0.3
94	94.0	0.0	1.1	0.30	0.3
89	89.0	0.0	1.1	0.30	0.3
84	84.0	0.0	1.1	0.30	0.3
79	79.0	0.0	1.1	0.30	0.3
74	74.0	0.0	1.1	0.30	0.3
69	69.0	0.0	1.1	0.30	0.3
64	63.9	-0.1	1.1	0.30	0.3
59	59.0	0.0	1.1	0.30	0.3

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7. Level linearity on the reference level range (cont.)

Anticipated value (dB)	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
54	53.9	-0.1	1.1	0.30	0.3
49	49.0	0.0	1.1	0.30	0.3
44	43.9	-0.1	1.1	0.30	0.3
39	39.0	0.0	1.1	0.30	0.3
34	33.9	-0.1	1.1	0.30	0.3
29	28.9	-0.1	1.1	0.30	0.3
28	27.9	-0.1	1.1	0.30	0.3
27	26.9	-0.1	1.1	0.30	0.3
26	25.9	-0.1	1.1	0.30	0.3
25	24.8	-0.2	1.1	0.30	0.3

8. Level linearlity including the level range control

At reference sound level on the reference level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
30-130	94.0	94.0	0.0	1.1	0.30	0.3

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Request No. 21-67/0232 **MTC No.** EEL. BP. 171/0167

8. Level linearlity including the level range control

At reference level at 5 dB greater than the under-range on a level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
30-130	25	25.0	0.0	1.1	0.30	0.3

9. Tone burst response

Time Weighting	Toneburst Duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	200	126.0	0.0	±1.0	0.20	0.3
	2	108.9	-0.1	+1.0; -2.5	0.20	0.3
	0.25	100.0	0.0	+1.5; -5.0	0.20	0.3
Slow	200	119.5	-0.1	±1.0	0.20	0.3
	2	100.0	0.0	+1.0; -5.0	0.20	0.3

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10. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Complete cycle	125.4	125.5	0.1	3.0	0.20	0.35
Positive half cycle	124.4	124.1	-0.3	2.0	0.20	0.35
Negative half cycle	124.4	124.1	-0.3	2.0	0.20	0.35

11. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Positive one-half cycle	Negative one-half cycle				
135.4	135.4	0.0	1.5	0.55	0.25

12. High-level stability

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	129.0	0.0	0.3	0.10	0.1
End	129.0				

Calibrated by : (Mr. Pannasit Phasingsri)

Approved by : (Mr. Prawate Khuaypa)
Director
Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 22-28 Feb. 2024
Date of Issue : 29 Feb. 2024
Ref : 2011267012400347001

End of Certificate

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Cert. No. : ACL24034
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623393 / 198640 / 26421
ID No.: RYG_FS0618

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) %

REVIEW BY Mongkoon P.
APPROVED BY
APPROVAL DATE 11/1/25

Received Date : 05 JANUARY 2024
Calibration Date : 12-15 JANUARY 2024
Date of Issue : 16 JANUARY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : (Thanakul Petchurai)

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

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Cert. No. : ACL24034
Job No. : VC67AC0052
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-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL.BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL.BP 29/0266	13-FEB-24
Digital Multimeter	34461A	MY60024273	EEL.BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAI	34560495	AA-3002-23	14-FEB-24

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. : ACL24034
Job No. : VC67AC0052
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

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Cert. No. : ACL24034
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Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	10.8
C - weight	17.4
Flat	23.3

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	-0.3	-0.2	-0.2	±5.0

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Job No. : VC67AC0052
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	0.0	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	0.0	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

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com
SITHIPORN associates
NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACL24034
Job No. : VC67AC0052
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	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	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.1	0.1	± 1.1
25.0	24.9	-0.1	± 1.1

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.5	-0.9	±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) Positive one-half cycle	Measured value (dB) Negative one-half cycle	Deviated Value (dB)	Acceptance Limits (dB)
89.7	89.6	-0.1	±1.5

12. High level stability

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

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

End of Calibration Certificate

Certificate of Calibration

Equipment :	pH Meter
Manufacturer :	Mettler Toledo
Model :	SevenCompact S220
Serial No. :	C104059460
ID No. :	RYG_EN0183
Condition As-Received:	Used Item
Received Date :	18 January 2024
Calibration Date :	19 January 2024
Reference :	2401-0579DSC-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 standard voltage calibrator and direct measurement with certified reference material (CRM) - CP-CH8 by comparison with themperature standard

REVIEW BY N Bamrit
APPROVED BY
NEXT CAL. DATE 19/07/25 THU
19/01/24 Bhumin Cal

Calibrated by : Warakorn Lerngagtrakul

Approved by : Saithip
Approved Signatory

(√) Saithip Meangmai
( ) Warakorn Lerngagtrakul
( ) Ponpan Paipim

Issue Date : 24 January 2024

The Uncertainties are for a confidence probability of approximately 95%

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A 0062854

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	23J908	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	940102	27 Nov 2025
pH 6.986	CPA chem	940104	02 Nov 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	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	4.000	177.48	177.4	4.000	0.058	2.00
S/N.: C104059460	7.000	0.00	0.0	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

Saithip

B 1198287

Cert.No.: 24CH96
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.01,7.00,10.01)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.008	4.013	176.0	0.0054	2.07
S/N.: 3225367	6.986	6.983	2.2	0.0084	2.00
	9.997	9.995	-174.1	0.0066	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe:

- Model : InLab®Expert Pro-ISM
- Serial No. 3225367

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	25.001	25.2	0.199	0.13	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 %.

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ผ 1198288

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
214-4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9494

Certificate of Calibration

Certificate No. : 24E289
Page : 1 of 2

Equipment : pH Meter
Manufacturer: Mettler Toledo
Model : SevenCompact S220
Serial No.: C10405946I
ID No.: RYG_EN0183
Condition As-Received: Used Item
Received Date: 18 January 2024
Calibration Date: 23 January 2024
Reference: 2401-0579DSC
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.Pluakdaeng,
Rayong 21140, Thailand

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Procedure used: Calibration were conducted using calibration procedure No. CP-E17 According to EURAMET cg-15.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5500A	6315011	E20/300035	29 May 2024

2.This result of calibration was made on requested at the point specified by customer.
3.The 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 :
-NA Calltechnologies Co.,Ltd., ANAB Accredited No. Calibration AC-2658

Calibrated by : Wutchanapom Wongchatkrang
Issue Date : 24 January 2024
Approved Signatory : [ ] Phaitoon Prabpaipat
[✓] Nuntawat Khamchai
[ ] Pongsagorn Boonyaporn

ผ 0333296

Cert. No.: 24E289
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	-200.0	0.0	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	99.9	-0.1	63
150.0000	149.9	-0.1	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.

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ผ 1198963

DKSH

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.

REVIEW BY N. Bamrat
APPROVED BY D.
NEXT CAL. DATE 18/3/25

Environment Condition: Temperature 23.9 °C ± 0.2
Humidity 65.3 %RH ± 1.4 %RH

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 Rungrueang
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 Starna Scientific Limited.
The standard for Wavelength Certificate No. 111583 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. Nattapat Rungrueang)
Person in charge

(Mr. Nitinun 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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DKSH Technology Limited
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2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
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CAL-FM-C06-15: 12 Sep 2022

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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	418.3	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
	0.2518	0.250	0.0018	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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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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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)
260.62 +/- 0.11 nm	280.6	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)	268.66	266.69	1.38	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4566	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

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
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CAL-FM-C08-15: 12 Sep 2022

DKSH

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00005382

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000 หมายเลขเครื่อง: 1627845

ตรวจสอบ (รับ) 18 Sep 2023 ปกติ	ตรวจสอบ (รับ) 18 Sep 2023 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 18 Sep 2023 ปกติ	ตรวจสอบ (ส่ง) 18 Sep 2023 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. ความสมบูรณ์เครื่อง	☑	☐	
☑	☐	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	☑	☐	
☑	☐	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	☑	☐	
☑	☐	4. ปุ่มกด (Keypad)	☑	☐	
☑	☐	5. หน้าจอ (Display, Screen Contrast)	☑	☐	
		Spectrophotometer			
☐	☐	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	☐	☐	
☐	☐	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	☐	☐	
☑	☐	8. ความยาวคลื่น (Wavelength Check)	☑	☐	
☑	☐	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	☑	☐	9.2 Hours
☑	☐	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	☑	☐	741.5 Hours
☑	☐	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	☑	☐	
		pH Meter and Conductivity Meter			
☐	☐	12. อิเล็คโทรด (Electrode and Connection Cable)	☐	☐	
☐	☐	13. ระดับสารละลายใน Electrode (Level KCl)	☐	☐	
☐	☐	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	☐	☐	
☐	☐	15. ขาจับอิเล็คโทรด (Stand)	☐	☐	
		Turbidimeter			
☐	☐	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	☐	☐	
☐	☐	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่เกิน 3.0)	☐	☐	
		Automatic titrator			
☐	☐	18. สภาพ Piston Burettes	☐	☐	
☐	☐	19. Function Rinsing and Dosing	☐	☐	
☐	☐	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	☐	☐	

เพิ่มเติม/ข้อแนะนำ : *656.1nm=656.1nm

*486.0nm=485.5nm

Mr.Nattapat Rungrueang

Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
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CAL-FM-R31-03: 20 Jul 2022

SCG

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

NAC-1001TC 17022 CALIBRATION 5044

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.Pluakdaeng, Rayong 21140
Customer Location	:	Laboratory
Date of Receipt	:	5 June 2024
Calibrated By	:	Sujjar Naknakred (Site Calibration Manager)
Approved By	:	Preecha Phisassuthikul (Temperature Calibration Manager)
Date of Issue	:	12 JUN 2024

REVIEW BY Thawitoll.
APPROVED BY
NEXT CAL. DATE 11/12/25

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.

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 :

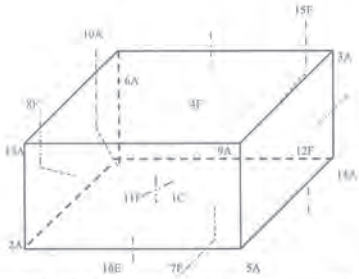
1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to W1-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .
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	T149	T240713	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 3 Hour 30 Minute At 3 °C
Fresh Air Damper [ ] Open [ ] Min [ ] Medium [ ] Max
[ ] Close
[X] Not Available
5. Adjustment
( ) without adjustment (X) after adjustment

Approved By

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

Calibration Report

Measurement Results:

	Average Standard Reading at each position (°C)									
Calibration Point	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	Average					
3.0	2.9 , 4.4	3.7	2.97	1.32	1.13	2.02	2.00

* The quoted uncertainty excludes " 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

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000 FAX. 0-2719-9484

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 Sirithean
Approved by : Saithip — Approved Signatory

( ) Malee Butkruea
(✓) Saithip Meangmai
( ) Warakorn Lerngagtrakul

REVIEW BY N.Bamrat
APPROVED BY
NEXT CAL DATE 24/07/25

Issue Date : 26 July 2023

B 0320211

Cert.No.: 23TW168
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	1126143764	140RC004	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

-o0o-

a 1172155

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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 Hlahib
Approved by :	Approved Signatory

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

Issue Date : 31 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0053616

Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2307-0713DSC-2

Cert. No.: 23LM125
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	22I1285	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 %.

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a 1159515

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Certificate of Calibration

Cert. No.: 24TM1663
Page : 1 of 3

REVIEW BY Thanitat.
APPROVED BY
NEXT CAL DATE 01/05/26

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 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Krisda Malee
Approved by :	Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 07 November 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 : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2411-0002OC-1

Cert. No.: 24TM1663
Page : 2 of 3

Procedure Used :-

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:-

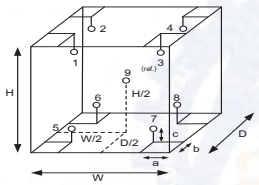
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44073381	24LM73	TPA	18 May 2025

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



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

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	m^3

Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2411-0002OC-1

Cert. No.: 24TM1663
Page : 3 of 3

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
20.0	20.0	20.0	0.026	0.26	0.53	2

Calibration Point (°C)	Measured Temperature (°C) Position 1	2	3	4	5	6	7	8	9 (ref.)	Uncertainty (±°C)
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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ilac-MRA
NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Cert.No.: 24CG3711
Page.: 1 of 2

Equipment : Burette
Capacity : 50 mL
Serial No. : -
ID. No. : RYG_EN0216
Manufacturer : Witeg
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

REVIEW BY ..... Tharita K.
APPROVED BY.....
NEXT CAL DATE..... 24/09/25

Ambient Temperature : (20 ± 2.5) °C
Relative Humidity : (50 ± 10) %
Barometric Pressure : 756 mmHg
Calibration Procedure : ASTM E 542 - 01

Calibrated by : Sa-ngeunkam Wongsa

Approved by :
Approved Signatory

(✓) Srisuda Khamtha
( ) Ponpan Paipim
( ) Unnopphol Harachai

Issue Date : 24 September 2024

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Burette
Received Date : 19 September 2024
Condition As-Received : Used Item
Calibration Date : 24 September 2024
Reference : 2409-0756DSC-3

Cert.No.: 24CG3711
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

Instruments	Model	Serial No.	ID. No.	Certificate No.	Traceability	Due date
1) Balance	XP205	B134206712	140RC007	24MM316	TPA	15 July 2025
2) Data Logger	HL-20D	20683159	140EC012	23H2174	TPA	10 Oct 2024
3) Thermometer	-	1594592	140EC010	24I175	TPA	20 Feb 2025

This certification is traceable to SI Unit

2. The certificate is valid only to the item calibrated on date and place of calibration.
3. True value is converted to true volume at the standard temperature of 20 °C

Calibration result :

Nominal capacity (mL)	Reading (mL)	Uncertainty (± mL)	*k* Factor
10	10.0259	0.0082	2.00
20	20.0214	0.0085	2.00
30	30.0006	0.0089	2.00
40	40.0003	0.0094	2.00
50	49.9988	0.011	2.00

Remark mL = cm^3

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 2643 6361-6 , e-mail: service.thailand@sartorius.com

NSC-TISI-TIS 17025
CALIBRATION 0436

SARTORIUS

Certificate of Calibration

REVIEW BY Thanitak
APPROVED BY
NEXT CAL. DATE 22/02/2025

Model Number :	MSE224S-100-DU	Certificate No. :	24BCI0069
Description :	Analytical Balance	Issued Date :	Friday, February 23, 2024
Serial Number :	0026207038	Reference No. :	229196
ID No. :	RYG_EN0002		
Manufacturer :	Sartorius	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

Ambients Conditions:
Temperature : 24.2 °C ± 5.0 °C
Humidity : 57.0 % RH ± 10.0 % RH
Pressure ± -

Reasons for calibration
☐ New Installation ☐ Service / Repaired ☑ Re-calibration/ Maintenance

Equipment Condition: ☑ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

The measurement uncertainty stated is the expended 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 form list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Cetificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2.YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19231845	23-Aug-2024

This certificate relate and apply this equipment only.
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Mr.chonchai Inthana(Technical Manager)

STAMP SARTORIUS ISO/IEC 17025:2017

SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 6361-6 Fax: +66 2643-6367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number :	MSE224S-100-DU	Certificate No. :	24BCI0069
Description :	Analytical Balance	Issued Date :	Friday, February 23, 2024
Serial Number :	0026207038	Reference No. :	229196
ID No. :	RYG_EN0002		
Manufacturer :	Sartorius	Page No. :	2 of 2

Calibration Results : Without Adjustment

Repeatability

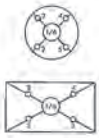
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load) 20 g	20.0000	199.9999
	20.0000	200.0000
Tolerance 0.0001 g	20.0001	200.0000
	20.0000	199.9999
	20.0001	200.0000
Nominal Value : (High Load) 200 g	19.9999	200.0000
	20.0000	200.0000
Tolerance 0.0001 g	20.0000	199.9999
	19.9999	200.0001
	19.9999	200.0000
Standard Deviation	0.00007	0.00006

Eccentricity (Off-center loading error)

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 R76).

Nominal value : 100 g
Tolerance 0.0004 g



	Difference
1	-
2	-0.0001
3	-0.0001
4	0.0000
5	-0.0001
6	-

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 (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (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	0.00016
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

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Certificate of Calibration

Cert. No.: 24TM632
Page : 1 of 3

REVIEW BY Thanitak
APPROVED BY
NEXT CAL DATE 21/09/25

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UFE 500
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. Pluakdaeng,
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 :
Approved Signatory

( ) Pornthippa Tameyakul
( ) Unnopphol Harachai
(✓) Suwit 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

Cert. No.: 24TM632
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

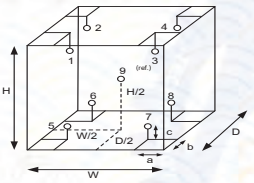
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This 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)	27	27
REL.Humid. (%)	57	59
AC Supply (Volt)	222	224



Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.40	m
W =	0.56	m
H =	0.48	m
Capacity =	0.11	m³

Position :	Ref. Std. ID No.: @ Calibration Point (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

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

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) Position									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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NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

REVIEW BY Thanitat.
APPROVED BY
NEXT CAL DATE 21/03/25

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UF 110
Serial No. : B423.0853
ID No. : RYG_EN0213
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140 Thailand
Location : Oven Room

Received Order : 21 March 2024
Calibration Date : 21 - 22 March 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :
Approved Signatory

( ) Pornthippa Tameyakul
( ) Unnopphol Harachai
(✓) Suwit Imjai

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 : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

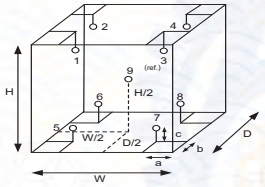
1. Reference standard instrument:-

Instrument	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 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)	27	27
REL.Humid. (%)	59	59
AC Supply (Volt)	224	223



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

Position :	Ref. Std. ID No.: @ Calibration Point (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

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
104.0	104.0	104.0	0.065	0.52	0.90	2
180.0	180.0	180.0	0.20	1.2	2.0	2

Calibration Point (°C)	Measured Temperature (°C) Position									Uncertainty (±°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.169	103.506	103.898	103.712	103.772	103.730	104.289	103.805	103.798	0.42
180.0	180.701	179.239	179.935	179.999	180.127	180.138	180.895	179.313	180.211	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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL.0-2717-3000-29 FAX.0-2719-9484

ilac-MRA
NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Cert. No.: 24TM635
Page : 1 of 3

Equipment : Water Bath
Manufacturer : Memmert
Model : WNB22
Serial No. : L513.0648
ID No. : RYG_EN0061

REVIEW BY ..... Thanitat K.
APPROVED BY.....
NEXT CAL DATE..... 21/09/25

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 :
Approved Signatory

( ) Pornthippa Tameyakul
( ) Unnopphol Harachai
(✓) Suwit Imjai

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

Cert. No.: 24TM635
Page : 2 of 3

Procedure Used :-

Calibration were 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:-

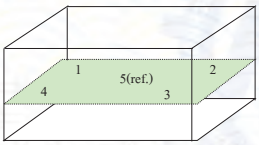
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This 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
Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
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) Position 1	2	3	4	5 (ref.)	Uncertainty (± °C)
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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NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Cert.No.: 24CH774
Page.: 1 of 2

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go S2
Serial No. : C221115514
ID No. : RYG_FS0596
Condition As-Received: Used Item
Received Date : 28 June 2024
Calibration Date : 01 July 2024

REVIEW BY ..... Pitthaya T.
APPROVED BY.....
NEXT CAL DATE..... 01/07/25

Reference : 2406-0969DSC-6
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 Lerngagtrakul

Approved by :
Approved Signatory

( ) Unnopphol Harachai
( ) Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 03 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.

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 Throught 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	970851	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	Coverage factor
	pH	mV	mV	pH	(±mV)	*k*
pH Meter	4.00	177.48	178	4.00	0.58	2.00
S/N.: C221115514	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-178	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	4.008	4.01	180	0.0079	2.00
S/N.: 3293232	6.986	6.99	5	0.011	2.00
	9.997	10.00	-172	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 %.

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NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Equipment : pH Meter with Sensor

Manufacturer : Mettler Toledo

Model : Seven2Go S2

Serial No. : C221115514

ID No. : RYG_FS0596

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 : 28 June 2024
Calibrated Date : 01 July 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngagtrakul

Approved by : Approved Signatory

( ) Ponpan Paipim
(✓) Suwit Imjai
( ) Kunchit Promprat

Issue Date : 03 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.

Equipment : pH Meter with Sensor
Condition As-Received : Used Item
Reference : 2406-0969DSC-7

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	23I1216	TPA	11 Oct 2024

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.: 3293232

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor *k*
25.0	100	25.003	25.1	0.097	0.16	2.00
30.0	100	30.002	30.2	0.198	0.16	2.00
40.0	100	40.003	40.2	0.197	0.16	2.00
50.0	100	50.002	50.2	0.198	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 %.

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DKSH

Certificate of Calibration

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-00020429
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 ± 4.1 %RH
Voltage: 225 VAC ± 1.7 VAC

REVIEW BY
APPROVED BY
NEXT CAL. DATE 11 09 25

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. Thanathorn 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.: TC22/0080

(Mr. Thanathorn Phunook)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is resulted 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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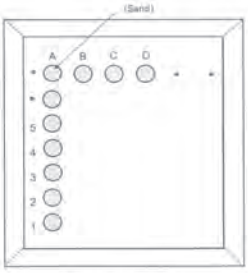
DKSH Technology Limited
2633 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
2633 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2030 7000 Email: info.calibration@dksh.com Website: www.dksh.com/th/calibration-laboratory

Fig. 1.: Front view



Location of standard

Fig. 2.: Digestion block

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the Digestion block.

Measured Temperature: The average reading of working standard at any positions or location.

Calibration Results:

Pre Calibrtion

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
A1	380	380	380	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				397.8	17.8	1.5
D2				396.6	16.6	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	380	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				377.3	12.3	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 (สง)		หมายเหตุ
11 Mar 2024			11 Mar 2024		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
☑	☐	1. สายไฟ	☑	☐	
☑	☐	2. การทำงาน Main Switch	☑	☐	
☑	☐	3. การทำงาน Selector Key	☑	☐	
☑	☐	4. การแสดงผล Display	☑	☐	
☑	☐	5. สภาพ Hole	☑	☐	
☐	☐	6. สภาพฝาปิด	☐	☐	ไม่มี
☑	☐	7. สภาพตัวเครื่อง	☑	☐	
☑	☐	8. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☑	☐	

ข้อแนะนำ

Mr. Thanathorn Phunook

Service Engineer

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
434/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-5000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 23E3924
Page : 1 of 2

Equipment :	pH Meter
Manufacturer:	Mettler Toledo
Model :	SevenExcellence
Serial No.:	B834291445
ID No.:	RYG_EN0152
Condition As-Received:	Used Item
Received Date:	08 December 2023
Calibration Date:	14 December 2023
Reference:	2312-0151DSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 10) %

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. Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand

Procedure used: Calibration were conducted using calibration procedure No. CP-E1f according to EURAMET cg-15.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5502A	2435602	EE-0041-23	26 Apr 2024

3.This result of calibration was made on requested at the point specified by customer.
3.The 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)

REVIEW BY ....
APPROVED BY ....
NEXT CAL DATE ....

Calibrated by : Napachanok Praeomoosin
Issue Date : 15 December 2023

Approved Signatory :
( ) Phalinee Pinpaipat
(✓) Nuntawat Khamchai
( ) Pongsagorn Booniyaporn

a 0331106

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.

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a 1193422

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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Cert.No.: 23CH1574
Page.: 1 of 3

Certificate of Calibration

Equipment :	pH Meter
Manufacturer :	Mettler Toledo
Model :	SevenExcellence
Serial No. :	B834291445
ID No. :	RYG_EN0152
Condition As-Received:	Used Item
Received Date :	08 December 2023
Calibration Date :	15 December 2023
Reference :	2312-0151DSC-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-CH8 by comparison with standard thermometer

Calibrated by : Warakorn Lerngagtrakul

Approved by : Approved Signatory

( ) Saithip Meangmai
( ) Warakorn Lerngagtrakul
(✓) Ponpan Paipim

Issue Date : 19 December 2023

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.

A 0061696

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-1635

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	913598	14 July 2025
pH 6.986	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	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	4.000	177.48	177.3	4.000	0.058	2.00
S/N: B834291445	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

a 1193852

Cert.No.: 23CH1674
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	4.008	4.013	184.1	0.0045	2.00
S/N.: 3225368	6.986	6.998	8.7	0.0084	2.00
	9.997	10.002	-164.7	0.0068	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 %.

-oOo-

a 1193851

Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 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 Sunda K.
APPROVED BY Sinluk P.
NEXT CAL. DATE 10/9/2025

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 traceble to SI unit through Stama Scientific Ltd. (UKAS accredited calibration laboratory NO. 0859)
Calibrated by	Mr.Wanchana Janloey

Approved by

Mr.Sonthi Temboonsakdi
Service Manager

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate. Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced except in full, without written approval of the Bara Scientific Co., Ltd.

FM-UV-702-02 Rev.01 (23/01/63)

Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com

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	0.18
418.53	418.57	0.04	0.18
572.99	572.97	-0.02	0.18
879.41	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	0.7169	-0.0002	0.0075
257	0.0000	0.0000	0.0000	0.0075
	0.8354	0.8345	-0.0009	0.0075
313	0.0000	0.0000	0.0000	0.0075
	0.2786	0.2781	-0.0005	0.0075
350	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-702-02 Rev.01 (23/01/63)

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Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com

Certificate of Calibration

Certificate No. BSCC-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
440.0	0.0000	0.0000	0.0000	0.0042
	0.5610	0.5613	0.0003	0.0042
	0.7001	0.6984	-0.0017	0.0042
	1.0026	1.0011	-0.0015	0.0042
465.0	0.0000	0.0000	0.0000	0.0042
	0.9235	0.9232	-0.0003	0.0042
	0.6614	0.6598	-0.0016	0.0042
	0.9456	0.9444	-0.0012	0.0042
546.1	0.0000	0.0000	0.0000	0.0042
	0.5249	0.5245	-0.0004	0.0042
	0.6975	0.6956	-0.0019	0.0042
	1.0009	0.9994	-0.0015	0.0042
590.0	0.0000	0.0000	0.0000	0.0042
	0.5590	0.5588	-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 wavelenght (nm)	Unit Under Calibration(UUC)		
	Wavelength (nm)	Transmission (%T)	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 NSC-ONSC Accredited.

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

End of Certificate

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate. Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced except in full, without written approval of the Bara Scientific Co., Ltd.

FM-UV-702-02 Rev.01 (23/01/63)

Agilent Technologies

Agilent Technologies (Thailand) Limited
U CHU LIANG BLDG. 22/F UNIT A,D
968 RAMA 4 ROAD, SILOM, BANGRAK
Bangkok 10500 Thailand

Tel. +662 637 6363
Fax: +662 632 4334
Email: ccc-smt@agilent.com
Website: www.agilent.com/chem

SERVICE REPORT

Customer Purchase Order Number:	Customer Number: 70371013
Service Request:	Service Request Date:
Service Order: 6006041263	Service Confirmation: 6905338201

Customer Contact:
ALS Laboratory Group (Thailand) Co Ltd
Head Office
104 Phatthanakan 40 Phatthanakan Rd
Khwaeng Phatthanakan Khet Suan
TAX ID : 0105540004859
Chanattagarn.lmchom@alsglobal.com
27603068

Invoice To:
ALS Laboratory Group (Thailand) Co Ltd
Head Office
104 Phatthanakan 40 Phatthanakan Rd
Khwaeng Phatthanakan Khet Suan

REVIEW BY Supakwan M.
APPROVED BY Sawita N.
NEXT CAL. DATE 13/06/2025

Delivery Site:
ALS Laboratory Group (Thailand) Co Ltd
Head Office
104 Phatthanakan 40 Phatthanakan Rd
Khwaeng Phatthanakan Khet Suan

Location:
Room
Bldg
Lab
Dept

Direct Inquiries to:
Contact Name: Customer Contact Center
Contact E-mail: ccc-smt@agilent.com
Contact Telephone: +662 637 6363
Contact Fax: +662 632 4334

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Agilent Technologies (Thailand) Limited. Head Office
U Chu Liang Bldg. 22/F Unit A,D
968 Rama 4 Road, Silom, Bangrak,
Bangkok 10500 Thailand
Tax ID : 0105542068218

Citibank N.A. Bangkok Branch
399 Interchange 21 Building, Sukhumvit Road, Klongtoey Nua
Sub-district, Wattana District, Bangkok 10110 Thailand
Acc. No: 012-4452-007 .
THB:Krung Thai Bank PCL
Siam Square Br.,416/1-2 Rama I Rd.,Pathumwan, BKK 10330
Thailand

ORIGINAL

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	ICPMS 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	DEAAC11098	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	JP12091612	ICP MS 7700 (HPLC)	SYS-IM-7700-E

Service Items:

Item	Service/Part #	Description	Qty	Entitlement	Service Start	Service End
1000	EOQ	Enterprise Operational Qualification	1.00	Agreement Entitlement - 100 % covered	12.12.2023	12.12.2023
1010	5185-5950	ICP-MS Checkout Solutions	1.00	Agreement Entitlement - 100 % covered		

Additional Information:

Service Confirmation Number: 6905338201
Service Confirmation Date: 12.12.2023

Service Information:

Problem Description:
WU-OQ-IM/HPLC-7700-5001143313

Service Provided:
Perform OQ Hardware control test CSD logon, Autosample , ISIS , 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: 5.0	**Travel Hours:** 1.0	
Customer Field Service Representative Name: Panthep Kurasathain	**Customer Field Service Representative Signature:**	**Date:** 12 Dec 2023
Customer Name: Supakwan Mak	**Customer Signature:** Supakwan M.	**Date:** 12 Dec 2023

Additional Comments:

SCG CEMENT-BUILDING MATERIALS

Metrological Center

SCI ECO Services Company Limited
33/2 Moo 3, T.Banpa, A.Kaengkhoi, 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. T231676

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	:	13 September 2023
Calibrated By	:	Sanee Musikawan (Site Calibration Manager)
Approved By	:	_____ / Sujjar Naknakred (Site Calibration Manager)
Date of Issue	:	26 SEP 2023

REVIEW BY Jattaporn C.
APPROVED BY Sawita N.
NEXT CAL. DATE 22/03/25

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.

Metrological Center

SCI ECO Services Company Limited

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Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

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	T151	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.

Metrological Center

SCI ECO Services Company Limited

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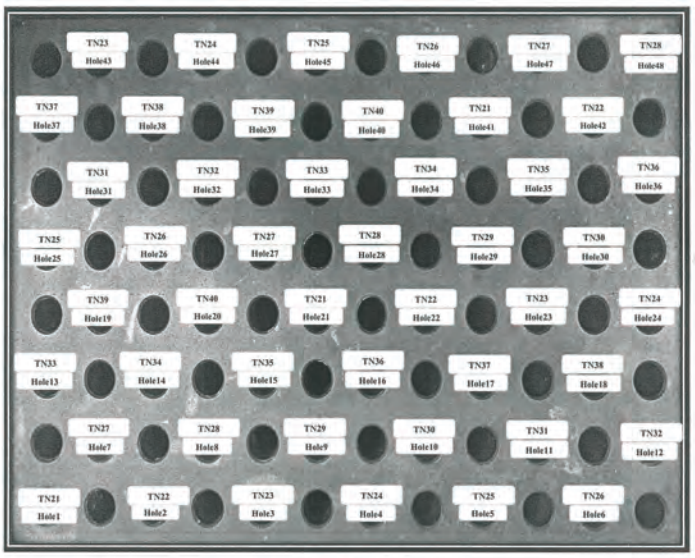
Calibration Report



FRONT CONTROL

Approved By.

Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Calibration Report

Measurement Results

Calibration Point		Average Standard Reading at each position (°C)					
R1 Hole1-Hole6		TN21	TN22	TN23	TN24	TN25	TN26
CAL POINT	Max	95.01	94.41	95.20	95.41	94.51	95.17
95	Min	94.57	93.95	94.75	94.92	94.00	94.72
	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	92.93	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.

Metrological Center

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Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Calibration Report

Measurement Results

Calibration Point		Average Standard Reading at each position (°C)					
R1 Hole1-Hole6		TN21	TN22	TN23	TN24	TN25	TN26
CAL POINT	Max	105.23	104.32	105.43	105.25	104.44	105.27
105	Min	104.94	103.95	105.15	105.04	104.11	104.96
	Average	105.09	104.13	105.29	105.15	104.28	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	105.37	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	104.88	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	103.34	105.78	105.59	105.87
	Min	104.67	105.96	103.08	105.56	105.36	105.68
	Average	104.81	106.11	103.21	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.

Metrological Center
SCI ECO Services Company Limited
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Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109
Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T231676

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

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
NSC-TISI-TIS 17025 CALIBRATION 0244

Certificate No. T232160

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

REVIEW BY _____
APPROVED BY _____
NEXT CAL. DATE 06/06/25

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.
NSC-TISI-TIS 17025 CALIBRATION 0244

Certificate No. T232160

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 :

1. Thisequipment 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 .
2. 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

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 30 Minute At 3 °C
   Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
   ☐ Close
   ☒ Not Available
5. Adjustment :
   (X) without adjustment ( ) after adjustment

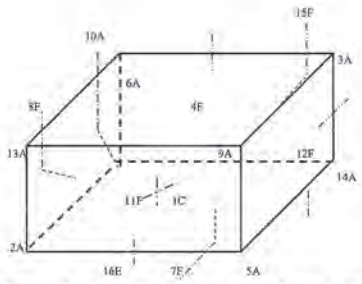
Approved By._____

FM-L15 118/18-08-66

Metrology
SCI ECO Services Company Limited
33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.
NSC-TISI-TIS 17025 CALIBRATION 0244

Certificate No. T232160

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-L15 118/18-08-66

SCG

Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.

NSC-TISI-TIS 17025 CALIBRATION 0244

Certificate No. T232160

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) Min , Max	Reading (°C) Average	Average (°C)	Stability (±°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage 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-L12 I18/18-08-66

BKK_EL0128

Scientist Instrument

REVIEW BY Chanatt Y.
APPROVED BY Sauth N.
NEXT CAL. DATE 6/12/24

Performance Verification Certificate

for Mercury Analyzer

PRODUCT ID	*Quicktrace M-8000 , Teledyne Leeman Labs*
Equipment ID	BKK_EL0128 Mercury Analyzer S/N: US22133002
	BKK_EL0129 Autosampler S/N : 052222A560
Customer Name	ALS Laboratory Group (Thailand) Co., Ltd.
Address	104 Soi Pattana 40, Pattana Rd. Suan Luang, Suan Luang Bangkok 10250 Thailand

Date of Qualified December 6, 2023
Next Due date December 6, 2024

This certifies for products which was performed in acceptable criteria specifications

Autosampler & Sample Introduction	PASSED
Analyzer	PASSED
Gas Liquid Separator & Dryer	PASSED
CVAFS Detector	PASSED
Electronics/Mechanical	PASSED
Data station/PC	PASSED
Analytical test	PASSED

Provided by

Scientist Instrument Co.,Ltd.
113 Soi Ekachai 44, Ekachai Road
Khlong Bang Phran, Bangbon
Bangkok 10150 Thailand

Certified by
Thunraphol Sakdayos
Service Engineer

BKK_EL0128

Scientist Instrument

REVIEW BY Orawan T.
APPROVED BY Sauth N.
NEXT CAL. DATE 06/12/25

Performance Verification Certificate

for Mercury Analyzer

PRODUCT ID	*Quicktrace M-8000 , Teledyne Leeman Labs*
Equipment ID	BKK_EL0128 Mercury Analyzer S/N: US22133002
	BKK_EL0129 Autosampler S/N: 052222A560
Customer Name	ALS Laboratory Group (Thailand) Co., Ltd.
Address	104 Soi Pattana 40, Pattana Rd. Suan Luang, Suan Luang Bangkok 10250 Thailand

Date of Qualified December 6, 2024
Next Due date December 6, 2025

This certifies for products which was performed in acceptable criteria specifications

Autosampler & Sample Introduction	PASSED
Analyzer	PASSED
Gas Liquid Separator & Dryer	PASSED
CVAFS Detector	PASSED
Electronics/Mechanical	PASSED
Data station/PC	PASSED
Analytical test	PASSED

Provided by

Scientist Instrument Co.,Ltd.
113 Soi Ekachai 44, Ekachai Road
Khlong Bang Phran, Bangbon
Bangkok 10150 Thailand

Certified by
Thunraphol Sakdayos
Service Engineer

SCG

Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, 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. T240742

Certificate of Calibration

Equipment	:	Digestion Unit
Manufacturer	:	SCP Science
Model	:	DigiPRER HT
Serial No.	:	HTC1120480658
Customer Code	:	BKK_EN0366
ID No.	:	T2635A5
Customer	:	ALS Laboratory Group (Thailand) Co.,Ltd. 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250
Customer Location	:	Wet Chemistry Lab 1
Date of Receipt	:	11 April 2024
Calibrated By	:	Sujjar Naknakred (Site Calibration Manager)
Approved By	:	/ Boonchai Suriyawong (Site Calibration Manager)
Date of Issue	:	02 MAY 2024

REVIEW BY Suda K.
APPROVED BY Siriluk P.
NEXT CAL. DATE 29/04/25

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 I09/30-05-57

Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, 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. T240742

Calibration Report

Equipment : **Digestion Unit**
Date of Calibration : **21 April 2024**
Environment : **Temperature : 23.9 - 26.3 °C**
Line Voltage : 221.8 - 225.9 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert four standard thermocouples type S into its chamber , the other one thermocouple type T use for ambient temperature measurement . The calibration was done in according to WI-T10.
was based on ITS - 90 .
2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	Type S	M20A2-(CH11-CH14)	T230886	09 May 2024
DATA LOGGER	34970A	T47	T230886	09 May 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 1 Hour 6 Minute At 380 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available
5. Adjustment :
(X) without adjustment ( ) after adjustment

Approved By.

Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, 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. T240742

Calibration Report

FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Stardards at Block							
(°C)	(°C)	(°C)	Reading	M20A2-CH11 Hole 1	M20A2-CH12 Hole 2	M20A2-CH13 Hole 3	M20A2-CH14 Hole 4	M20A2-CH11 Hole 5	M20A2-CH12 Hole 6	M20A2-CH13 Hole 7	M20A2-CH14 Hole 8
380.0	380.0	379.2 - 380.5	Max °C	378.7	378.9	377.9	378.7	380.5	379.8	378.7	377.4
			Min °C	378.2	378.5	377.5	378.2	380.1	379.3	378.3	376.9
			Average °C	**378.4**	**378.7**	**377.7**	**378.4**	**380.3**	**379.6**	**378.5**	**377.2**
			Stability ± °C	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2

Cal. Point	Setting	Reading	STD.	Position of Stardards at Block							
(°C)	(°C)	(°C)	Reading	M20A2-CH11 Hole 9	M20A2-CH12 Hole 10	M20A2-CH13 Hole 11	M20A2-CH14 Hole 12	M20A2-CH11 Hole 13	M20A2-CH12 Hole 14	M20A2-CH13 Hole 15	M20A2-CH14 Hole 16
380.0	380.0	379.2 - 380.5	Max °C	378.4	378.6	379.2	379.6	381.9	380.6	379.1	378.1
			Min °C	377.8	378.2	378.7	379.2	381.4	379.9	378.3	377.2
			Average °C	**378.1**	**378.4**	**379.0**	**379.4**	**381.6**	**380.3**	**378.7**	**377.7**
			Stability ± °C	0.3	0.2	0.2	0.2	0.3	0.4	0.4	0.5

Approved By.

Metrological Center

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Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T240742

Calibration Report

FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Stardards at Block							
(°C)	(°C)	(°C)	Reading	M20A2-CH11 Hole 17	M20A2-CH12 Hole 18	M20A2-CH13 Hole 19	M20A2-CH14 Hole 20	M20A2-CH11 Hole 21	M20A2-CH12 Hole 22	M20A2-CH13 Hole 23	M20A2-CH14 Hole 24
380.0	380.0	379.2 - 380.5	Max °C	378.9	379.2	379.5	380.1	382.1	381.0	378.9	377.8
			Min °C	378.2	378.6	379.1	379.6	381.7	380.2	378.3	377.2
			Average °C	**378.5**	**378.9**	**379.3**	**379.8**	**381.9**	**380.6**	**378.6**	**377.5**
			Stability ± °C	0.3	0.3	0.2	0.2	0.2	0.4	0.3	0.3

Cal. Point	Setting	Reading	STD.	Position of Stardards at Block							
(°C)	(°C)	(°C)	Reading	M20A2-CH11 Hole 25	M20A2-CH12 Hole 26	M20A2-CH13 Hole 27	M20A2-CH14 Hole 28	M20A2-CH11 Hole 29	M20A2-CH12 Hole 30	M20A2-CH13 Hole 31	M20A2-CH14 Hole 32
380.0	380.0	379.2 - 380.5	Max °C	378.5	378.1	378.0	378.6	380.7	379.7	377.7	380.9
			Min °C	378.2	377.8	377.7	378.1	380.3	379.0	377.2	380.4
			Average °C	**378.4**	**378.0**	**377.9**	**378.4**	**380.5**	**379.4**	**377.5**	**380.6**
			Stability ± °C	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3

Approved By.

Metrological Center

SCI ECO Services Company Limited

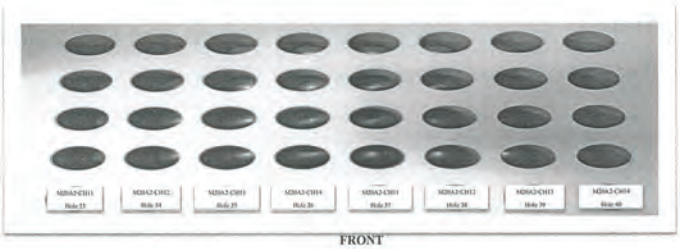
33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T240742

Calibration Report



FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Stardards at Block							
(°C)	(°C)	(°C)	Reading	M20A2-CH11 Hole 33	M20A2-CH12 Hole 34	M20A2-CH13 Hole 35	M20A2-CH14 Hole 36	M20A2-CH11 Hole 37	M20A2-CH12 Hole 38	M20A2-CH13 Hole 39	M20A2-CH14 Hole 40
380.0	380.0	379.2 - 380.5	Max °C	378.3	377.9	378.7	379.5	381.6	380.5	378.4	378.0
			Min °C	378.0	377.6	378.4	379.1	381.2	380.0	378.1	377.6
			Average °C	**378.2**	**377.8**	**378.6**	**379.3**	**381.4**	**380.3**	**378.2**	**377.8**
			Stability ± °C	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

The expanded uncertainty of temperature measurement was ± 1.87 °C

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=2 , providing a level of confidence of approximately 95 % .

Approved By.

บริษัท ดับเบิ้ล เอส ไดแอกนอสติคส์ จำกัด
DOUBLE S DIAGNOSTICS CO., LTD.

Maintenance Plan YEAR : 2024

เดือน	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
วัน								8				

Periodical maintenace check list for Konelab

	6M	12M	Note!
1.Diluent-wash tubing change	☐	☑	
2.ISE tubing change	☒	☒	None -
3.Syringe check/change		☑	
4.Dispensing check/ change		☑	
5.Waste tubing change when necessary		☑	
6.Lamp check/change	☐	☑	
7.Mixer paddle/paddle change(not Konelab20)		☑	
8.ISE needles check/change		☒	None
9.Pump tubing check/ chance	☐	☑	
10.Broken/worn out part check /change		☑	
11.Peristaltic pump check /cleaning/ lubrication	☐	☑	
12.Heating check		☑	
13.Cooling check		☑	
14.Dispenser mechanic check/adjustment	☐	☑	
15.Cuvette transfer mechanic check/adjustment	☐	☑	
16.Dispenser movement check/adjustment	☐	☑	
17.Sample/reagent register check/adjustment	☐	☑	
18.Dispensing tubing tightness check	☐	☑	
19.Photometer and optics cleaning/check/adjustment	☐	☑	
20.Workstation PC cleaning if necessary	☐	☑	
21.Mechanic cleaning/lubrication	☐	☑	
22.Instrument cleaning if necessary	☐	☑	
23.Complete analyzer testing with waterblank/QC or sample	☐	☑	
24.Test parameters/Adjustment/config. Save to USB key	☐	☑	
25.UPS Test	☐	☑	

Place: ALS LAB **Instrument:** Bio Aquakem
Date/Time: 16/8/67 **Serial no:** 20281
Service done by: **Install date:**
Signature of customer: **Date/Time:** 16/08/2024

Accuracy results Aquakem 7.2.AQ2 Page: 1

Laboratory
Analyzer User

8/16/2024 14:53

Performed 8/16/2024
Lot W234

ACCEPTANCE CRITERIA

	Result	Limit	Warning
Temperature (?C)	37.8	37.0 +/- 1.0	
Dispensing ratio	16.4	14.8 - 17.2	
CV%	0.29	<1.7	
Photometric noise			
Max SD L340_2 (mA)	0.17	<2.0	
Max SD L340_4 (mA)	0.87	<3.0	
Linearity of photometer			
Slope	1.0141	0.94 - 1.06	
Curvature	0.0053	+/- 0.02	
Max bias from linear fit (mA)	4.3	<15.0	
Max delta %	-1.6	+/- 6.0	
Linearity of sample dispensing			
Proport. volume XDISP2 (?l)	2.06	1.96 - 2.16	
Proport. volume XDISP4 (?l)	4.14	3.86 - 4.40	
XDISP2 CV%	1.21	<2.0	
XDISP4 CV%	0.90	<2.0	
XDISP10 CV%	0.68	<2.0	
Needle 0 ?l volume			
Average (A)	0.005	<0.050	
Standard deviation (A)	0.002	<0.005	
Volume (?l)	0.03	<0.32	

OTHER INFORMATION

Dispensing ratio

Posit	Result (A)
1	0.1549
2	0.1549
3	0.1537
4	0.1547
5	0.1547
6	0.1545

Photom. noise: SD (mA)

Posit	L340_2	L340_4
1	0.15	0.80
2	0.17	0.79
3	0.04	0.85
4	0.16	0.31
5	0.11	0.58
6	0.14	0.87

Accuracy results Aquakem 7.2.AQ2 Page: 2

Laboratory
Analyzer User

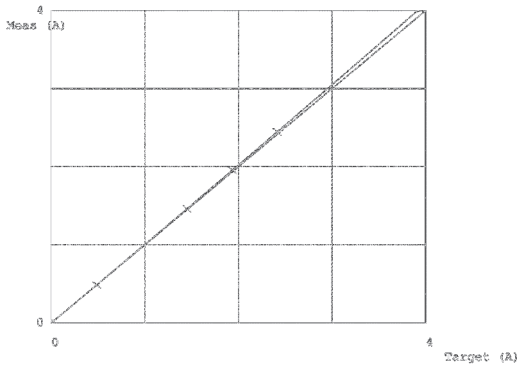
8/16/2024 14:53

Linearity of sample dispensing

Test	Absorbance (A)
XDISP2	0.306
XDISP4	0.612
XDISP10	1.471

Linearity of photometer

L340_	Target (A)	Meas (A)	Delta (A)	Delta %
1	0.002	0.006	-0.004	-217.7
2	0.486	0.493	-0.007	-1.5
3	1.451	1.469	-0.018	-1.2
4	1.936	1.963	-0.027	-1.4
5	2.415	2.454	-0.039	-1.6



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Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID:	GM-10
Organization Name:	ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location:	104 Patthanakarn 40, Patthanakarn Rd., Kwang Suan Luang, Khet Suan Luang, Bangkok 10250
Date:	November 21, 2024 2:12:44 PM
EQP Name:	AgilentRecommended , AgilentRecommended
EQP Revision:	GC.02.55, GCMS.02.56
Overall Qualification Status:	Pass

REVIEW BY Suchada T.
APPROVED BY Nant Sonr
NEXT CAL. DATE 21-May-26

CDS Logon Verification - GC

Logon: asbkk.env03

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

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Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Setpoint Status: **Pass**

Zone: Oven

	Setpoint/Actual				
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				
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		
Temperature:	100.0	100.7333	°C
Stability:		0.1	°C
Agilent Recommended:	<=	0.5	

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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
Injection Tower

Name: 7693A

Source: EI - Extractor

Setpoint Status: **Completed**

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Instrument Detection Limit

Tested Combination1 Front MMI / External TQ
Injection Tower

Name: 7693A

Source: EI - Extractor

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Setpoint Status: **Pass**

Injection Volume on Column: 1.0 uL

		Area		Retention Time	
Minimum RSD:		4.58	%	0.01	%
Agilent Recommended:	<=	12.00		<= 1.00	
Status:		Pass		Pass	

Instrument Detection Limit: 1.54238 fg

Agilent Recommended: <= 4.03800

Status: Pass

Overall Instrument Detection Limit Test Status

Pass

Mass Ratio Precision

Tested Combination1 Front MMI / External TQ
Injection Tower

Name: 7693A

Source: EI - Extractor

Setpoint Status: **Pass**

Injection Volume on Column: 0.5 uL

		Area Mass 1 Abundance*s		Mass Ratio	
RSD:		2.23	%	0.10	%
Agilent Recommended:	<=	5.00		<= 5.00	
		Pass		Pass	

Overall Mass Ratio Precision Test Status

Pass

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Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	GM-10
Manufacturer	Agilent Technologies
Name	7890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

Tested Combination1

Injection Technique	Injection Tower
Inlet	Front
Detector	External
LTM Included?	No

Sampler 1

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN18180003
Firmware Revision	A.11.02
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Sampler 2

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN18170137
Firmware Revision	A.11.03
Vial Heater	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	7890
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

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	OFN Std

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Extractor
Number of filaments	2

Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and logon to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	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\ClearStore\AceSelfQualification.

Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

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User Name: supasak.nimsongtham
Report Generated by Hostname: 5CG1115HKC

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 11:58:17 AM	Audit	SessionCreated	Session	Host Name: 5CG1115HKC, Drive Serial Number: C2031778
November 21, 2024 11:58:17 AM	start	Configuration	Session	None
November 21, 2024 11:58:17 AM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
November 21, 2024 12:01:59 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks/Gc/Configurations/02.55/Gc.02.55.eqp], EQP File Name: [Gc.02.55.eqp], EQP Name: [AgilentRecommended],Protocol Revision :[Gc.02.55] EQP details for hyphenated technique [GcMs] - File path: [ProtocolPacks/GcMs/Configurations/02.56/GcMs.02.56.eqp], EQP File Name: [GcMs.02.56.eqp], EQP Name: [AgilentRecommended]
November 21, 2024 12:02:04 PM	End	Configuration	Session	None
November 21, 2024 12:02:12 PM	start	Qualification	Session	OQ
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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User Name: supasak.nimsongtham
Report Generated by Hostname: SCG1115HKC

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 12:03:11 PM	start	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	None
November 21, 2024 12:03:20 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints 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 % setpoint 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 % setpoint 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 % setpoint 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 % setpoint 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 % setpoint in K	Manual Data Entry

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User Name: supasak.nimsongtham
Report Generated by Hostname: SCG1115HKC

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 12:06:23 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
November 21, 2024 12:06:25 PM	start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
November 21, 2024 12:07:10 PM	Audit	Data	GC Oven Temperature Stability - 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 Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
November 21, 2024 12:07:16 PM	start	Execution	Tune EI - 7000D TQ: - Source: - EI - Extractor Filament 1 (Qualitative - No setpoints associated)	None
November 21, 2024 12:07:26 PM	End	Execution	Tune EI - 7000D TQ: - Source: - EI - Extractor Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
November 21, 2024 12:07:28 PM	start	Execution	Tune EI - 7000D TQ: - Source: - EI - Extractor Filament 2 (Qualitative - No setpoints associated)	None
November 21, 2024 12:07:39 PM	End	Execution	Tune EI - 7000D TQ: - Source: - EI - Extractor Filament 2 (Qualitative - No setpoints associated)	Run Count : 1
November 21, 2024 12:07:41 PM	start	Execution	Scouting Run - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor- Part of GCMS System Preparation	None

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Report Generated by Hostname: SCG1115HKC

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 12:08:53 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor- Part of GCMS System Preparation	Data files Path : C:\GM-10 OQ2024\SC001.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: 0;Initial Height Reject: 50;Integration: Off at 0;Integration: On at 4]
November 21, 2024 12:09:50 PM	End	Execution	Scouting Run - Injection Tower, Front MMI, TQ: - Source: - EI - 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: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	None
November 21, 2024 12:16:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL001.D
November 21, 2024 12:16:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL002.D

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Report Generated by Hostname: SCG1115HKC

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 12:16:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL003.D
November 21, 2024 12:16:46 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL004.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL005.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL006.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL007.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL008.D
November 21, 2024 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Rel. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\DL009.D

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Report Generated by Hostname: 5CG1115HKC

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 12:16:47 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\GM-10 OQ2024\IDL010.D
November 21, 2024 12:18:15 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: 0;Initial Height Reject: 50;Integration: Off at 0;Integration: On at 4]
November 21, 2024 12:22:43 PM	End	Execution	Instrument Detection Limit - Injection Tower, Front MMI, TQ: - Source: - EI - Extractor - RSD L (Area): <= 12.00% - RSD L (Ret. Time): <= 1.00%	Run Count : 1
November 21, 2024 12:22:52 PM	start	Execution	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	None
November 21, 2024 12:27:36 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Data files Path : C:\GM-10 OQ2024\MRP002.D
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Data files Path : C:\GM-10 OQ2024\MRP003.D
November 21, 2024 12:27:38 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Data files Path : C:\GM-10 OQ2024\MRP004.D

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

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Report Generated by Hostname: 5CG1115HKC

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 MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Data files Path : C:\GM-10 OQ2024\MRP005.D
November 21, 2024 12:27:39 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Data files Path : C:\GM-10 OQ2024\MRP006.D
November 21, 2024 12:27:39 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Data files Path : C:\GM-10 OQ2024\MRP007.D
November 21, 2024 12:33:20 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: 0;Initial Height Reject: 50000;Integration: Off at 0;Integration: On at 4]
November 21, 2024 12:36:42 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MMI, TQ: - Source: EI - Extractor - L (RSD): <= 5.00%	Run Count : 1
November 21, 2024 12:37:11 PM	End	Qualification	Session	OQ
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 1:37:20 PM	Audit	Reporting	Session	Report Generated : Report

Date: November 21, 2024 2:12:44 PM
System ID: GM-10

BKK_EL0037

Agilent CrossLab
From Insight to Outcome

Agilent CrossLab Start Up Services

Agilent 5100 5110 ICP-OES Preventive Maintenance

REVIEW BY Thitima B.
APPROVED BY Sam L.N.
NEXT CAL. DATE 21/02/2025

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.

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Agilent CrossLab
From Insight to Outcome

Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists section of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.
- For customers using HF applications, the instrument should be returned to its standard sample introduction system.

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Important Customer Web Links

- To access **Agilent University**, visit http://www.agilent.com/crosslab/university/ to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- To access the **Agilent Resource Center** web page, visit https://www.agilent.com/en-us/agilentresources. The following information topics are available:
  - Sample Prep and Containment
  - Chemical Standards
  - Analysis
  - Service and Support
  - Application Workflows
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at https://www.youtube.com/user/agilent
- **Need to place a service call?** Flexible Repair Options | Agilent

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Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "**X**" or tick mark "✓".
- Check **"Service not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in the most logical order relevant to the individual system service in the order of the tasks listed.
- Complete the **Service Review** section together with the customer.
- Complete the fields for page numbers at the foot of each selected page.
- Add relevant page numbers to selected pages and complete the total number of pages field in the Service Completion section.
- **Ask the customer to sign the Service Verification section including the customer's and your signature.**

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Instrument Maintenance

System Information

☑ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	G8010A / MY16010005
Instrument System Site and Location	ALS Laboratory Group (Thailand) Co, LTD.

List System Component Product Numbers	List the Serial Numbers of each Component
1. G8010A	MY16010005
2. G3410A	AU15460754
3. G3281-80001	2008-00169
4.	
5.	
6.	
7.	
8.	
9.	

ICP-OES Configuration Table	Circle the type or write in the type if other
Nebulizer Type	SeaSpray | Cinnabar | Conikal | Other
Spray Chamber	Cyclonic Single Pass | Cyclonic Double Pass | Other
Torch	Radial | Dual View | Other
Torch Type	One Piece | Semi Demountable | Fully Demountable | Other
Injector Diameter	2.4mm | 1.8mm | 1.4mm | 0.8mm | Other
Injector Material	Quartz | Ceramic | Other

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Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components and implementation of Service Notes.
- ☑ Check for required firmware/software updates and verify with customers if they would like them installed.
- ☑ For HF application systems, if standard sample introduction system was not installed, ask the customer to install it. N/A
- ☑ Ask the customer to remove any samples from the ICP-OES sample introduction area, auto sampler or around the ICP-OES.

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Preventive Maintenance Procedures

Record Pre-PM instrument performance

- ☑ Run Instrument Performance test
- ☑ Record results in Instrument Performance Test Results Table – Pre-PM.

Clean and inspect ICP-OES system

- ☑ Look for any obvious external damage or problems.
- ☑ Inspect water cooling hoses, gas lines and power cord for excessive wear or damage.
- ☑ Perform a general internal inspection of the system for excessive dust accumulation, clean if necessary
- ☑ Inspect sample introduction components and record any required maintenance in the Service Engineer Comments and notify the customer as the required actions required.
- ☑ Record the instrument operating conditions in the ICP-OES Status Results Table.
- ☑ Replace the polychromator purge filter.
- ☑ Replace the radial pre-optics window
- ☑ Replace the axial pre-optics window for SVDV and VDV instruments.
- ☑ Check exhaust flow for the correct positive extraction at the exhaust duct to insure they meet minimum specifications.
- ☑ Replace air inlet dust filter.
- ☑ Replace high capacity air inlet dust filter element if installed.
- ☑ Remove and clean instrument water inlet filter.

Agilent Water Recirculator

- ☐ **Service not applicable**
- ☑ Drain cooling fluid and remove any particles from the chiller reservoir
- ☑ Remove, clean and reinstall water inlet metal mesh filter if present.
- ☑ Re fill with Agilent Cool Clear cooling fluid.
- ☑ Clean the cooling system Air filter and the condenser.

SPS 3 Auto Sampler

- ☑ **Service not applicable**
- ☐ Power cycle the autosampler and verify successful initialization.
- ☐ Inspect X and Z axis belts for wear. Replace is necessary.
- ☐ Clean X and Z axis slide shafts.
- ☐ Using customer's racks and the Agilent software move the sample probe to the 4 outermost corners and rinse port, ensure that the probe is approximately centered in the vial.

SPS 4 Auto sampler

- ☐ **Service not applicable**
- ☑ Clean the spill tray, rack location mat, end frames and chassis with a damp soft cloth and diluted mild detergent.
- ☑ Clean the auto sampler cover panels, if cover kit is installed, with domestic window cleaner.
- ☑ Check the X-axis and Z-axis drive belts for cracks, splits, damaged teeth, excessive fraying, color changes or degradation from fumes.
- ☑ Check the X-axis, Theta-axis and Z-axis FFC cables for cracks, incorrect positioning, damaged edges or damaged connectors.
- ☑ Pump Tubing Replacement. Replace peristaltic pump tubing. Replace all tubing that goes from the rinse station to the pump and from the pump to the waste/rinse bottles
- ☑ Test using customer's tray and move the sample probe to the sample vial 1, wash vial and rinse port and ensure that the probe is centered in the vial. If not use calibration wizard and calibrate the position.

AVS 4, 6, 7 Advanced Valve System

- ☑ **Service not applicable**
- ☐ Replace valve rotor seal
- ☐ Check fittings for signs of leaks
- ☐ Check tubing including autosampler tubing for kinks or excessive wear
- ☐ Check high flow pump for signs of leaks

ICP-OES adjustment

- ☑ Check position of Zn peak, adjust if required.
- ☑ Check Argon Ratio, adjust to specified value if required.
- ☑ Perform Detector Calibration.
- ☑ Perform Instrument Calibration

Record Post-PM instrument performance

- ☑ Run Instrument Performance test.
- ☐ Record results in Instrument Performance Test Results Table - Post PM.
- ☑ For systems using ICP Expert version 7.3 and above, run the following Instrument tests
  - ☑ Subsystem Communications Test
  - ☑ Air Flow
  - ☑ Water Flow
  - ☑ Gas Flows
  - ☑ RF Generator
  - ☑ Camera Test
  - ☑ Optics Test
  - ☑ Nebulizer Test
- ☑ Record the result in the Instrument Test Results Table

Restore Instrument

- ☑ For HF applications, ask the customer to reinstall their sample introduction system.
- ☑ Leave system in an idle state: on and purging.
- ☑ Guidance: If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☑ Record the PM event in the Smart Alerts logbook, if applicable.
- ☑ Update/reset instrument maintenance counters as appropriate.
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review this service, parts replaced, and test results obtained with the customer.
- ☑ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☑ **Complete the Signature Page with both Service Engineer and Customer signatures.**

Test Results

Instrument Performance Test Results Table

Note: These measurements do not form part of any specification and are for reference only.

	Pre PM Sensitivity Check		Post PM Sensitivity Check	
	Radial	Axial *	Radial	Axial*
Zn 213.857 nm SRBR	1571.2	3446.3	1520.0	3421.8
Mn 257.610 nm SRBR	13561.1	13557.6	13489.5	13959.3
Al 396.152 nm SBR	2.1	16.0	5.8	18.3
K 766.491 nm SBR	3.3	64.0	5.6	92.2

* Axial result is not applicable for G8016AA, G8012AA Radial View instruments

Instrument Test Results Table

Note: The Instrument Test results are for systems using ICP Expert version 7.3 and above only

Instrument Test	Result
Subsystem Communications Test	PASS
Air Flow	PASS
Water Flow	PASS
Gas Flows	PASS
RF Generator	PASS
Camera Test	PASS
Optics Test	PASS
Nebulizer test	PASS

ICP-OES Status Results Table

Note: These measurements do not form part of any specification and are for reference only.

Measurement	Standby Mode		Plasma On	
Mains Voltage	219.337	VAC	215.135	VAC
Mains Current	0.096	A	0.113	A
Instrument Temperature	21.8	°C	23.2	°C
RF Air Flow (sensor speed)	49.0	Hz	23.0	Hz
Plasma Exhaust Temperature	No measurement		30.1	°C
Water Flow Oscillator	No measurement		1.20	L/min
Water Flow Detector	1.14	L/min	1.09	L/min
Water Inlet Temperature	22.8	°C	23.6	°C
Polychromator Temperature	35.0	°C	35.0	°C
CCD Temperature	-40.1	°C	-40.0	°C
Thermal Stabilizer	31.3	°C	34.4	°C
Argon Supply Pressure	614.94	kPa	552.70	kPa
Purge Gas Supply Pressure*1	610.61	kPa	534.30	kPa
Option Gas Supply Pressure*1	—	kPa	—	kPa
Nebulizer Flow	No measurement		0.70	L/min
Nebulizer Back Pressure	No measurement		236.06	kPa
Plasma Gas Flow	No measurement		11.99	L/min
Auxiliary Gas Flow	No measurement		1.00	L/min
RF Power	No measurement		1199.6	W
RF Supply Current	No measurement		9.64	A
RF Supply Voltage	No measurement		124.81	V

*1 If option installed

Consumed PM Parts

Part Description	Part Number	Product or Model# where used	Quantity consumed
Axial Pre Optic Window	G8010-68014	G8010A, G8011A, G8014A/G8015A	1
Radial Pre-Optic Window	G8010-68015	All	1
Agilent Cool Clear Coolant Fluid	5799-0037	Agilent Water Recirculator	1
Purge Gas Filter	G8010-60136	All	1
Air inlet filter	G8000-68002	All	1
High Capacity Air Filter	G8010-60189	Optional	–
Rotor seal for 6-7 port valve for AVS6/7	G8494-60002	G8494A/G8495	–
Rotor seal for 4 port valve for AVS4	G8493-60002	G8493A	–
Rinse solution to rinse station 2.5mm id x 1m	G8410-80123	SPS 4	1
Barb connector 2.5mm-1.5mm ID	G8410-80124	SPS 4	1
PVC waste tubing,8mm od x 5mm id, 2m	G8410-80122	SPS 4	1
Additional Parts may be required from engineer's stock:			
X axis drive belt	5410047500	SPS 3	–
Z axis drive belt	5410047400	SPS 3	–
Peristaltic pump tubing, PVC SolvaFlex, 3 bridged,	3710049000	SPS 4	–

Consumed Parts Reference
(Purchased by customer, not included as part of PM)

☑ Section Not Applicable

Part Description	Part Number	Product or Model# where used	Quantity consumed

Signature Page

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the installation or other items of interest for the customer, please write in this box.

Service Verification

Service Request Number: 5006602534

Date Service Completed: Feb 29, 2024

Service Engineer Name: Nikom Kwangsing-ngn

Customer Name:

Service Engineer Signature: Nikom K.

Customer Signature:

Total number of pages in this document: 14

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel. +66 2643 8301-6 , e-mail: service.thailand@sartorius.com

ISO/IEC 17025
NSO-TISI-TIS 17025
CALIBRATION 0428

SARTORIUS

REVIEW BY Jinda K.
APPROVED BY Siriluk P.
NEXT CAL DATE 02/08/25

Certificate of Calibration

Model Number :	MSE224S-100-DU	Certificate No. :	24BC10270
Description :	Analytical Balance	Issued Date :	Monday, August 05, 2024
Serial Number :	0027405555	Reference No. :	240942
ID No. :	BKK_EN0003		
Manufacturer :	Sartorius	Page No. :	1 Of 2

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

Calibrated Place : Lab Room

Calibrated By : Mr Chonchai Inthana
Calibration Date : Friday, August 02, 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

Ambients Conditions.
Temperature : 23.0 °C ± 5.0 °C
Humidity : 55.0 % RH ± 10.0 % RH
Pressure ± -

Reasons for calibration
☐ New installation ☐ Service / Repaired ☒ Re-calibration/ Maintenance

Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

The measurement uncertainty stated is the expended 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 form list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-622-00	Sartorius weight set 1mg - 5000g E2,YCS011-622-00	TCS	M23081975	23-Aug-2026
Testo 174 H	Thermo-Hygrometer , Testo 174H	ENTECH	H/T 661303,H661140	12-Nov-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)

STAMP SARTORIUS ISO/IEC 17025 2020

SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8301-6 Fax: +66 2643-8307, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number :	MSE224S-100-DU	Certificate No. :	24BC10270
Description :	Analytical Balance	Issued Date :	Monday, August 05, 2024
Serial Number :	0027405555	Reference No. :	240942
ID No. :	BKK_EN0003		
Manufacturer :	Sartorius	Page No. :	2 of 2

Calibration Results : Without Adjustment

Repeatability

The repeatability is the ability of a weighing instrument to display nearly identical results under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express repeatability quantitatively.

Nominal Value : (Low Load)	20.0000	200.0000
20 g	20.0000	199.9999
Tolerance	20.0001	200.0000
0.0001 g	20.0000	200.0000
	20.0000	200.0000
Nominal Value : (High Load)	20.0000	200.0000
200 g	20.0001	200.0001
Tolerance	20.0000	200.0000
0.0001 g	20.0000	199.9999
	20.0000	200.0000
Standard Deviation	0.00004	0.00006

Eccentricity (Off-center loading error)

The off-center loading error is plotted by the difference between the reading 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 R76).

Nominal value : 100 g
Tolerance 0.0004 g

	Difference
1	-
2	0.0000
3	0.0000
4	0.0000
5	0.0001
6	-

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 (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00015
0.1	0.1000	0.1000	0.0000	0.00015
1	1.0000	1.0000	0.0000	0.00015
2	2.0000	2.0000	0.0000	0.00015
5	5.0000	5.0000	0.0000	0.00015
10	10.0000	10.0000	0.0000	0.00015
20	20.0000	20.0000	0.0000	0.00015
50	50.0000	50.0001	0.0001	0.00016
100	100.0000	100.0001	0.0001	0.00019
200	200.0000	200.0000	0.0000	0.00029

End of Report.

SOP FM 33 03 February 2022

ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จากกรมโรงงานอุตสาหกรรม

ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๔ สิงหาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๑๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล หรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสิระ จันทร์เฉิด)
นักวิทยาศาสตร์เชี่ยวชาญ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๑๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

Green Industry "อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

๑) นางสาวยุพาพร จันทร์เปล่ง	ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๑
๒) นางสาวจัชนัย โกมารกุล ณ นคร	ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๒
๓) นายศรายุทธ จีตรานนท์	ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๓
๔) นางสาวกนกกร เอนก	ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๔
๕) นายสุริยา สอนแก้ว	ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๕
๖) นายวิชาญ ชุณหรัด	ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๖

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๘๑ ราย

๑) นายกาจบัณฑิต กิตติศุภวณิชย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๑
๒) นายภัทรพล สว่างใจธรรม์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๒
๓) นายนราธิป เทือกชัยคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๓
๔) นายศิริโชค พงษ์ประสม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๔
๕) นายณัฐวุฒิ ด้วงแพง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๕
๖) นางสาวจินตา โชจุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๖
๗) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๗
๘) นางสาวขณัฐกาญจน์ อิ่มชม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๘
๙) นางสาวนรินทร์ สายเสิ่ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๙
๑๐) นางสาวนันทวดี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๐
๑๑) นางสาวศรัณยา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๑
๑๒) นางสาวอัญญธร มงคลจิรวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๒
๑๓) นางสาวศิริลักษณ์ บุนนาค	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๓
๑๔) นายนพพงศ์ จันทรุพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๔
๑๕) นายนรเศรษฐ์ โกมาลย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๕
๑๖) นายธันวา จริยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๖
๑๗) นางสาวเกศรินทร์ แก้วมั่น	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๗
๑๘) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๘
๑๙) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๙
๒๐) นางสาวเปมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๐
๒๑) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๑
๒๒) นางสาวเสาวลักษณ์ ภู่นภาอำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๒
๒๓) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๓
๒๔) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๔
๒๕) ว่าที่ร้อยตรีหญิง พรรณิภา ชำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๕
๒๖) นางจิลดา คำภูแก้ว	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๖
๒๗) นางสาวอรวรรณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๗
๒๘) นางสาวนพรัตน์ แย้มกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๘
๒๙) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๙
๓๐) นางสาวดายุรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๐
๓๑) นายพรมมี ศรีปัดเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๑
๓๒) นายอุทิศ อุ่นสิม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๒
๓๓) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๓
๓๔) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๔
๓๕) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๕

๓๖) นางสาวจุฑารัตน์...

๓๖) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๖
๓๗) นางสาวจารุวรรณ พิมพ์อภิกฤดิยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๗
๓๘) นางสาวปรางค์ทิพย์ กิจไพศาลศักดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๘
๓๙) นางสาวเดือนโจ ทารกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๙
๔๐) นางสาวจิราพร ศิริเวช	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๐
๔๑) นายวรากร ผูกรักษ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๑
๔๒) นายหนง วิริยะสหกิจ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๒
๔๓) นายธนิต เจนจบ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๓
๔๔) นายคณิศร ชำเพชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๔
๔๕) นายภูวิช พรหมสะอาด	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๕
๔๖) นายธนเดช โภคาพิพัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๖
๔๗) นายชวฤทธิ์ วงษ์จันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๗
๔๘) นายอาทิตย์ ครึ่งเสน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๘
๔๙) นายเจษดินทร์ ตงลักดิ์ไทย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๙
๕๐) นายจรัล บุญยิ่ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๐
๕๑) นายธนาณัติ เอนก	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๑
๕๒) นายภิวัฒน์ หุมหนู	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๒
๕๓) นางสาวสุภาชวัญ มาก	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๓
๕๔) นางสาวทัตพร ขวาลสมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๔
๕๕) นางสาวธิติมา บุญเพ็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๕
๕๖) นางสาวภานุมาศ นามวัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๖
๕๗) นางสาวอุไรรัตน์ ทึงสร้างแป้น	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๗
๕๘) นายธีรวัฒน์ ปวงสุข	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๘
๕๙) นายอิทธิพล ยะโส	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๙
๖๐) นายประพจน์ วรรณชูชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๐
๖๑) นายชยธร พวงทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๑
๖๒) นางสาวกนกวรรณ จันทบาล	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๒
๖๓) นายสิทธิโชค ธงเงิน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๓
๖๔) นางศิลาวรรณ ใจบุญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๔
๖๕) นางสาวพรรณธิดา พุ่มคง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๕
๖๖) นายนวภัทร ศรีวิริยะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๖
๖๗) นายสุวิชา หลงอ่อน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๗
๖๘) นายวิญญู บุญตะนัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๘
๖๙) นายสมบูรณ์ บุตรจันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๙
๗๐) นายวิรัตน์ ไชยนะรา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๐
๗๑) นายนฤเบศน์ เพิ่มพูน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๑
๗๒) นายจิรณัฐ ขาวละออ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๒
๗๓) นายอัสรี นามบุรี	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๓
๗๔) นายอัศวเรศ จ่อสาว	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๔

๗๕) นายประเสริฐ...

๗๕) นายประเสริฐ สุรมจันท์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๗๕
๗๖) นายนูกูล จันทร์เนียม	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๗๖
๗๗) นายพีรพงษ์ ทองคูณปรีดา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๗๗
๗๘) นายนฤพล ทองนุช	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๗๘
๗๙) นายอนุวัฒน์ ม่วงแพร	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๗๙
๘๐) นายเจตศราวุฒิ ปัตตะมะ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๐
๘๑) นายกฤษณะ สายวรรณ์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๑
๘๒) นายพัชัย บุญยงค์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๒
๘๓) นายภานุพงศ์ โฮมวงค์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๓
๘๔) นายสามารถ คุ้มปลี	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๔
๘๕) นายสัญชัย โกศรีนาม	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๕
๘๖) นายณัฐวุฒิ ศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๖
๘๗) นายขวัลธัช นาคพนม	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๗
๘๘) นายพงศธร ชัยทิพย์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๘
๘๙) นายสิทธิโชค ทาสีดา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๘๙
๙๐) นายธนากร อินสุดา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๐
๙๑) นางสาววรณิชชา ขาติวันชัย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๑
๙๒) นางสาวพิมพ์ตะวัน มีนากูล	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๒
๙๓) นางสาวเพชรัตน์ สิงห์สมบุญ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๓
๙๔) นางสาวชญานิน พรหมจันทร์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๔
๙๕) นายกีรติ ทวีราช	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๕
๙๖) นายจักรีน หมั่นวิชา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๖
๙๗) นายณัตรชัย สุขเบีย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๗
๙๘) นายเณรนนท์ ลิ้ะทองคำ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๘
๙๙) นายศุลยพล สนนอก	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๐๙๙
๑๐๐) นายทักษ์ตนัย อุบลศรี	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๐
๑๐๑) นายธนศวร นามะกุณณา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๑
๑๐๒) นายธิติพงศ์ บัวแดง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๒
๑๐๓) นายนนทชัย อุปถัมภ์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๓
๑๐๔) นายนัฐพล คุณสุทธิ์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๔
๑๐๕) นายนันทวัฒน์ สาริน	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๕
๑๐๖) นายปิยะนัฐ พลมะศรี	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๖
๑๐๗) นายพงศ์สิริ โสมเขียว	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๗
๑๐๘) นายพีรพัฒน์ ก่ำคำ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๘
๑๐๙) นายภาณุพงศ์ มานิตย์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๐๙
๑๑๐) นายมงคล ผลาทิพย์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๐
๑๑๑) นายสิรินนท์ ทองอั่น	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๑
๑๑๒) นายอเนชา ทันสมัย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๒
๑๑๓) นายอติศักดิ์ ผมไผ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๓

๑๑๔) นายอนันตชัย...

๑๑๔) นายอนันตชัย วีสม	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๔
๑๑๕) นายวรวุธ ดีนัก	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๕
๑๑๖) นายแสงตะวัน นะตะสัด	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๖
๑๑๗) นายยุทธิพงศ์ รัตนะ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๗
๑๑๘) นายชยัณวุฒิ ไชยอนิจ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๘
๑๑๙) นายวิสรุต ศรีธรรมมา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๑๙
๑๒๐) นายนนทกร เผือกผ่อง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๐
๑๒๑) นายกำชัย ลุทธะ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๑
๑๒๒) นางสาวณัฐภรณ์ บุญคะนัย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๒
๑๒๓) นางสาวพัชรินทร์ แสนสร้อย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๓
๑๒๔) นายไพรวัลย์ เปรี่ยมพิมาย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๔
๑๒๕) นางสาวศุภมาศ ทองมาก	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๕
๑๒๖) นางสาวลลิตา จิตรสว่าง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๖
๑๒๗) นางสาวชไมพร เสิกภูเขียว	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๗
๑๒๘) นางสาวภณฤติมาพร คำมีแก่น	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๘
๑๒๙) นางสาวสกุลรัตน์ ภาคภูมิ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๒๙
๑๓๐) นางสาวไพรินทร์ ศรีรูปี	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๐
๑๓๑) นางสาวทิพเนตร ผุยปัญญา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๑
๑๓๒) นางสาวสาธิตา ปานทอง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๒
๑๓๓) นางสาวอรีสา ทองนวล	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๓
๑๓๔) นางสาวอรยา ค้าคล่อง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๔
๑๓๕) นางสาวชุดาภรณ์ สุนทรสนาน	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๕
๑๓๖) นางสาวอัญชลี คำจันทร์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๖
๑๓๗) นายบุญฤทธิ์ เอี่ยมเทศ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๗
๑๓๘) นางสาวศุภรดา ปั้นมยุรา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๘
๑๓๙) นางสาวพาฤดี คุณนาน	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๓๙
๑๔๐) นางสาวจิราเจต ฟองดา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๐
๑๔๑) นางสาวอารยา มีชัย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๑
๑๔๒) นางสาววิชชุดา นาคผจญ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๒
๑๔๓) นางสาวนันทิยา จันทะลุน	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๓
๑๔๔) นายกิตติพงศ์ แซ่ลี้	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๔
๑๔๕) นายอนุวัติ ภูถวิล	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๕
๑๔๖) นายธีรพล แสงทอง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๖
๑๔๗) นายศักดิ์พิพัฒน์ บุญมั่น	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๗
๑๔๘) นายฐิติวัลค์ เอมอุไร	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๘
๑๔๙) นายชัยณรงค์ ศรีบุรินทร์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๔๙
๑๕๐) นางสาวอัจฉราวรรณ สวนสนอง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๐
๑๕๑) นางสาวณัฐฐาพร สิงหา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๑
๑๕๒) นายภีมเรศ แหยมโต	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๒

๑๕๓) นางสาวอุบล...

๑๕๓) นางสาวอุบล เศิกศิริ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๓
๑๕๔) นางสาวมโนรัตน์ ทองบุตร	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๔
๑๕๕) นายภาคภูมิ แทนไทย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๕
๑๕๖) นางสาวสุภาณัฐ เมล์พ่วง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๖
๑๕๗) นางสาวพรทิวา สาตาขนม์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๗
๑๕๘) นายเอกวิทย์ วันทะนา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๘
๑๕๙) นายไตรมณฑล ทิพย์วรรณ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๕๙
๑๖๐) นายจิรเมธ ประเสริฐสิริพงศ์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๐
๑๖๑) นายจิรายุส เกษมสุข	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๑
๑๖๒) นายจิรศักดิ์ ศรีวิชัย	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๒
๑๖๓) นายณัฐกฤษณ์ สะพานแก้ว	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๓
๑๖๔) นายนูรณศักดิ์ ปะทิ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๔
๑๖๕) นายปัณณวิชญ์ เสมอทรัพย์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๕
๑๖๖) นายพิษณุพงษ์ ใจยา	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๖
๑๖๗) นายภัทรพงษ์ มณฑาทอง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๗
๑๖๘) นายวสันต์ ตรีนกูล	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๘
๑๖๙) นายภาณุเดช เพชรอุต	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๖๙
๑๗๐) นายนนูกูล วิละแสง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๐
๑๗๑) นายภัทรพงษ์ มีสุข	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๑
๑๗๒) นางสาวนุชรวี ลีละทีป	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๒
๑๗๓) นางสาวสุภาวดี โกศรีนาม	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๓
๑๗๔) นางสาวอรณิช เทียนดำ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๔
๑๗๕) นางสาวพรเพ็ญ ช่อบสอน	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๕
๑๗๖) นางสาววันวิสา ขอนพิกุล	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๖
๑๗๗) นางสาวอรวรรณ เถาว์ทอง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๗
๑๗๘) นางสาวอัยย์ลิณ เมธร์วิณณ์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๘
๑๗๙) นางสาววริสรา คู่ยครอง	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๗๙
๑๘๐) นายวุฒิกร ศิริวรรณ	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๘๐
๑๘๑) นางสาวจารุวรรณ กระจ่างพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-๑-๐๑๘๑

สิ่งที่ส่งมาด้วย ๓

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๗๔ รายการ

น้ำเสีย จำนวน 60 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method[4]
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method[4]
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method[4]
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
6	Barium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[4] 2) 5-Day BOD Test, Membrane Electrode Method[4]
12	Carbaryl	High-Performance Liquid Chromatographic Method[4]
13	Carbofuran	High-Performance Liquid Chromatographic Method[4]
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method[4] 2) Closed Reflux, Tritimetric Method[4]
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
17	Chromium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method[4]

19 Copper...

ลำดับที่	สารมลพิษ	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[3]
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	สารมลพิษ	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[3]
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[9]
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]

น้ำใต้ดิน...

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
3	Aldrin	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	สารมลพิษ	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	สารมลพิษ	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	สารมลพิษ	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	สารมลพิษ	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-Methylnapthalene	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[5]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]

94 N-Nitrosodiphenylamine...

ลำดับที่	สารมลพิษ	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 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
98	pH	Electrometric Method[6]
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[5]
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_5-C_8)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,25]

110 TPH ($C_{>8}$-C_{16})...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C_{10}-C_{16})	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,22]
111	TPH ($C_{>16}$-C_{35})	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,22]
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
126	Zinc	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
5	Carbon Monoxide	1) Instrumental Analyzer Method[5] 2) Sampling Bag Non-Dispersive Infrared Method[5]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method [5]
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic Method[5]
11	Dioxins	Isokinetic Sampling[5]
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]

15 Lead...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5] 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
19	Opacity	Ringelmann's Method[2]
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method[5] 2) Absorption Sampling, Alkaline Permanganate/ Colorimetric Method[5] 3) Instrumental Analyzer Method[5]
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method[5] 2) Instrumental Analyzer Method[5]
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[5]
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method[5] 2) Paired Train, Isokinetic Sampling, Gravimetric Method[5]

27 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[5]
28	Xylene	Adsorption Sampling, Gas Chromatographic Method[5]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
2	Antimony	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
3	Arsenic	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
4	Barium	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
6	Cadmium	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
8	Chromium	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method[1,6,16,19] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method[1,6,17,19] 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,16,19] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,17,19]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method[1,6,19] 2) Alkaline Digestion, Colorimetric Method[8,19]
11	Cobalt	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
12	Copper	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
20	Lead	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[1,6,20] 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[1,6,30] 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[20] 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[30] 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method[21]
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method[11,26]
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method[11,26]
25	Molybdenum	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
26	Nickel	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic Method[11,26]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
	- 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	
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
29	pH	Electrometric Method[23,24]
30	Selenium	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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]

31 Silver...

ลำดับที่	สารมลพิษ	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[7,16] 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[7,16] 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[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[7,16] 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[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]

ดิน...

<u>ดิน จำนวน 125 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
2	Acetone	1)Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25] 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method[13]
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
5	Antimony	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
8	Barium	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
21	Butanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method[13,25]
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]

23 Cadmium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method[7,16] 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[7,8,16,19] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,17,19]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method[8,19]

36 Chrysene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
37	Cyanide	Extraction, Distillation, Colorimetric Method[27,28,29]
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]

49 1,2-Dichloroethane...

ลำดับที่	สารมลพิษ	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[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]

63 Di-n-Octyl Phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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	สารมลพิษ	วิธีวิเคราะห์
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[20] 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry[21] 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[30]

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25] 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method[13,25]
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]

96 Polychlorinated biphenyls (PCBs)

ลำดับที่	สารมลพิษ	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',3,4,5-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
97	Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
98	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]

99 Phenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
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[15,25]
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
108	TPH (C_5–C_8)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
109	TPH ($C_{>8}$– C_{16})	1) Automate Extraction, Gas Chromatographic Method[1,22] 2) Solvent Extraction, Gas Chromatographic Method[1,22] 3) Ultrasonic Extraction, Gas Chromatographic Method[22,31]
110	TPH ($C_{>16}$ – C_{35})	1) Automate Extraction, Gas Chromatographic Method[1,22] 2) Solvent Extraction, Gas Chromatographic Method[1,22] 3) Ultrasonic Extraction, Gas Chromatographic Method[22,31]
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]

115 2,4,5-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
115	2,4,5-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,26]
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[15,25]
125	Zinc	1) Digestion, Inductively Coupled Plasma Method[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,17]

<u>เอกสารอ้างอิง</u>

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2566. เรื่อง การจัดการสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 31 พฤษภาคม 2566. เล่มที่ 140 ตอนพิเศษ 126 ง.

2. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเชื้อราครั้งที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แกลบเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.

3. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

4. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24th ed. Washington, DC: APHA, 2023.

5. United States...

5. United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2023.

6. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. SW-846, 2014.

7. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B, 1996.

8. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.

9. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.

10. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C, 1996.

11. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Automated Soxhlet Extraction. SW-846 Method 3541, 1994.

12. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Microscale Solvent Extraction (MSE). SW-846 Method 3570, 2002.

13. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Volatile Organic Compounds (VOCs) in Various Sample Matrices Using Equilibrium Headspace Analysis. SW-846 Method 5021A, 2014.

14. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030B, 1996.

15. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035, 1996.

16. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Atomic Emission Spectrometry. SW-846 Method 6010B, 1996.

17. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Mass Spectrometry. SW-846 Method 6020A, 2007.

18. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Antimony and Arsenic (Atomic Absorption, Borohydride Reduction). SW-846 Method 7062, 1994. เพิ่มใหม่

19. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992.

20. United States...

20. United States...

20. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471B, 2007.

21. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry. SW-846 Method 7473, 2007.

22. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Nonhalogenated Organics by Gas Chromatography. SW-846 Method 8015C, 2007.

23. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C, 2004.

24. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Soil and Waste pH. SW-846 Method 9045D, 2004.

25. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.

26. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS). SW-846 Method 8270E, 2018.

27. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation SW-846 Method 9010B, 1996.

28. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oil. SW-846 Method 9013A, 1996.

29. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014, 2014.

30. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Sediment and Tissue Samples by Atomic Fluorescence Spectrometry. SW-846 Method 7474, 2007.

31. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Ultrasonic Extraction. SW-846 Method 3550C, 2007.

ที่ อก ๐๓๑๐(๑)/ ๔๑๒๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๕ เมษายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๙ มีนาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

๑) นางสาวพรรณธิดา ทุ่มคง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๕
๒) นายกำชัย สุทธะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๒๑
๓) นางสาวศุภรดา ปั้นมยุรา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๘

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๒ ราย

๑) นางสาวฐานิดา กลิ่นเขียว	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๒
๒) นางสาวกัญญ์กัสสร สายคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๓
๓) นางสาวณัฐนันท์ กันทะวงศ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๔
๔) นายอำนาจ วงษาเคน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๕
๕) นายกฤษณพล ปัญญาวงศ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๖
๖) นายณชากร หรรษา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๗
๗) นายวัชรินทร์ ผ่องสามสวน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๘
๘) นายณัฐพงศ์ โสภา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๙
๙) นายศักรินทร์ ปานเพ็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๐
๑๐) นายณัฐพล ชุ่มชื่น	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๑
๑๑) นายธนา สุพาพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๒
๑๒) นายนราธร แก้วพงษ์ษา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๓

อนึ่ง หนังสือฉบับนี้...

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๒ กันยายน ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

ที่ อก ๐๓๑๐(๑)/ ๑๒๓๖๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๘ ธันวาคม ๒๕๖๗

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒ ธันวาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๘ ราย ได้แก่

๑) นายประพจน์ วรรณชูชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๐
๒) นายจิรณัฐ ขาวละออ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๒
๓) นายพีรพัฒน์ กำคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๐๘
๔) นางสาวอรยา ค้าคล่อง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๔
๕) นายกิตติพงศ์ แซ่ลี้	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๔
๖) นายจิรเมธ ประเสริฐสิริพงศ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๖๐
๗) นายภัทรพงษ์ มณฑาทอง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๖๗
๘) นางสาวจารุวรรณ กระจ่างพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรทัศน์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

ที่ อก ๐๓๑๐/ ๗๙๓๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๘ สิงหาคม ๒๕๖๗

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๗ พฤษภาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๓ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอบ้านค่าย จังหวัดระยอง ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน

๑) นายเดช ช้างขน	ทะเบียนเลขที่ ว-๓๒๓-ค-๐๐๐๑
๒) นางวิลาวัณย์ บริรักษ์	ทะเบียนเลขที่ ว-๓๒๓-ค-๐๐๐๒
๓) นายสุพจน์ สลามเต๊ะ	ทะเบียนเลขที่ ว-๓๒๓-ค-๐๐๐๓

ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน

๑) นายณัฐพงษ์ เพ็งชาวนา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๑
๒) นางสาวกัลยทรรศน์ รักดี	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๒
๓) นางสาวจุฑารัตน์ ลีทองหลาง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๓
๔) นางสาวจิตสุภา ประเทืองสุข	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๔
๕) นายสรวเสริญ คุ่ยยกสุย	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๕
๖) นายณัฐวุฒิ อถมพรมราช	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๖
๗) นายจิตกร สิวะสา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๗
๘) นายสิทธิปวิชญ์ สุวรรณรัตน์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๘
๙) นายสิทธิพันธ์ เสนาฬิว	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๐๙
๑๐) นายอนุเวศน์ เตมา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๐
๑๑) นายสุรวิทย์ นราพงษ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๑
๑๒) นายณัฐพล เขียงวริวงศ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓
๑๓) นายชานนท์ บุญชื่น	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔
๑๔) นายณัฏกานต์ วงศ์ยินหร์อยู่	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๕
๑๕) นายอานนท์ โพธิ์พระทอง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๖

๑๖) นายณัชพล...

๑๖) นายณัชพล ถั่วกลาง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๗
๑๗) นายศุภณัฐ พิสัยพันธ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๘
๑๘) นายวสันต์ คีนันติ	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๙
๑๙) นายวรัญญู ฉิมพาลี	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๐
๒๐) นายศุภณัฐ สกุลกิตติมศักดิ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๑
๒๑) นายเอกชัย ถันทอง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๒
๒๒) นายพงษ์เทพ สีทธิเลาะ	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๓
๒๓) นายทินกร กุมภาษี	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๔
๒๔) นางสาวนันทิยา เบญจรันธุ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๕
๒๕) นายสิทธิชัย ถันพิมาย	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๖
๒๖) นางสาวปภาณิน หลอดทอง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๗
๒๗) นางสาวพจนา สีดา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๘
๒๘) นางสาวธนิตา กุลศิริวงศ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๙
๒๙) นายพิทยา ทองแดง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๐
๓๐) นางสาวชลธิชา สุขงกช	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๑
๓๑) ว่าที่ร้อยตรี รณชัย ม่วงมา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๒
๓๒) นายวรารวุฒิ พับพา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๓
๓๓) นายศักดิ์นรินทร์ จรัสกาย	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๔
๓๔) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๕
๓๕) นายสถาพร ถาแก้ว	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๖
๓๖) นายสุทธิ์ดำรง โชคปิติบันฑิต	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๗
๓๗) นายวัลลภ หันไชยเนาว์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๘
๓๘) นางสาวรนาลี เหรียญพระกูล	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๓๙
๓๙) นายธนะลีหธิ์ วงศ์ษาไชย	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๐
๔๐) นายชัยนุสรณ์ เลิศบันหกุลชัย	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๑
๔๑) นายสังจา เพ็ชรแสวง	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๒
๔๒) นายกันตภณ มณีสัมพันธ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๓
๔๓) นายธารินทร์ ธัยกจินดา	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๔
๔๔) นายศุภชัย วงศ์สุริย์ฉาย	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๕
๔๕) นายไสว ต้นไพฑิ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๖
๔๖) นางสาวกิตติยา สัญญาอริยากรณ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๗
๔๖) นางสาวสิตารัตน์ ศิริมังคะโร	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๘
๔๗) นายพิพัฒน์ นิภัทร์ศรษฐ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๔๙
๔๘) นายศิริวิทย์ เรืองสม	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๕๐
๔๙) นายปารามเมศ สัตยาคุณ	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๕๑
๕๐) นายนฤนาท ธรรมสะโร	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๕๒
๕๑) นางสาวศุภรัตน์ โสจันทร์	ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๕๓

๕๒) นายพชรกร...

๕๒) นายพชรกร เจ็งเจริญ ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๕๔
๕๓) นายทิวากร เชื้อมาก ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๕๕
๕๔) นายอนุรักษ์ ทองขจรศักดา ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๕๖
๕๕) นายอภิชาติ วิลาศ ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๕๗
๕๖) นายจรัสระรี ศรีรักษา ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๕๘
๕๘) นายประสานมิตร เชื่อนเพชร ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๕๙
๕๙) นายภานุวัฒน์ วังบง ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๖๐
๖๐) นายสันติ ชัยชนะ ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๖๓
๖๑) นายพินกร กุลชาติ ทะเบียนเลขที่ ว-๑๒๓-๙-๐๐๖๒

ค. ขอบข่ายชนิดสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย ตามสิ่งที่ส่งมาด้วย

หนังสือบันนี้จะหมดอายุในวันที่ ๒๘ มิถุนายน ๒๕๗๑ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๖๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลันกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๑ ๖๐๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

Green Industry "อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๑๒๓
ที่ อก ๐๓๒๐/ ๗ ๙๓ ๘ ลงวันที่ ๐๘ สิงหาคม ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method[2] 2) 5-Day BOD Test, Azide Modification Method[2]
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method[2] 2) Closed Reflux, Colorimetric Method[2] 3) Closed Reflux, Titrimetric Method[2]
3	Color	ADMI Weighted-Ordinate Spectrophotometric Method[2]
4	Cyanide	Distillation, Colorimetric Method[2]
5	Formaldehyde	Distillation, Colorimetric Method[1]
6	Free Chlorine	DPD Ferrous Titrimetric Method[2]
7	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method[2]
8	pH	Electrometric Method[2]
9	Phenols	1) Distillation, Chloroform Extraction Method[2] 2) Distillation, Direct Photometric Method[2]
10	Sulfide	ZnS Precipitation, Iodometric Method[2]
11	Temperature	Field Method[2]
12	Total Dissolved Solids	Dried at 180 ^{0}C [2]
13	Total Kjeldahl Nitrogen	Semi-Macro Kjeldahl Method[2]
14	Total Suspended Solids	Dried at 103-105 ^{0}C[2]

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method[2]
2	pH	Electrometric Method[2]
3	Phenols	Distillation, Direct Photometric Method[2]

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method[5] 2) Instrumental Analyzer Method[9]
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
3	Opacity	Ringelmanns Method[3,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method[8] 2) Instrumental Analyzer Method[10]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Acid Method[5] 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 พรรณสวัสดิ์ และวิบูลย์ลักษณ์ วิสุทธิศักดิ์, 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 กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แกลบเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง

4. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำของโรงงาน. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง

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.

ที่ อก ๐๗๒๐/ ๑๐๐๙๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๔ ตุลาคม ๒๕๖๗

เรื่อง แก้ไขรายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง หนังสือ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขที่ Env 2024/005 ลงวันที่ ๓๐ สิงหาคม ๒๕๖๗

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง ขอแก้ไขชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน เนื่องจากมีความคลาดเคลื่อน ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรม ได้รับทราบและดำเนินการแก้ไขรายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๕ ราย ตามที่แจ้งเรียบร้อยแล้ว เป็นดังนี้

ลำดับที่ ๒๗ นางพจนา สีดา
ลำดับที่ ๒๘ นางสาวธนิดา กุลสุริวงศ์
ลำดับที่ ๓๐ นางชลธิชา สุขงกช
ลำดับที่ ๓๖ นายสุทธิ์ดำรงค์ โชคปิตินันท์
ลำดับที่ ๔๒ นายกันตภณ มณีสันทัน์

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรอศ กลันกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๑๓-๒
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