

# ภาคผนวก ค

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ใบรับรองผลการตรวจวิเคราะห์

# ภาคผนวก ค-1

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คุณภาพอากาศในบรรยากาศ





## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2279159

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2357261-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Page 1 of 1

Sample Description	Air Quality
Location	จังหวัดสุพรรณบุรี (A1)
Date Analysis Commenced	Jul 14, 2022
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag, 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)
2279159-1	Jul 01 - Jul 02, 2022	0.050	0.016	754	34
2279159-2	Jul 02 - Jul 03, 2022	0.050	0.016	754	34
2279159-3	Jul 03 - Jul 04, 2022	0.036	0.018	754	34
2279159-4	Jul 04 - Jul 05, 2022	0.048	0.023	754	32
2279159-5	Jul 05 - Jul 06, 2022	0.048	0.024	754	32
2279159-6	Jul 06 - Jul 07, 2022	0.051	0.025	754	33
2279159-7	Jul 07 - Jul 08, 2022	0.056	0.027	754	33
Guideline		0.33	0.12	-	-

### Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

Particulate Matter (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 : Jatsarawut Pattana

### Remark :

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

Approved by

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2279159

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379409-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Page 1 of 1

Sample Description	Air Quality
Location	จังหวัดสุพรรณบุรี (A2)
Date Analysis Commenced	Jul 14, 2022
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag, 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)
2279159-8	Jul 01 - Jul 02, 2022	0.050	0.024	754	34
2279159-9	Jul 02 - Jul 03, 2022	0.036	0.019	754	34
2279159-10	Jul 03 - Jul 04, 2022	0.032	0.015	754	34
2279159-11	Jul 04 - Jul 05, 2022	0.039	0.018	754	32
2279159-12	Jul 05 - Jul 06, 2022	0.040	0.019	754	32
2279159-13	Jul 06 - Jul 07, 2022	0.051	0.024	754	33
2279159-14	Jul 07 - Jul 08, 2022	0.049	0.023	754	33
Guideline		0.33	0.12	-	-

### Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

Particulate Matter (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 : Jatsarawut Pattana

### Remark :

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

Approved by

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2279159

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379410-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Page 1 of 1

Sample Description	Air Quality				
Location	วัดวังใหม่ (A3)				
Date Analysis Commenced	Jul 14, 2022				
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag, 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)
2279159-15	Jul 01 - Jul 02, 2022	0.047	0.024	754	34
2279159-16	Jul 02 - Jul 03, 2022	0.042	0.021	754	34
2279159-17	Jul 03 - Jul 04, 2022	0.033	0.017	754	34
2279159-18	Jul 04 - Jul 05, 2022	0.054	0.028	754	32
2279159-19	Jul 05 - Jul 06, 2022	0.048	0.027	754	32
2279159-20	Jul 06 - Jul 07, 2022	0.076	0.042	754	33
2279159-21	Jul 07 - Jul 08, 2022	0.058	0.029	754	33
Guideline		0.33	0.12	-	-

### Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

Particulate Matter (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 : Jatsarawat Pattama

### Remark :

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

Approved by

*Saranya C.*

Saranya Chalermthamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279154

Date Received : Jul 11, 2022

Date Reported : Jul 16, 2022

Report Number: 2357259-1

Page 1 of 1

Sample Description	Air Quality						
Location	วัดวังใหม่ (A1)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Jul 01, 2022 - Jul 08, 2022						
Measurement by	Jatsarawat Pattama						
	2279154-1	2279154-2	2279154-3	2279154-4	2279154-5	2279154-6	2279154-7
Time	Jul 01, 2022	Jul 02, 2022	Jul 03, 2022	Jul 04, 2022	Jul 05, 2022	Jul 06, 2022	Jul 07, 2022
01:00 PM - 02:00 PM	0.010	0.014	0.012	0.015	0.009	0.011	0.014
02:00 PM - 03:00 PM	0.010	0.014	0.010	0.018	0.014	0.012	0.016
03:00 PM - 04:00 PM	0.008	0.013	0.010	0.015	0.016	0.013	0.021
04:00 PM - 05:00 PM	0.012	0.015	0.012	0.013	0.023	0.008	0.021
05:00 PM - 06:00 PM	0.016	0.017	0.011	0.014	0.021	0.009	0.022
06:00 PM - 07:00 PM	0.021	0.015	0.010	0.017	0.024	0.014	0.028
07:00 PM - 08:00 PM	0.023	0.012	0.011	0.014	0.018	0.020	0.027
08:00 PM - 09:00 PM	0.024	0.008	0.012	0.016	0.022	0.021	0.026
09:00 PM - 10:00 PM	0.016	0.009	0.014	0.016	0.021	0.019	0.027
10:00 PM - 11:00 PM	0.010	0.011	0.013	0.014	0.016	0.018	0.021
11:00 PM - 12:00 AM	0.010	0.008	0.010	0.014	0.004	0.016	0.019
12:00 AM - 01:00 AM	0.010	0.008	0.011	0.012	0.007	0.014	0.017
01:00 AM - 02:00 AM	0.011	0.009	0.009	0.009	0.010	0.015	0.015
02:00 AM - 03:00 AM	0.010	0.009	0.010	0.008	0.010	0.014	0.012
03:00 AM - 04:00 AM	0.010	0.008	0.009	0.008	0.009	0.011	0.010
04:00 AM - 05:00 AM	0.009	0.008	0.008	0.007	0.008	0.012	0.011
05:00 AM - 06:00 AM	0.010	0.008	0.008	0.008	0.008	0.012	0.012
06:00 AM - 07:00 AM	0.009	0.007	0.008	0.009	0.008	0.012	0.011
07:00 AM - 08:00 AM	0.010	0.007	0.008	0.009	0.008	0.012	0.012
08:00 AM - 09:00 AM	0.009	0.007	0.009	0.007	0.008	0.013	0.012
09:00 AM - 10:00 AM	0.009	0.007	0.008	0.006	0.009	0.012	0.010
10:00 AM - 11:00 AM	0.009	0.007	0.008	0.006	0.012	0.012	0.012
11:00 AM - 12:00 PM	0.011	0.008	0.010	0.008	0.011	0.012	0.013
12:00 PM - 01:00 PM	0.014	0.009	0.014	0.008	0.010	0.012	0.009
Average	0.012	0.010	0.010	0.011	0.013	0.013	0.017
1hr - Maximum	0.024	0.017	0.014	0.018	0.024	0.021	0.028
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 EPA Method Part 50 App. F (Chemiluminescence)

Approved by

*Saranya C.*

Saranya Chalermthamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279154  
Date Received : Jul 11, 2022  
Date Reported : Jul 16, 2022  
Report Number: 2377019-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านป่าละอู (A2)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Jul 01, 2022 - Jul 08, 2022						
Measurement by	Jatsarawut Pattama						
Time	2279154-8 Jul 01, 2022	2279154-9 Jul 02, 2022	2279154-10 Jul 03, 2022	2279154-11 Jul 04, 2022	2279154-12 Jul 05, 2022	2279154-13 Jul 06, 2022	2279154-14 Jul 07, 2022
11:00 AM - 12:00 PM	0.008	0.014	0.012	0.005	0.008	0.009	0.002
12:00 PM - 01:00 PM	0.002	0.008	0.016	0.005	0.002	0.005	0.005
01:00 PM - 02:00 PM	0.007	0.005	0.013	0.004	0.003	0.002	0.005
02:00 PM - 03:00 PM	0.007	0.005	0.008	0.004	0.004	0.003	0.005
03:00 PM - 04:00 PM	0.008	0.004	0.005	0.002	0.010	0.003	0.008
04:00 PM - 05:00 PM	0.007	0.005	0.003	0.003	0.006	0.004	0.011
05:00 PM - 06:00 PM	0.006	0.004	0.011	0.003	0.019	0.003	0.009
06:00 PM - 07:00 PM	0.009	0.007	0.016	0.004	0.021	0.011	0.005
07:00 PM - 08:00 PM	0.008	0.008	0.004	0.004	0.019	0.010	0.006
08:00 PM - 09:00 PM	0.019	0.010	0.005	0.011	0.013	0.006	0.010
09:00 PM - 10:00 PM	0.031	0.011	0.007	0.011	0.010	0.006	0.009
10:00 PM - 11:00 PM	0.023	0.013	0.006	0.011	0.007	0.004	0.006
11:00 PM - 12:00 AM	0.020	0.012	0.007	0.009	0.007	0.003	0.006
12:00 AM - 01:00 AM	0.016	0.011	0.006	0.010	0.009	0.008	0.005
01:00 AM - 02:00 AM	0.013	0.012	0.006	0.009	0.009	0.012	0.005
02:00 AM - 03:00 AM	0.021	0.012	0.008	0.009	0.005	0.009	0.004
03:00 AM - 04:00 AM	0.022	0.012	0.008	0.010	0.005	0.009	0.004
04:00 AM - 05:00 AM	0.023	0.010	0.008	0.009	0.007	0.009	0.004
05:00 AM - 06:00 AM	0.025	0.010	0.012	0.010	0.006	0.007	0.005
06:00 AM - 07:00 AM	0.022	0.010	0.017	0.011	0.015	0.004	0.005
07:00 AM - 08:00 AM	0.023	0.008	0.012	0.004	0.013	0.004	0.005
08:00 AM - 09:00 AM	0.021	0.010	0.018	0.012	0.015	0.004	0.005
09:00 AM - 10:00 AM	0.014	0.008	0.018	0.009	0.016	0.003	0.004
10:00 AM - 11:00 AM	0.017	0.006	0.010	0.006	0.014	0.003	0.003
Average	0.016	0.009	0.010	0.007	0.010	0.006	0.006
1hr - Maximum	0.031	0.014	0.018	0.012	0.021	0.012	0.011
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 EPA Method Part 50 App. F (Chemiluminescence)

Approved by

*Saranya C.*

Saranya Chalermthamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279154  
Date Received : Jul 11, 2022  
Date Reported : Jul 16, 2022  
Report Number: 2377020-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านป่าละอู (A3)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Jul 01, 2022 - Jul 08, 2022						
Measurement by	Jatsarawut Pattama						
Time	2279154-15 Jul 01, 2022	2279154-16 Jul 02, 2022	2279154-17 Jul 03, 2022	2279154-18 Jul 04, 2022	2279154-19 Jul 05, 2022	2279154-20 Jul 06, 2022	2279154-21 Jul 07, 2022
12:00 PM - 01:00 PM	0.003	0.003	0.004	0.006	0.003	0.004	0.004
01:00 PM - 02:00 PM	0.001	0.003	0.003	0.004	0.003	0.004	0.004
02:00 PM - 03:00 PM	0.002	0.003	0.003	0.004	0.004	0.004	0.004
03:00 PM - 04:00 PM	0.002	0.003	0.002	0.004	0.005	0.004	0.004
04:00 PM - 05:00 PM	0.002	0.003	0.002	0.005	0.009	0.003	0.004
05:00 PM - 06:00 PM	0.003	0.004	0.003	0.006	0.010	0.003	0.005
06:00 PM - 07:00 PM	0.004	0.005	0.004	0.005	0.010	0.004	0.006
07:00 PM - 08:00 PM	0.004	0.004	0.006	0.004	0.010	0.004	0.011
08:00 PM - 09:00 PM	0.008	0.002	0.008	0.006	0.006	0.006	0.009
09:00 PM - 10:00 PM	0.009	0.003	0.007	0.009	0.009	0.009	0.012
10:00 PM - 11:00 PM	0.005	0.006	0.007	0.008	0.007	0.011	0.012
11:00 PM - 12:00 AM	0.006	0.004	0.007	0.008	0.002	0.010	0.011
12:00 AM - 01:00 AM	0.008	0.005	0.006	0.008	0.005	0.009	0.010
01:00 AM - 02:00 AM	0.009	0.005	0.006	0.006	0.007	0.010	0.009
02:00 AM - 03:00 AM	0.008	0.006	0.006	0.005	0.007	0.010	0.007
03:00 AM - 04:00 AM	0.008	0.005	0.005	0.004	0.006	0.008	0.007
04:00 AM - 05:00 AM	0.008	0.006	0.006	0.005	0.005	0.008	0.007
05:00 AM - 06:00 AM	0.007	0.006	0.006	0.005	0.005	0.008	0.008
06:00 AM - 07:00 AM	0.006	0.005	0.006	0.005	0.005	0.009	0.008
07:00 AM - 08:00 AM	0.006	0.005	0.005	0.005	0.004	0.008	0.008
08:00 AM - 09:00 AM	0.006	0.005	0.004	0.005	0.004	0.009	0.007
09:00 AM - 10:00 AM	0.006	0.004	0.004	0.003	0.005	0.008	0.006
10:00 AM - 11:00 AM	0.005	0.004	0.004	0.002	0.005	0.008	0.006
11:00 AM - 12:00 PM	0.005	0.004	0.005	0.002	0.006	0.006	0.005
Average	0.005	0.004	0.005	0.005	0.006	0.007	0.007
1hr - Maximum	0.009	0.006	0.008	0.009	0.010	0.011	0.012
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 EPA Method Part 50 App. F (Chemiluminescence)

Approved by

*Saranya C.*

Saranya Chalermthamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID : 2279161

Date Received : Jul 11, 2022

Date Reported : Jul 22, 2022

Report Number : 2357269-1

Page 1 of 2

Sample Number : 2279161-1 to 7  
Parameter : Wind Speed / Wind Direction  
Location : วัดคลองบาง (A1)  
Sampling Date : Jul 01 - Jul 08, 2022  
Sampling by : Jatsarawat Pattama

Time	Jul 01 - Jul 02, 2022		Jul 02 - Jul 03, 2022		Jul 03 - Jul 04, 2022		Jul 04 - Jul 05, 2022		Jul 05 - Jul 06, 2022		Jul 06 - Jul 07, 2022		Jul 07 - Jul 08, 2022	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
01:00 PM - 02:00 PM	1.8	192.0	SSW	0.7	356.0	N	1.5	240.0	WSW	0.0	-	-	0.0	-
02:00 PM - 03:00 PM	2.2	196.0	SSW	0.6	201.0	SSW	1.9	210.0	SSW	0.0	-	-	0.6	169.0
03:00 PM - 04:00 PM	3.2	168.0	SSE	1.0	267.0	W	2.3	213.0	SSW	0.0	-	-	0.2	-
04:00 PM - 05:00 PM	2.2	200.0	SSW	1.4	239.0	WSW	2.4	224.0	SW	0.0	-	-	0.0	-
05:00 PM - 06:00 PM	2.5	234.0	SW	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
06:00 PM - 07:00 PM	0.8	208.0	SSW	0.5	186.0	S	0.2	-	-	0.0	-	-	0.1	-
07:00 PM - 08:00 PM	0.3	208.0	SSW	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
08:00 PM - 09:00 PM	4.0	219.0	SW	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
09:00 PM - 10:00 PM	0.0	-	-	0.0	-	-	0.0	-	-	0.6	359.0	N	0.3	65.0
10:00 PM - 11:00 PM	0.0	-	-	0.0	-	-	0.2	-	-	0.0	-	-	0.0	-
11:00 PM - 12:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
12:00 AM - 01:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
01:00 AM - 02:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
02:00 AM - 03:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
03:00 AM - 04:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.3	88.0	E	0.0	-
04:00 AM - 05:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.4	89.0	E	0.0	-
05:00 AM - 06:00 AM	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-
06:00 AM - 07:00 AM	0.0	-	-	0.0	-	-	0.3	129.0	SE	0.0	-	-	0.0	-
07:00 AM - 08:00 AM	0.0	-	-	0.0	-	-	1.6	178.0	S	0.0	-	-	0.0	-
08:00 AM - 09:00 AM	1.9	226.0	SW	1.6	216.0	SW	0.0	-	-	0.0	-	-	0.0	-
09:00 AM - 10:00 AM	1.5	258.0	WSW	1.3	269.0	W	2.1	214.0	SW	0.1	-	-	0.2	-
10:00 AM - 11:00 AM	1.8	221.0	SW	0.5	42.0	NE	2.7	246.0	WSW	0.1	-	-	0.0	-
11:00 AM - 12:00 PM	3.6	205.0	SSW	3.3	206.0	SSW	1.3	206.0	SSW	2.7	205.0	SSW	1.7	209.0
12:00 PM - 01:00 PM	2.8	243.0	WSW	2.8	235.0	SW	0.0	-	-	0.0	-	-	0.8	209.0
													0.0	-
													1.2	217.0

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jitranont  
Assistant General Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

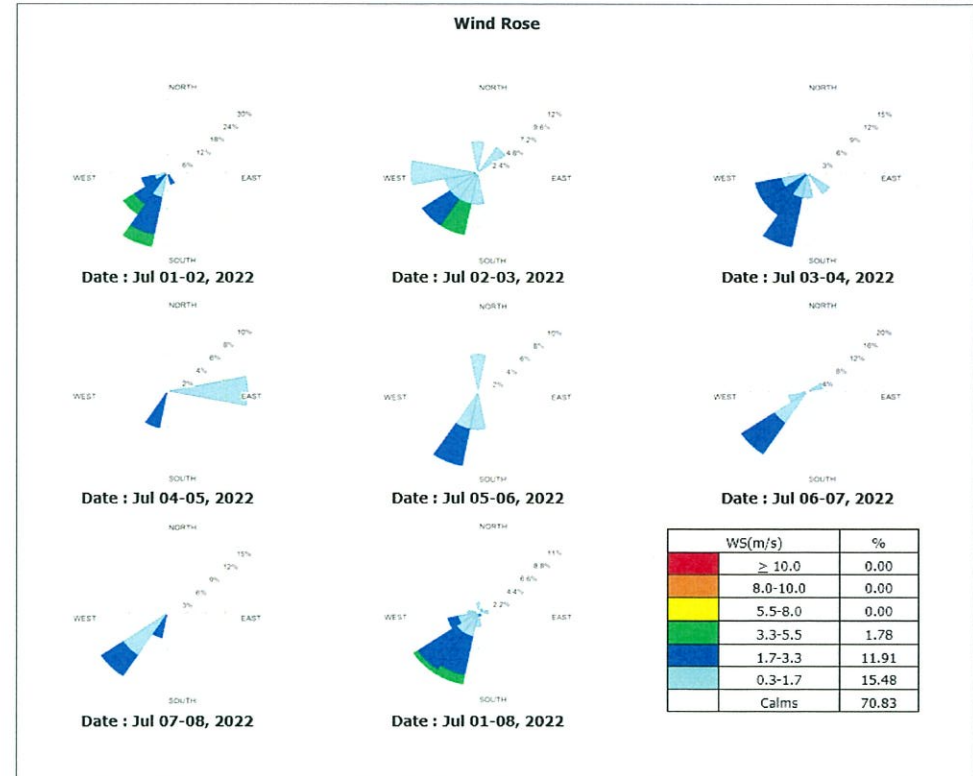
Lot ID : 2279161

Date Received : Jul 11, 2022

Date Reported : Jul 22, 2022

Report Number : 2357269-1

Page 2 of 2



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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID : 2279161

Date Received : Jul 11, 2022

Date Reported : Jul 22, 2022

Report Number : 2357269-1

Page 1 of 2

Sample Number : 2279161-8 to 14  
Parameter : Wind Speed / Wind Direction  
Location : จันทรา (A2)  
Sampling Date : Jul 01 - Jul 08, 2022  
Sampling by : Jatsarawut Pattama

Time	Jul 01 - Jul 02, 2022			Jul 02 - Jul 03, 2022			Jul 03 - Jul 04, 2022			Jul 04 - Jul 05, 2022			Jul 05 - Jul 06, 2022			Jul 06 - Jul 07, 2022			Jul 07 - Jul 08, 2022		
	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	0.7	132.0	SE	0.8	156.0	SSE	0.6	137.0	SE	0.9	127.0	SE	0.0	-	-	0.9	135.0	SE	1.1	145.0	SE
12:00 PM - 01:00 PM	0.7	121.0	ESE	0.7	159.0	SSE	0.6	135.0	SE	1.0	128.0	SE	0.0	-	-	0.8	128.0	SE	0.8	146.0	SE
01:00 PM - 02:00 PM	1.6	163.0	SSE	1.0	146.0	SE	1.4	165.0	SSE	1.7	162.0	SSE	0.6	149.0	SSE	1.6	149.0	SSE	1.9	174.0	S
02:00 PM - 03:00 PM	0.7	162.0	SSE	1.1	170.0	S	1.4	165.0	SSE	2.7	162.0	SSE	1.6	174.0	S	0.7	158.0	SSE	0.8	177.0	S
03:00 PM - 04:00 PM	2.7	143.0	SE	1.8	168.0	SSE	0.5	166.0	SSE	3.1	163.0	SSE	2.2	178.0	S	1.6	190.0	S	2.3	151.0	SSE
04:00 PM - 05:00 PM	2.1	162.0	SSE	2.3	182.0	S	1.6	166.0	SSE	2.5	194.0	SSW	2.8	163.0	SSE	1.3	148.0	SSE	0.7	168.0	SSE
05:00 PM - 06:00 PM	1.8	166.0	SSE	1.5	190.0	S	0.7	218.0	SW	1.0	166.0	SSE	1.5	196.0	SSW	0.9	151.0	SSE	1.7	272.0	W
06:00 PM - 07:00 PM	2.8	133.0	SE	1.6	212.0	SSW	1.0	224.0	SW	2.4	162.0	SSE	1.6	164.0	SSE	0.5	154.0	SSE	1.9	188.0	S
07:00 PM - 08:00 PM	1.3	165.0	SSE	0.8	216.0	SW	1.7	171.0	S	1.6	219.0	SW	0.0	-	-	1.2	159.0	SSE	1.3	227.0	SW
08:00 PM - 09:00 PM	1.0	129.0	SE	0.4	240.0	WSW	2.7	129.0	SE	1.5	181.0	S	1.0	184.0	S	0.7	309.0	NW	0.3	236.0	SW
09:00 PM - 10:00 PM	0.8	271.0	W	1.0	200.0	SSW	1.5	287.0	WNW	2.4	165.0	SSE	0.5	130.0	SE	0.6	355.0	N	0.5	245.0	WSW
10:00 PM - 11:00 PM	0.8	219.0	SW	1.5	202.0	SSW	1.6	177.0	S	2.0	157.0	SSE	1.6	136.0	SE	0.0	-	-	1.2	286.0	WNW
11:00 PM - 12:00 AM	0.9	161.0	SSE	2.7	167.0	SSE	1.5	131.0	SE	1.9	154.0	SSE	0.6	154.0	SSE	0.4	242.0	WSW	2.1	179.0	S
12:00 AM - 01:00 AM	0.9	259.0	W	1.2	9.0	N	2.1	156.0	SSE	0.0	-	-	1.3	137.0	SE	0.0	-	-	1.2	178.0	S
01:00 AM - 02:00 AM	2.0	177.0	S	0.4	173.0	S	1.3	144.0	SE	0.7	134.0	SE	0.9	123.0	ESE	0.3	238.0	WSW	0.3	175.0	S
02:00 AM - 03:00 AM	1.1	183.0	S	1.2	161.0	SSE	1.6	148.0	SSE	1.1	169.0	S	1.4	127.0	SE	0.0	-	-	1.3	126.0	SE
03:00 AM - 04:00 AM	1.9	176.0	S	1.8	163.0	SSE	1.1	161.0	SSE	0.0	-	-	0.9	14.0	NNE	1.5	178.0	S	0.7	163.0	SSE
04:00 AM - 05:00 AM	1.0	116.0	ESE	0.7	138.0	SE	1.2	118.0	ESE	0.6	170.0	S	0.2	-	-	1.2	190.0	S	0.8	196.0	SSW
05:00 AM - 06:00 AM	0.6	140.0	SE	1.4	120.0	ESE	0.5	113.0	ESE	0.8	171.0	S	0.0	-	-	1.3	174.0	S	0.5	193.0	SSW
06:00 AM - 07:00 AM	0.8	125.0	SE	0.8	126.0	SE	0.7	150.0	SSE	0.5	121.0	ESE	0.0	-	-	1.1	185.0	S	0.8	188.0	S
07:00 AM - 08:00 AM	1.6	134.0	SE	1.0	121.0	ESE	0.5	120.0	ESE	2.1	128.0	SE	0.4	20.0	NNE	1.6	180.0	S	0.9	172.0	S
08:00 AM - 09:00 AM	0.8	142.0	SE	1.6	137.0	SE	0.9	126.0	SE	0.3	128.0	SE	1.0	146.0	SE	0.9	174.0	S	0.8	159.0	SSE
09:00 AM - 10:00 AM	0.7	126.0	SE	0.9	130.0	SE	0.9	143.0	SE	0.0	-	-	1.1	146.0	SE	0.7	174.0	S	1.2	139.0	SE
10:00 AM - 11:00 AM	0.8	155.0	SSE	1.2	142.0	SE	1.3	137.0	SE	0.3	126.0	SE	0.7	120.0	ESE	0.8	158.0	SSE	1.5	147.0	SSE

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Sarayuth Jitranont  
Assistant General Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

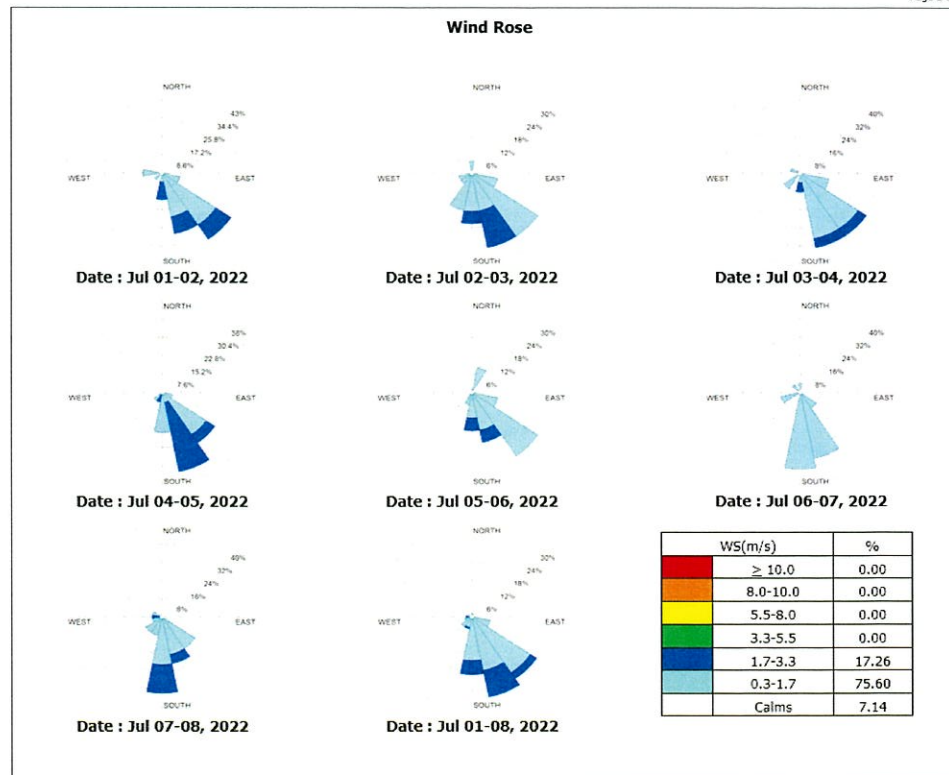
Lot ID : 2279161

Date Received : Jul 11, 2022

Date Reported : Jul 22, 2022

Report Number : 2357269-1

Page 2 of 2



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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID : 2279161

Date Received : Jul 11, 2022

Date Reported : Jul 22, 2022

Report Number : 2357269-1

Page 1 of 2

Sample Number : 2279161-15 to 21  
Parameter : Wind Speed / Wind Direction  
Location : วัดวังน้ำ (A3)  
Sampling Date : Jul 01 - Jul 08, 2022  
Sampling by : Jatsarawut Pattama

Time	Jul 01 - Jul 02, 2022		Jul 02 - Jul 03, 2022		Jul 03 - Jul 04, 2022		Jul 04 - Jul 05, 2022		Jul 05 - Jul 06, 2022		Jul 06 - Jul 07, 2022		Jul 07 - Jul 08, 2022	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
12:00 PM - 01:00 PM	1.1	255.0	WSW	1.4	229.0	SW	0.4	235.0	SW	2.4	234.0	SW	0.5	202.0
01:00 PM - 02:00 PM	1.4	258.0	WSW	0.9	231.0	SW	0.5	246.0	WSW	0.5	246.0	WSW	0.3	270.0
02:00 PM - 03:00 PM	1.0	271.0	W	0.7	193.0	SSW	1.5	276.0	W	0.9	271.0	W	0.5	149.0
03:00 PM - 04:00 PM	0.9	270.0	W	1.0	286.0	WNW	2.5	232.0	SW	1.0	230.0	SW	0.6	234.0
04:00 PM - 05:00 PM	2.7	289.0	WNW	0.9	271.0	W	2.8	222.0	SW	1.6	243.0	WSW	0.1	-
05:00 PM - 06:00 PM	1.3	269.0	W	0.3	239.0	WSW	0.9	240.0	WSW	2.5	207.0	SSW	0.2	-
06:00 PM - 07:00 PM	1.4	205.0	SSW	0.7	196.0	SSW	2.1	193.0	SSW	1.3	269.0	W	0.8	190.0
07:00 PM - 08:00 PM	0.6	225.0	SW	2.6	263.0	W	1.3	148.0	SSE	1.9	305.0	NW	0.5	148.0
08:00 PM - 09:00 PM	0.3	215.0	SW	0.0	-	-	1.9	193.0	SSW	1.4	222.0	SW	0.2	-
09:00 PM - 10:00 PM	0.3	196.0	SSW	0.5	248.0	WSW	0.9	171.0	S	1.1	199.0	SSW	0.0	-
10:00 PM - 11:00 PM	0.5	172.0	S	0.4	101.0	E	0.4	157.0	SSE	2.0	220.0	SW	0.4	189.0
11:00 PM - 12:00 AM	1.3	168.0	SSE	0.3	177.0	S	0.6	119.0	ESE	1.6	181.0	S	0.2	-
12:00 AM - 01:00 AM	1.2	147.0	SSE	1.2	189.0	S	0.2	-	-	1.5	100.0	E	0.0	-
01:00 AM - 02:00 AM	1.0	176.0	S	1.1	136.0	SE	0.5	168.0	SSE	0.3	169.0	S	0.0	-
02:00 AM - 03:00 AM	1.5	173.0	S	0.1	-	-	0.6	150.0	SSE	0.6	141.0	SE	0.0	-
03:00 AM - 04:00 AM	0.5	145.0	SE	0.2	-	-	1.6	161.0	SSE	0.8	65.0	ENE	0.0	-
04:00 AM - 05:00 AM	1.9	168.0	SSE	0.4	293.0	WNW	0.9	155.0	SSE	0.0	-	-	1.6	171.0
05:00 AM - 06:00 AM	0.7	160.0	SSE	0.8	174.0	S	1.5	188.0	S	0.4	86.0	E	0.3	172.0
06:00 AM - 07:00 AM	0.8	157.0	SSE	0.7	191.0	S	0.2	-	-	0.5	104.0	ESE	0.8	200.0
07:00 AM - 08:00 AM	0.6	163.0	SSE	0.3	169.0	S	1.6	171.0	S	0.3	103.0	ESE	0.2	-
08:00 AM - 09:00 AM	0.4	179.0	S	0.3	201.0	SSW	0.6	174.0	S	1.2	191.0	S	1.1	155.0
09:00 AM - 10:00 AM	1.4	198.0	SSW	0.4	203.0	SSW	1.4	156.0	SSE	0.9	147.0	SSE	0.3	208.0
10:00 AM - 11:00 AM	0.8	155.0	SSE	0.2	-	-	3.9	159.0	SSE	1.1	128.0	SE	0.4	264.0
11:00 AM - 12:00 PM	0.5	208.0	SSW	1.6	213.0	SSW	0.6	216.0	SW	1.3	95.0	E	1.3	187.0

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Assistant General Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

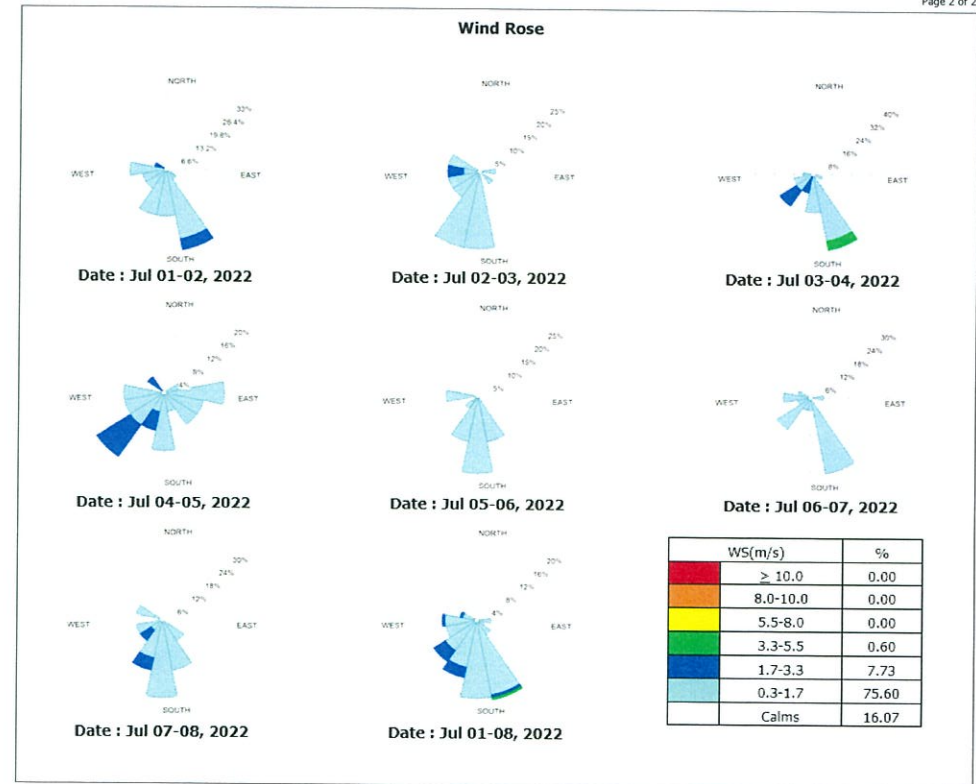
Lot ID : 2279161

Date Received : Jul 11, 2022

Date Reported : Jul 22, 2022

Report Number : 2357269-1

Page 2 of 2



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Assistant General Manager

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# ภาคผนวก ค-2

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :



TESTING  
No.0009

Lot ID: 2279105  
Date Received : Aug 20, 2022  
Date Reported : Aug 29, 2022  
Report Number: 2357142-1

Page 1 of 1

Sample Number 2279105-1  
Sampled Date Aug 20, 2022  
Sample Description Emission from Stationary Source  
Location Bag House 1 (1BH-1) : MCL1  
Date Analysis Commenced Aug 22, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	760	mmHg	Diameter	1.50	m	Oxygen	20.9	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	49.0	°C	Gas Velocity	12.7	m/s
Type of Fuel	-		Moisture	4.06	%	Flow Rate (Actual O2)	71924	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	09:45 AM - 10:33 AM	mg/m3	-	0.5	24.1	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : Aisawared Jorsaw

#### Remark :

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

Technical Management

*Saranya C.*  
Saranya Chalerthamrong  
Scientist (4)  
โทรศัพท์ 2-204-4-4717

Approved by

*Kanokkorn Anek*  
Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 2-204-4-6111

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S:\Reports\_Air Stack\_2GL.rpt ( 2.00PM)

3595-31/ EMAIL



## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :



TESTING  
No.0009

Lot ID: 2279107  
Date Received : Aug 20, 2022  
Date Reported : Aug 29, 2022  
Report Number: 2357144-1

Page 1 of 1

Sample Number 2279107-1  
Sampled Date Aug 10, 2022  
Sample Description Emission from Stationary Source  
Location Bag House 6 (1BH-3) : MCL1  
Date Analysis Commenced Aug 22, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	760	mmHg	Diameter	0.90	m	Oxygen	20.9	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	56.0	°C	Gas Velocity	11.9	m/s
Type of Fuel	-		Moisture	3.71	%	Flow Rate (Actual O2)	23721	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	11:00 AM - 11:45 AM	mg/m3	-	0.5	<0.5	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : Aisawared Jorsaw

#### Remark :

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

Technical Management

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Approved by

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Senior Manager  
โทรศัพท์ 2-204-4-6111

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279111

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357158-1

Page 1 of 1

Sample Number 2279111-1  
Sampled Date Jul 04, 2022  
Sample Description Emission from Stationary Source  
Location ปล่องระบายไอจาก HT2 Stack1 (2SN-1)  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into one 2-L collection flask, one 10-L air sampling bag, one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.5	m	Oxygen	18.3	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.7	%
Type of Process	Combustion (Open System)		Stack Temperature	298	°C	Gas Velocity	10.1	m/s
Type of Fuel	LPG		Moisture	3.47	%	Flow Rate (Actual O2)	3558	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide *	02:00 PM - 02:10 PM	ppm	-	1.0	25.2	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen *	02:05 PM - 02:16 PM	ppm	-	1.06	2.52	60	180	US EPA, Method 7	Bangkok
Total Suspended Particulate	02:00 PM - 02:48 PM	mg/m3	-	0.5	<0.5	60	120	US EPA, Method 5	Bangkok

Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)

Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

Remark :

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Technical Management

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Approved by

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O :

Project Name : Environmental Testing

Project Location :

Lot ID: 2279113

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357163-1

Page 1 of 1

Sample Number 2279113-1  
Sampled Date Jul 04, 2022  
Sample Description Emission from Stationary Source  
Location ปล่องระบายไอจาก HT2 Stack2 (2SN-2)  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish and one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.69	m	Oxygen	18.3	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.8	%
Type of Process	Combustion (Open System)		Stack Temperature	172	°C	Gas Velocity	8.9	m/s
Type of Fuel	LPG		Moisture	3.57	%	Flow Rate (Actual O2)	7666	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide *	03:30 PM - 03:40 PM	ppm	-	1.0	2.7	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen *	03:30 PM - 03:41 PM	ppm	-	1.06	1.74	60	180	US EPA, Method 7	Bangkok
Total Suspended Particulate	03:24 PM - 04:12 PM	mg/m3	-	0.5	<0.5	60	120	US EPA, Method 5	Bangkok

Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)

Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

Remark :

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Technical Management

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Scientist (4)  
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Approved by

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Kanokorn Anek  
Senior Manager  
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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279114  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357168-1

Page 1 of 1

Sample Number 2279114-1  
Sampled Date Jul 05, 2022  
Sample Description Emission from Stationary Source  
Location Oil circulate 2 (2OC-2) : HT2  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.50	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	48.0	°C	Gas Velocity	11.3	m/s
Type of Fuel	-		Moisture	3.83	%	Flow Rate (Actual O2)	7105	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	09:48 AM - 10:36 AM	mg/m3	-	0.5	6.6	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : Ussaree Namburee

#### Remark :

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Technical Management

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279114  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357168-2

Page 1 of 1

Sample Number 2279114-1  
Sampled Date Jul 05, 2022  
Sample Description Emission from Stationary Source  
Location Oil circulate 2 (2OC-2) : HT2  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.50	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	48.0	°C	Gas Velocity	11.3	m/s
Type of Fuel	-		Moisture	3.83	%	Flow Rate (Actual O2)	7105	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Air Testing</b>							
Total Hydrocarbon as Methane	09:50 AM - 10:00 AM	ppm	-	1.0	21.4	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Bangkok
Total VOCs as Propane	09:50 AM - 10:00 AM	ppm	-	1.0	10.3	US EPA, Method 25A	Bangkok

Sampled By : Ussaree Namburee

#### Remark :

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Approved by

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Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279115

Date Received : Aug 11, 2022

Date Reported : Aug 19, 2022

Report Number: 2357171-1

Page 1 of 1

Sample Number 2279115-1  
Sampled Date Aug 10, 2022  
Sample Description Emission from Stationary Source  
Location Bag House 3 (3BH-1) : MCL2  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one amber plastic bottle

### Stack Description

Ambient Pressure	755	mmHg	Diameter	1.25	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	31.7	°C	Gas Velocity	16.0	m/s
Type of Fuel	-		Moisture	2.55	%	Flow Rate (Actual O2)	66980	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	09:50 AM - 10:50 AM	mg/m3	-	0.5	<0.5	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : AnechaTansamai

Remark :

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Technical Management

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279117

Date Received : Aug 11, 2022

Date Reported : Aug 19, 2022

Report Number: 2357175-1

Page 1 of 1

Sample Number 2279117-1  
Sampled Date Aug 08, 2022  
Sample Description Emission from Stationary Source  
Location Bag House 4 (3BH-2) : MCL2  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one amber plastic bottle

### Stack Description

Ambient Pressure	755	mmHg	Diameter	1.25	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	52.6	°C	Gas Velocity	18.3	m/s
Type of Fuel	-		Moisture	2.46	%	Flow Rate (Actual O2)	71883	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	10:20 AM - 11:20 AM	mg/m3	-	0.5	1.0	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : AnechaTansamai

Remark :

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Technical Management

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279120  
Date Received : Aug 11, 2022  
Date Reported : Aug 19, 2022  
Report Number: 2357188-1

Page 1 of 1

Sample Number 2279120-1  
Sampled Date Aug 09, 2022  
Sample Description Emission from Stationary Source  
Location โรงหล่อเหล็ก HT4 Stack 2 (3SN-2)  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one 10-L air sampling bag, two 2-L collection flasks, one filter paper placed in plastic petri dish and one amber plastic bottle

### Stack Description

Ambient Pressure	755	mmHg	Diameter	0.45	m	Oxygen	17.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.8	%
Type of Process	Combustion (Open System)		Stack Temperature	260	°C	Gas Velocity	9.9	m/s
Type of Fuel	LPG		Moisture	4.14	%	Flow Rate (Actual O2)	3026	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Carbon Monoxide *	11:05 AM - 11:15 AM	ppm	-	1.0	8.6	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen *	10:50 AM - 11:00 AM	ppm	-	1.06	10.6	60	180	US EPA, Method 7	Bangkok
Total Suspended Particulate	10:45 AM - 11:33 AM	mg/m3	-	0.5	0.6	60	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : AnechaTansamai

#### Remark :

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Technical Management

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Approved by

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279121  
Date Received : Aug 11, 2022  
Date Reported : Aug 19, 2022  
Report Number: 2357193-1

Page 1 of 1

Sample Number 2279121-1  
Sampled Date Aug 09, 2022  
Sample Description Emission from Stationary Source  
Location โรงหล่อเหล็ก HT4 Stack 1 (3SN-3)  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one 10-L air sampling bag, two 2-L collection flasks, one filter paper placed in plastic petri dish and one amber plastic bottle

### Stack Description

Ambient Pressure	755	mmHg	Diameter	0.70	m	Oxygen	14.0	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	4.0	%
Type of Process	Combustion (Open System)		Stack Temperature	224	°C	Gas Velocity	4.3	m/s
Type of Fuel	LPG		Moisture	3.47	%	Flow Rate (Actual O2)	3399	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Carbon Monoxide *	12:00 PM - 12:10 PM	ppm	-	1.0	7.0	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen *	11:45 AM - 11:55 AM	ppm	-	1.06	25.5	60	180	US EPA, Method 7	Bangkok
Total Suspended Particulate	11:45 AM - 12:25 PM	mg/m3	-	0.5	<0.5	60	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : AnechaTansamai

#### Remark :

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Technical Management

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Approved by

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Senior Manager  
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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279125

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357204-1

Page 1 of 1

Sample Number 2279125-1  
Sampled Date Jul 05, 2022  
Sample Description Emission from Stationary Source  
Location โรงงานปูนซีเมนต์ HT3 Stack 2 (3SN-4)  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic cassette and one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	17.1	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	2.2	%
Type of Process	Combustion (Open System)		Stack Temperature	210	°C	Gas Velocity	11.2	m/s
Type of Fuel	LPG		Moisture	4.49	%	Flow Rate (Actual O2)	3762	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide *	11:10 AM - 11:20 AM	ppm	-	1.0	6.4	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen *	10:55 AM - 11:05 AM	ppm	-	1.06	4.68	60	180	US EPA, Method 7	Bangkok
Total Suspended Particulate	10:50 AM - 11:44 AM	mg/m3	-	0.5	<0.5	60	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)

Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

Remark :

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

Technical Management

*Saranye C.*

Saranye Chalermitamrong  
Scientist (4)  
โทร: 02-204-4-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทร: 02-204-4-6111

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3595-31/ EMAIL



## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279127

Date Received : Aug 11, 2022

Date Reported : Aug 23, 2022

Report Number: 2357214-1 Rev. No.1

Page 1 of 1

Sample Number 2279127-1  
Sampled Date Aug 10, 2022  
Sample Description Emission from Stationary Source  
Location Oil Circulate 4 (3OC-2) : HT4  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one 10-L air sampling bag, one filter paper placed in plastic petri dish and one amber plastic bottle

### Stack Description

Ambient Pressure	755	mmHg	Diameter	0.90	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	45.2	°C	Gas Velocity	7.3	m/s
Type of Fuel	-		Moisture	3.47	%	Flow Rate (Actual O2)	14969	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	12:50 PM - 01:38 PM	mg/m3	-	0.5	1.0	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)

Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Note:

This Analysis test report is reissued to supersede report No 2357214-1 Reported : Aug 19, 2022 due to revise guideline/specification

Sampled By : AnechaTansamai

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.

Technical Management

*Saranye C.*

Saranye Chalermitamrong  
Scientist (4)  
โทร: 02-204-4-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทร: 02-204-4-6111

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3595-31/ EMAIL



## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhai, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279127  
Date Received : Aug 11, 2022  
Date Reported : Aug 19, 2022  
Report Number: 2357214-2

Page 1 of 1

Sample Number 2279127-1  
Sampled Date Aug 10, 2022  
Sample Description Emission from Stationary Source  
Location Oil Circulate 4 (3OC-2) : HT4  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one 10-L air sampling bag, one filter paper placed in plastic petri dish and one amber plastic bottle

Stack Description									
Ambient Pressure	755	mmHg	Diameter	0.90	m	Oxygen	20.9	%	
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%	
Type of Process	Process		Stack Temperature	45.2	°C	Gas Velocity	7.3	m/s	
Type of Fuel	-		Moisture	3.47	%	Flow Rate (Actual O2)	14969	Nm3/hr	

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Air Testing</b>							
Total Hydrocarbon as Methane	12:55 PM - 01:05 PM	ppm	-	1.0	29.2	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Bangkok
Total VOCs as Propane	12:55 PM - 01:05 PM	ppm	-	1.0	12.0	US EPA, Method 25A	Bangkok

Sampled By : AnechaTansamai

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

Approved by

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhai, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279128  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357217-1

Page 1 of 1

Sample Number 2279128-1  
Sampled Date Jul 04, 2022  
Sample Description Emission from Stationary Source  
Location โรงกลั่นน้ำมันโรงฟาน HT3 Stack 1 (3SN-1)  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into one 2-L collection flask, one filter paper placed in plastic cassette and two 10-L air sampling bags

Stack Description									
Ambient Pressure	754	mmHg	Diameter	0.70	m	Oxygen	8.3	%	
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	7.2	%	
Type of Process	Combustion (Open System)		Stack Temperature	348	°C	Gas Velocity	3.1	m/s	
Type of Fuel	LPG		Moisture	5.09	%	Flow Rate (Actual O2)	1965	Nm3/hr	

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide *	03:55 PM - 04:05 PM	ppm	-	1.0	<1.0	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen *	04:00 PM - 04:10 PM	ppm	-	1.06	27.2	60	180	US EPA, Method 7	Bangkok
Total Suspended Particulate	03:50 PM - 04:50 PM	mg/m3	-	0.5	<0.5	60	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

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

Technical Management

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)  
หมายเลขโทรศัพท์ 2-204-3-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
หมายเลขโทรศัพท์ 2-204-3-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279128

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357217-2

Page 1 of 1

Sample Number 2279128-1  
 Sampled Date Jul 04, 2022  
 Sample Description Emission from Stationary Source  
 Location ปล่องระบายไอจาก HT3 Stack 1 (3SN-1)  
 Date Analysis Commenced Jul 08, 2022  
 Condition of Sample Extracted into one 2-L collection flask, one filter paper placed in plastic cassette and two 10-L air sampling bags

Stack Description							
Ambient Pressure	754	mmHg	Diameter	0.70	m	Oxygen	8.3 %
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	7.2 %
Type of Process	Combustion (Open System)		Stack Temperature	348	°C	Gas Velocity	3.1 m/s
Type of Fuel	LPG		Moisture	5.09	%	Flow Rate (Actual O2)	1965 Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Air Testing</b>							
Total Hydrocarbon as Methane	04:10 PM - 04:20 PM	ppm	-	1.0	7.9	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Bangkok
Total VOCs as Propane	04:10 PM - 04:20 PM	ppm	-	1.0	3.6	US EPA, Method 25A	Bangkok

Sampled By : Ussaree Namburee

Remark :

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

Approved by

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279166

Date Received : Jul 07, 2022

Date Reported : Jul 19, 2022

Report Number: 2379126-1

Page 1 of 1

Sample Number 2279166-1  
 Sampled Date Jul 05, 2022  
 Sample Description Emission from Stationary Source  
 Location ปล่อง Bag House of Melting (4BH-1) : MCL4  
 Date Analysis Commenced Jul 08, 2022  
 Condition of Sample Extracted into one filter paper placed in plastic petri dish

Stack Description							
Ambient Pressure	754	mmHg	Diameter	1.50	m	Oxygen	20.7 %
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.2 %
Type of Process	Process		Stack Temperature	38.0	°C	Gas Velocity	8.3 m/s
Type of Fuel	-		Moisture	3.78	%	Flow Rate (Actual O2)	48338 Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	06:15 PM - 07:03 PM	mg/m3	-	0.5	<0.5	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
 Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : Ussaree Namburee

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.

Technical Management

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)  
เบอร์โทรศัพท์ 7-204-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
เบอร์โทรศัพท์ 7-204-46111

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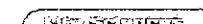


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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279166

Date Received : Jul 07, 2022

Date Reported : Jul 19, 2022

Report Number: 2379126-2

Page 1 of 1

Sample Number 2279166-1  
 Sampled Date Jul 05, 2022  
 Sample Description Emission from Stationary Source  
 Location โรงงาน Bag House of Melting (4BH-1) : MCL4  
 Date Analysis Commenced Jul 16, 2022  
 Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	754	mmHg	Diameter	1.50	m	Oxygen	20.7	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.2	%
Type of Process	Process		Stack Temperature	38.0	°C	Gas Velocity	8.3	m/s
Type of Fuel	-		Moisture	3.78	%	Flow Rate (Actual O2)	48338	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
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### Metals Testing

Chromium	06:15 PM - 07:03 PM	mg/m3	-	0.10	<0.10	US EPA, Method 29	Bangkok
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Sampled By : Ussaree Namburee

### Remark :

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

Approved by

*Sawitree N.*

Sawitree Nisangiam  
Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279168

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357281-1

Page 1 of 1

Sample Number 2279168-1  
 Sampled Date Jul 05, 2022  
 Sample Description Emission from Stationary Source  
 Location โรงงาน Bag House of Sand plant (4BH-2) : MCL4  
 Date Analysis Commenced Jul 08, 2022  
 Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.60	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	33.0	°C	Gas Velocity	10.3	m/s
Type of Fuel	-		Moisture	4.13	%	Flow Rate (Actual O2)	9745	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
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### Air Testing

Total Suspended Particulate	01:10 PM - 01:58 PM	mg/m3	-	0.5	<0.5	40	120	US EPA, Method 5	Bangkok
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Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)

Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Sampled By : Ussaree Namburee

### 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.

Technical Management

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)  
โทร: 204-4-4717

Approved by

*Kanokorn Anek*

Kanokorn Anek  
Senior Manager

โทร: 204-4-6111

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279169  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357283-1

Page 1 of 1

Sample Number 2279169-1  
Sampled Date Jul 05, 2022  
Sample Description Emission from Stationary Source  
Location Waiag Bag House of Shake-Out (4BH-3) : MCL4  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	754	mmHg	Diameter	1.38	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	35.0	°C	Gas Velocity	7.9	m/s
Type of Fuel	-		Moisture	3.71	%	Flow Rate (Actual O2)	39498	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	11:30 AM - 12:18 PM	mg/m3	-	0.5	<0.5	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Sampled By : Ussaree Namburee

### Remark :

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

Technical Management

*Saranya C.*  
Saranya Chalerthamrong  
Scientist (4)  
โทร 02-04-4717

Approved by

*Kanokorn Anek*  
Kanokorn Anek  
Senior Manager  
โทร 02-04-6111

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279170  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357284-1

Page 1 of 1

Sample Number 2279170-1  
Sampled Date Jul 05, 2022  
Sample Description Emission from Stationary Source  
Location Waiag Bag filter of shotblasting (4BH-4) : MCL4  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.78	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	37.0	°C	Gas Velocity	5.7	m/s
Type of Fuel	-		Moisture	2.17	%	Flow Rate (Actual O2)	9148	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	01:55 PM - 02:43 PM	mg/m3	-	0.5	4.3	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Sampled By : Ussaree Namburee

### Remark :

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

Technical Management

*Saranya C.*  
Saranya Chalerthamrong  
Scientist (4)  
โทร 02-04-4717

Approved by

*Kanokorn Anek*  
Kanokorn Anek  
Senior Manager  
โทร 02-04-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279172

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357286-1

Page 1 of 1

Sample Number 2279172-1  
 Sample Date Jul 06, 2022  
 Sample Description Emission from Stationary Source  
 Location โรงงาน Heat Treatment Batch furnace 1 (4HT-1) : MCL4  
 Date Analysis Commenced Jul 08, 2022  
 Condition of Sample Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	18.0	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.7	%
Type of Process	Combustion (Open System)		Stack Temperature	172	°C	Gas Velocity	3.4	m/s
Type of Fuel	LPG		Moisture	2.39	%	Flow Rate (Actual O2)	1272	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Carbon Monoxide	10:15 AM - 10:25 AM	ppm	-	1.0	<1.0	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	10:10 AM - 10:20 AM	ppm	-	1.06	4.40	60	180	US EPA, Method 7	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
 Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
 Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

Remark :

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

Technical Management

*Saranya C.*  
 Saranya Chalerthamrong  
 Scientist (4)  
 โทร 02-204-4-4717

Approved by

*Kanokkorn Anek*  
 Kanokkorn Anek  
 Senior Manager  
 โทร 02-204-4-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279174

Date Received : Sep 23, 2022

Date Reported : Oct 01, 2022

Report Number: 2357287-1

Page 1 of 1

Sample Number 2279174-1  
 Sample Date Sep 23, 2022  
 Sample Description Emission from Stationary Source  
 Location โรงงาน Heat Treatment Batch furnace 2 (4HT-2) : MCL4  
 Date Analysis Commenced Sep 23, 2022  
 Condition of Sample Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	756	mmHg	Diameter	0.45	m	Oxygen	20.0	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	0.6	%
Type of Process	Combustion (Open System)		Stack Temperature	109	°C	Gas Velocity	3.4	m/s
Type of Fuel	LPG		Moisture	3.86	%	Flow Rate (Actual O2)	1431	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Carbon Monoxide	10:45 AM - 10:55 AM	ppm	-	1.0	6.3	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	10:45 AM - 10:55 AM	ppm	-	1.06	1.51	60	180	US EPA, Method 7	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
 Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
 Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Anantachai Wesorn

Remark :

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

Technical Management

*Saranya C.*  
 Saranya Chalerthamrong  
 Scientist (4)  
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Approved by

*Kanokkorn Anek*  
 Kanokkorn Anek  
 Senior Manager  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279175

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357289-1

Page 1 of 1

Sample Number 2279175-1  
Sampled Date Jul 06, 2022  
Sample Description Emission from Stationary Source  
Location 14 Moo Heat Treatment Batch furnace 3 (4HT-3) : MCL4  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	17.1	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	2.2	%
Type of Process	Combustion (Open System)		Stack Temperature	197	°C	Gas Velocity	5.6	m/s
Type of Fuel	LPG		Moisture	2.61	%	Flow Rate (Actual O2)	1981	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide	09:45 AM - 09:55 AM	ppm	-	1.0	<1.0	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	09:40 AM - 09:50 AM	ppm	-	1.06	13.1	60	180	US EPA, Method 7	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

Remark :

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

Technical Management

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)

โทรเลขเลขที่ 2-204-4-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทรเลขเลขที่ 2-204-4-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279176

Date Received : Jul 07, 2022

Date Reported : Jul 15, 2022

Report Number: 2357291-1

Page 1 of 1

Sample Number 2279176-1  
Sampled Date Jul 07, 2022  
Sample Description Emission from Stationary Source  
Location 14 Moo Heat Treatment Batch furnace 4 (4HT-4) : MCL4  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	17.3	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	2.1	%
Type of Process	Combustion (Open System)		Stack Temperature	217	°C	Gas Velocity	3.6	m/s
Type of Fuel	LPG		Moisture	2.66	%	Flow Rate (Actual O2)	1209	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide	09:45 AM - 09:55 AM	ppm	-	1.0	1.1	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	09:40 AM - 09:50 AM	ppm	-	1.06	18.1	60	180	US EPA, Method 7	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

Remark :

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

Technical Management

*Saranya C.*

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Scientist (4)  
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Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทรเลขเลขที่ 2-204-4-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279177  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357292-1

Page 1 of 1

Sample Number 2279177-1  
Sampled Date Jul 06, 2022  
Sample Description Emission from Stationary Source  
Location โรงงาน Heat Treatment Batch furnace 5 (4HT-5) : MCL4  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	17.6	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.9	%
Type of Process	Combustion (Open System)		Stack Temperature	172	°C	Gas Velocity	3.3	m/s
Type of Fuel	LPG		Moisture	3.05	%	Flow Rate (Actual O2)	1206	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Carbon Monoxide	10:45 AM - 10:55 AM	ppm	-	1.0	140	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	10:40 AM - 10:50 AM	ppm	-	1.06	2.58	60	180	US EPA, Method 7	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

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

Technical Management

*Saranya C.*  
Saranya Chalerthamrong  
Scientist (4)  
โทรศัพท์ ๖-204-๔-4717

Approved by

*Kanokkorn Anek*  
Kanokkorn Anek  
Senior Manager  
โทรศัพท์ ๖-204-๔-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279179  
Date Received : Jul 07, 2022  
Date Reported : Jul 15, 2022  
Report Number: 2357293-1

Page 1 of 1

Sample Number 2279179-1  
Sampled Date Jul 06, 2022  
Sample Description Emission from Stationary Source  
Location โรงงาน Heat Treatment Batch furnace 6 (4HT-6) : MCL4  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	20.3	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Combustion (Open System)		Stack Temperature	172	°C	Gas Velocity	3.8	m/s
Type of Fuel	LPG		Moisture	2.92	%	Flow Rate (Actual O2)	1398	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Carbon Monoxide	10:30 AM - 10:40 AM	ppm	-	1.0	3.8	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	10:30 AM - 10:41 AM	ppm	-	1.06	2.89	60	180	US EPA, Method 7	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Ussaree Namburee

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

Technical Management

*Saranya C.*  
Saranya Chalerthamrong  
Scientist (4)  
โทรศัพท์ ๖-204-๔-4717

Approved by

*Kanokkorn Anek*  
Kanokkorn Anek  
Senior Manager  
โทรศัพท์ ๖-204-๔-6111

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## Analysis / Test Report

**Client :** Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
**P/O :** 213751  
**Project Name :** Environmental Testing  
**Project Location :**

**Lot ID: 2279180**  
**Date Received :** Sep 23, 2022  
**Date Reported :** Oct 01, 2022  
**Report Number:** 2357295-1

Page 1 of 1

**Sample Number** 2279180-1  
**Sampled Date** Sep 23, 2022  
**Sample Description** Emission from Stationary Source  
**Location** Jaias Heat Treatment Batch furnace 7 (4HT-7) : MCL4  
**Date Analysis Commenced** Sep 23, 2022  
**Condition of Sample** Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	756	mmHg	Diameter	0.45	m	Oxygen	19.3	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	1.0	%
Type of Process	Combustion (Open System)		Stack Temperature	108	°C	Gas Velocity	3.6	m/s
Type of Fuel	LPG		Moisture	4.32	%	Flow Rate (Actual O2)	1548	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide	11:15 AM - 11:25 AM	ppm	-	1.0	2.0	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	11:15 AM - 11:25 AM	ppm	-	1.06	<1.06	60	180	US EPA, Method 7	Bangkok

**Guideline :** Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

**Sampled By :** Anantachai Wesom

**Remark :**

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

**Technical Management**

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)  
โทรศัพท์ 2-204-4-4717

**Approved by**

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 2-204-4-6111

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## Analysis / Test Report

**Client :** Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
**P/O :** 213751  
**Project Name :** Environmental Testing  
**Project Location :**

**Lot ID: 2279181**  
**Date Received :** Jul 07, 2022  
**Date Reported :** Jul 15, 2022  
**Report Number:** 2357296-1

Page 1 of 1

**Sample Number** 2279181-1  
**Sampled Date** Jul 06, 2022  
**Sample Description** Emission from Stationary Source  
**Location** Jaias Heat Treatment Batch furnace 8 (4HT-8) : MCL4  
**Date Analysis Commenced** Jul 08, 2022  
**Condition of Sample** Extracted into two 2-L collection flasks, one 10-L air sampling bag

### Stack Description

Ambient Pressure	754	mmHg	Diameter	0.45	m	Oxygen	18.5	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.4	%
Type of Process	Combustion (Open System)		Stack Temperature	170	°C	Gas Velocity	3.3	m/s
Type of Fuel	LPG		Moisture	3.31	%	Flow Rate (Actual O2)	1207	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Carbon Monoxide	09:50 AM - 10:00 AM	ppm	-	1.0	2.2	-	690 (3)	US EPA, Method 10	Bangkok
Oxides of Nitrogen	09:50 AM - 10:01 AM	ppm	-	1.06	8.60	60	180	US EPA, Method 7	Bangkok

**Guideline :** Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source  
Guideline (3) : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

**Sampled By :** Ussaree Namburee

**Remark :**

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

**Technical Management**

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)  
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**Approved by**

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 2-204-4-6111

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279190  
Date Received : Aug 11, 2022  
Date Reported : Aug 19, 2022  
Report Number: 2357316-1

Page 1 of 1

Sample Number 2279190-1  
Sampled Date Aug 09, 2022  
Sample Description Emission from Stationary Source  
Location 14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
Date Analysis Commenced Aug 15, 2022  
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one amber plastic bottle

### Stack Description

Ambient Pressure	755	mmHg	Diameter	0.80	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	89.7	°C	Gas Velocity	10.5	m/s
Type of Fuel	-		Moisture	2.30	%	Flow Rate (Actual O2)	15104	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Total Suspended Particulate	02:15 PM - 02:57 PM	mg/m3	-	0.5	40.0	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : AnechaTansamai

#### Remark :

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

Technical Management

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)  
โทรศัพท์ 2-204-4-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 2-204-4-6111

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O :  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2295947  
Date Received : Aug 17, 2022  
Date Reported : Aug 25, 2022  
Report Number: 2395686-1

Page 1 of 1

Sample Number 2295947-1  
Sampled Date Aug 16, 2022  
Sample Description Emission from Stationary Source  
Location Oil Circulate 3 (3OC-1) : HT3  
Date Analysis Commenced Aug 18, 2022  
Condition of Sample Extracted into one 10-L air sampling bag, one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	756	mmHg	Diameter	0.90	m	Oxygen	20.9	%
Ambient Temperature	28.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	50.0	°C	Gas Velocity	20.3	m/s
Type of Fuel	-		Moisture	6.33	%	Flow Rate (Actual O2)	39950	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Total Suspended Particulate	11:15 AM - 12:03 PM	mg/m3	-	0.5	0.7	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
Guideline (2) : Notification of the Ministry of Science, Technology and Environmental (B.E.2544) : New Source

Sampled By : AnechaTansamai

#### Remark :

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Technical Management

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)  
โทรศัพท์ 2-204-4-4717

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 2-204-4-6111

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O :

Project Name : Environmental Testing

Project Location :

Lot ID: 2295947

Date Received : Aug 17, 2022

Date Reported : Aug 25, 2022

Report Number: 2395686-2

Page 1 of 1

Sample Number 2295947-1  
 Sampled Date Aug 16, 2022  
 Sample Description Emission from Stationary Source  
 Location Oil Circulate 3 (3OC-1) : HT3  
 Date Analysis Commenced Aug 18, 2022  
 Condition of Sample Extracted into one 10-L air sampling bag, one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	756	mmHg	Diameter	0.90	m	Oxygen	20.9	%
Ambient Temperature	28.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	50.0	°C	Gas Velocity	20.3	m/s
Type of Fuel	-		Moisture	6.33	%	Flow Rate (Actual O2)	39950	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Air Testing</b>							
Total Hydrocarbon as Methane	11:30 AM - 11:40 AM	ppm	-	1.0	4.3	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Bangkok
Total VOCs as Propane	11:30 AM - 11:40 AM	ppm	-	1.0	3.8	US EPA, Method 25A	Bangkok

Sampled By : AnechaTansamai

Remark :

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

Approved by

*Saranya C.*  
 Saranya Chalermthamrong  
 Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O :

Project Name : Environmental Testing

Project Location :



TESTING  
 No.0009

Lot ID: 22134314

Date Received : Nov 21, 2022

Date Reported : Nov 28, 2022

Report Number: 2482301-1

Page 1 of 1

Sample Number 22134314-1  
 Sampled Date Nov 20, 2022  
 Sample Description Emission from Stationary Source  
 Location บ้าน Bag House 5 (3BH-3)  
 Date Analysis Commenced Nov 22, 2022  
 Condition of Sample Extracted into one filter paper placed in plastic petri dish

### Stack Description

Ambient Pressure	755	mmHg	Diameter	1.25	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	46.7	°C	Gas Velocity	21.3	m/s
Type of Fuel	-		Moisture	3.44	%	Flow Rate (Actual O2)	84433	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
<b>Air Testing</b>									
Total Suspended Particulate	09:30 AM - 10:18 AM	mg/m3	-	0.5	10.7	40	120	US EPA, Method 5	Bangkok

Guideline : Guideline (1) : Environmental Impact Assessment Report of Magotteaux Co., Ltd. (B.E.2554)  
 Guideline (2) : Notification of the Ministry of Science, Technology and Environment (B.E.2544) : New Source

Sampled By : Atsawared Jorsaw

Remark :

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

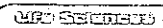
*Saranya C.*  
 Saranya Chalermthamrong  
 Scientist (4)  
 โทรศัพท์ 02-204-4-4717

Approved by

*Kanokkorn Anek*  
 Kanokkorn Anek  
 Senior Manager  
 โทรศัพท์ 02-204-4-6111

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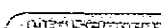


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# ภาคผนวก ค-3

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คุณภาพน้ำ



## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2279649

Date Received : Jul 14, 2022  
Date Reported : Jul 21, 2022  
Report Number : 2381747-1

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Page 1 of 1

Sample Number	2279649-1
Sampled Date	Jul 14, 2022 9:25 AM
Sample Description	Wastewater
Location	ศูนย์รวมพื้นที่โครงการ (MCL1+2)
Date Analysis Commenced	Jul 15, 2022
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
BOD (5 days at 20 degree C)	mg/L	-	2	<2	Based on APHA (2017), 5210 B	Bangkok
COD	mg/L	1.5	5	9	Based on APHA (2017), 5220 D	Bangkok
Oil & Grease	mg/L	-	3	<3	Based on APHA (2017), 5520 B	Bangkok
pH at 25 degree C		-	-	7.7	Based on APHA (2017), 4500-H (B)	Bangkok
Temperature *	Degree C	-	-	31.1	Based on APHA (2017), 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	Based on APHA (2017), 2540 D	Bangkok

Sampled By : Jirarat Khowlaor

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

Siriluk P.

Siriluk Puengppang  
Supervisor  
โทรศัพท์ 02-204-4-4720

Approved by

Kanokkorn Anek

Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 02-204-4-6111

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2279649

Date Received : Jul 14, 2022  
Date Reported : Jul 21, 2022  
Report Number : 2381748-1

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Page 1 of 1

Sample Number	2279649-2
Sampled Date	Jul 14, 2022
Sample Description	Wastewater
Location	น้ำทิ้ง (MCL1+2)
Date Analysis Commenced	Jul 15, 2022
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	7	≤20	Based on APHA (2017), 5210 B	Bangkok
COD	mg/L	1.5	5	81	≤120	Based on APHA (2017), 5220 D	Bangkok
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Bangkok
pH at 25 degree C		-	-	7.6	5.5-9.0	Based on APHA (2017), 4500-H (B)	Bangkok
Temperature *	Degree C	-	-	30.7	≤40	Based on APHA (2017), 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	21	≤50	Based on APHA (2017), 2540 D	Bangkok

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

Sampled By : Jirarat Khowlaor

Remark :  
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Technical Management

Siriluk P.

Siriluk Puengppang  
Supervisor  
โทรศัพท์ 02-204-4-4720

Approved by

Kanokkorn Anek

Kanokkorn Anek  
Senior Manager  
โทรศัพท์ 02-204-4-6111

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## Analysis / Test Report

TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279656  
Date Received : Jul 14, 2022  
Date Reported : Jul 21, 2022  
Report Number : 2381797-1

Page 1 of 1

Sample Number	2279656-1
Sampled Date	Jul 14, 2022 9:55 AM
Sample Description	Wastewater
Location	ศูนย์รวมพื้นที่โครงการ (MCL4)
Date Analysis Commenced	Jul 15, 2022
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
BOD (5 days at 20 degree C)	mg/L	-	2	<2	Based on APHA (2017), 5210 B	Bangkok
COD	mg/L	1.5	5	8	Based on APHA (2017), 5220 D	Bangkok
Oil & Grease	mg/L	-	3	<3	Based on APHA (2017), 5520 B	Bangkok
pH at 25 degree C		-	-	7.2	Based on APHA (2017), 4500-H (B)	Bangkok
Temperature *	Degree C	-	-	30.1	Based on APHA (2017), 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	5	Based on APHA (2017), 2540 D	Bangkok

Sampled By : Jiranat Khowlaor

Remark :

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

Technical Management

*Siriluk P.*

Siriluk Puengpang  
Supervisor

โทรศัพท์ 02-204-4-4720

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager

โทรศัพท์ 02-204-4-6111

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## Analysis / Test Report

TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2279656  
Date Received : Jul 14, 2022  
Date Reported : Jul 21, 2022  
Report Number : 2381798-1

Page 1 of 1

Sample Number	2279656-2
Sampled Date	Jul 14, 2022 9:50 AM
Sample Description	Wastewater
Location	น้ำพักน้ำทิ้ง (MCL4)
Date Analysis Commenced	Jul 15, 2022
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 degree C)	mg/L	-	2	<2	≤20	Based on APHA (2017), 5210 B	Bangkok
COD	mg/L	1.5	5	15	≤120	Based on APHA (2017), 5220 D	Bangkok
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Bangkok
pH at 25 degree C		-	-	7.3	5.5-9.0	Based on APHA (2017), 4500-H (B)	Bangkok
Temperature *	Degree C	-	-	30.2	≤40	Based on APHA (2017), 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	Based on APHA (2017), 2540 D	Bangkok

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

Sampled By : Jiranat Khowlaor

Remark :

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Technical Management

*Siriluk P.*

Siriluk Puengpang  
Supervisor

โทรศัพท์ 02-204-4-4720

Approved by

*Kanokkorn Anek*

Kanokkorn Anek  
Senior Manager

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# ภาคผนวก ค-4

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ระดับเสียงโดยทั่วไป





## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279130

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379040-1

Page 1 of 1

Sample Number 2279130-1  
Parameter Noise (Leq 24 hrs.)  
Location ริมรั้วด้านทิศตะวันตกโครงการ MCL1-2 : MCL1-2 (GPS 47P 0700052, 1593539)  
Measurement Date Jul 04 - Jul 05, 2022  
Measurement by Jatsarawat Pattama  
Sound Level meter Serial No. 710640

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	55.7	76.9	50.1
01:00 PM - 02:00 PM	55.0	77.8	49.7
02:00 PM - 03:00 PM	54.5	74.1	50.2
03:00 PM - 04:00 PM	53.5	72.9	49.9
04:00 PM - 05:00 PM	57.4	76.2	50.0
05:00 PM - 06:00 PM	56.0	81.8	51.9
06:00 PM - 07:00 PM	61.8	75.1	54.9
07:00 PM - 08:00 PM	55.0	70.3	53.3
08:00 PM - 09:00 PM	55.0	71.3	53.3
09:00 PM - 10:00 PM	54.9	70.2	53.3
10:00 PM - 11:00 PM	59.6	74.8	54.6
11:00 PM - 12:00 AM	60.9	74.1	55.8
12:00 AM - 01:00 AM	60.9	81.3	58.1
01:00 AM - 02:00 AM	60.6	71.4	57.8
02:00 AM - 03:00 AM	62.7	76.5	60.0
03:00 AM - 04:00 AM	61.4	72.0	59.4
04:00 AM - 05:00 AM	61.8	76.7	59.7
05:00 AM - 06:00 AM	62.9	78.2	60.8
06:00 AM - 07:00 AM	62.0	77.5	59.4
07:00 AM - 08:00 AM	63.0	81.7	58.1
08:00 AM - 09:00 AM	59.8	83.5	53.7
09:00 AM - 10:00 AM	58.9	83.4	52.4
10:00 AM - 11:00 AM	58.9	77.1	53.1
11:00 AM - 12:00 PM	58.7	72.6	53.4

Leq Average 24 hrs. (dB(A)) 59.7  
Lmax (dB(A)) 83.5  
L90 (dB(A)) 53.4  
Ldn (dB(A)) 67.6  
Standard (dB(A)) 70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

*Saranya C.*

Saranya Chalemtamrong  
Scientist (4)

Approved by

*Supot S.*

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279130

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379041-1

Page 1 of 1

Sample Number 2279130-2  
Parameter Noise (Leq 24 hrs.)  
Location ริมรั้วด้านทิศตะวันตกโครงการ MCL1-2 : MCL1-2 (GPS 47P 0700052, 1593539)  
Measurement Date Jul 05 - Jul 06, 2022  
Measurement by Jatsarawat Pattama  
Sound Level meter Serial No. 710640

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	56.7	77.9	51.1
01:00 PM - 02:00 PM	56.0	78.8	50.7
02:00 PM - 03:00 PM	55.5	75.1	51.2
03:00 PM - 04:00 PM	54.5	73.9	50.9
04:00 PM - 05:00 PM	58.4	77.2	51.0
05:00 PM - 06:00 PM	57.1	85.1	51.8
06:00 PM - 07:00 PM	57.0	76.4	51.9
07:00 PM - 08:00 PM	59.7	73.3	53.5
08:00 PM - 09:00 PM	55.6	73.5	53.3
09:00 PM - 10:00 PM	56.5	68.8	55.0
10:00 PM - 11:00 PM	58.0	66.3	55.5
11:00 PM - 12:00 AM	59.8	77.8	57.1
12:00 AM - 01:00 AM	62.6	91.3	57.7
01:00 AM - 02:00 AM	60.8	70.4	58.7
02:00 AM - 03:00 AM	60.6	70.5	58.9
03:00 AM - 04:00 AM	61.2	72.3	59.3
04:00 AM - 05:00 AM	61.6	74.5	59.7
05:00 AM - 06:00 AM	61.9	74.0	59.8
06:00 AM - 07:00 AM	63.8	77.9	60.5
07:00 AM - 08:00 AM	61.1	78.2	58.2
08:00 AM - 09:00 AM	61.9	79.3	55.1
09:00 AM - 10:00 AM	60.8	80.5	54.5
10:00 AM - 11:00 AM	58.5	80.2	53.0
11:00 AM - 12:00 PM	56.7	78.3	52.0

Leq Average 24 hrs. (dB(A)) 59.7  
Lmax (dB(A)) 91.3  
L90 (dB(A)) 54.5  
Ldn (dB(A)) 67.5  
Standard (dB(A)) 70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

*Saranya C.*

Saranya Chalemtamrong  
Scientist (4)

Approved by

*Supot S.*

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279130

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379042-1

Page 1 of 1

Sample Number 2279130-3  
 Parameter Noise (Leq 24 hrs.)  
 Location บริเวณพื้นที่ตรวจวัดโครงการ MCL1-2 : MCL1-2 (GPS 47P 0700052, 1593539)  
 Measurement Date Jul 06 - Jul 07, 2022  
 Measurement by Jatsarawut Pattama  
 Sound Level meter Serial No. 710640

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
12:00 PM - 01:00 PM	56.9	79.6	52.0
01:00 PM - 02:00 PM	55.1	74.6	51.6
02:00 PM - 03:00 PM	57.8	67.2	52.8
03:00 PM - 04:00 PM	56.3	72.4	52.1
04:00 PM - 05:00 PM	58.7	80.3	52.7
05:00 PM - 06:00 PM	56.8	77.5	52.6
06:00 PM - 07:00 PM	57.4	78.6	52.9
07:00 PM - 08:00 PM	57.6	73.1	53.5
08:00 PM - 09:00 PM	56.9	70.0	54.5
09:00 PM - 10:00 PM	57.2	70.3	55.8
10:00 PM - 11:00 PM	57.5	71.5	55.8
11:00 PM - 12:00 AM	60.0	77.7	57.8
12:00 AM - 01:00 AM	60.1	79.8	56.5
01:00 AM - 02:00 AM	62.2	76.4	60.3
02:00 AM - 03:00 AM	62.2	77.9	60.1
03:00 AM - 04:00 AM	62.4	76.9	59.4
04:00 AM - 05:00 AM	61.8	76.5	59.5
05:00 AM - 06:00 AM	60.9	72.6	59.1
06:00 AM - 07:00 AM	61.7	77.6	58.7
07:00 AM - 08:00 AM	59.5	78.6	55.0
08:00 AM - 09:00 AM	61.1	86.6	53.9
09:00 AM - 10:00 AM	59.2	80.9	53.4
10:00 AM - 11:00 AM	59.9	81.2	53.8
11:00 AM - 12:00 PM	60.7	88.6	51.9

Leq Average 24 hrs. (dB(A)) 59.7  
 Lmax (dB(A)) 88.6  
 L90 (dB(A)) 53.9  
 Ldn (dB(A)) 67.3  
 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

Technical Management

*Saranya C.*  
 Saranya Chalemtamrong  
 Scientist (4)

Approved by

*Supot S.*  
 Supot Salamteh  
 Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279130

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379043-1

Page 1 of 1

Sample Number 2279130-4  
 Parameter Noise (Leq 24 hrs.)  
 Location บริเวณพื้นที่ตรวจวัดโครงการ MCL1-2 : MCL1-2 (GPS 47P 0700382, 1593268)  
 Measurement Date Jul 04 - Jul 05, 2022  
 Measurement by Jatsarawut Pattama  
 Sound Level meter Serial No. 509356

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	56.6	69.2	51.4
09:00 AM - 10:00 AM	56.1	72.5	51.1
10:00 AM - 11:00 AM	53.8	81.5	48.6
11:00 AM - 12:00 PM	64.6	96.2	48.3
12:00 PM - 01:00 PM	63.5	86.1	53.6
01:00 PM - 02:00 PM	59.7	80.9	54.3
02:00 PM - 03:00 PM	66.8	90.0	54.4
03:00 PM - 04:00 PM	58.7	90.3	47.2
04:00 PM - 05:00 PM	55.8	69.5	49.8
05:00 PM - 06:00 PM	63.1	98.1	53.6
06:00 PM - 07:00 PM	57.3	76.1	52.9
07:00 PM - 08:00 PM	56.2	74.0	52.5
08:00 PM - 09:00 PM	53.2	69.4	48.4
09:00 PM - 10:00 PM	61.6	75.5	54.3
10:00 PM - 11:00 PM	54.6	76.5	50.6
11:00 PM - 12:00 AM	54.5	70.0	48.2
12:00 AM - 01:00 AM	55.8	72.5	54.8
01:00 AM - 02:00 AM	58.6	68.0	53.7
02:00 AM - 03:00 AM	60.0	73.0	56.9
03:00 AM - 04:00 AM	58.2	66.4	52.4
04:00 AM - 05:00 AM	60.2	68.0	55.9
05:00 AM - 06:00 AM	64.8	78.9	56.4
06:00 AM - 07:00 AM	61.4	72.8	56.2
07:00 AM - 08:00 AM	59.4	68.6	56.8

Leq Average 24 hrs. (dB(A)) 60.6  
 Lmax (dB(A)) 98.1  
 L90 (dB(A)) 52.9  
 Ldn (dB(A)) 66.5  
 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

Technical Management

*Saranya C.*  
 Saranya Chalemtamrong  
 Scientist (4)

Approved by

*Supot S.*  
 Supot Salamteh  
 Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279130

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379044-1

Page 1 of 1

Sample Number 2279130-5  
 Parameter Noise (Leq 24 hrs.)  
 Location ริมรั้วด้านทิศตะวันออกเชิงใต้โครงการ MCL1-2 : MCL1-2 (GPS 47P 0700382, 1593268)  
 Measurement Date Jul 05 - Jul 06, 2022  
 Measurement by Jatsarawat Pattama  
 Sound Level meter Serial No. 509356

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	60.1	72.7	57.5
09:00 AM - 10:00 AM	66.9	106.2	56.1
10:00 AM - 11:00 AM	56.4	73.3	52.0
11:00 AM - 12:00 PM	55.5	73.1	52.1
12:00 PM - 01:00 PM	66.6	90.2	54.1
01:00 PM - 02:00 PM	65.4	87.9	53.7
02:00 PM - 03:00 PM	57.0	72.8	52.2
03:00 PM - 04:00 PM	50.7	70.8	47.8
04:00 PM - 05:00 PM	56.7	72.6	53.5
05:00 PM - 06:00 PM	57.6	73.8	54.3
06:00 PM - 07:00 PM	57.2	70.6	54.8
07:00 PM - 08:00 PM	57.3	82.2	54.2
08:00 PM - 09:00 PM	59.6	88.6	50.0
09:00 PM - 10:00 PM	57.9	79.7	53.8
10:00 PM - 11:00 PM	54.5	78.6	49.3
11:00 PM - 12:00 AM	54.9	73.4	49.3
12:00 AM - 01:00 AM	56.5	78.5	55.0
01:00 AM - 02:00 AM	58.3	70.1	54.0
02:00 AM - 03:00 AM	59.4	66.4	56.4
03:00 AM - 04:00 AM	58.9	67.0	54.1
04:00 AM - 05:00 AM	60.6	74.3	57.4
05:00 AM - 06:00 AM	60.6	75.1	57.3
06:00 AM - 07:00 AM	59.1	72.9	54.1
07:00 AM - 08:00 AM	60.2	73.7	56.1

Leq Average 24 hrs. (dB(A)) 60.4

Lmax (dB(A)) 106.2

L90 (dB(A)) 54.1

Ldn (dB(A)) 65.5

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

Technical Management

*Saranya C.*

Saranya Chalemtamrong  
Scientist (4)

Approved by

*Supt S.*

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279130

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2379045-1

Page 1 of 1

Sample Number 2279130-6  
 Parameter Noise (Leq 24 hrs.)  
 Location ริมรั้วด้านทิศตะวันออกเชิงใต้โครงการ MCL1-2 : MCL1-2 (GPS 47P 0700382, 1593268)  
 Measurement Date Jul 06 - Jul 07, 2022  
 Measurement by Jatsarawat Pattama  
 Sound Level meter Serial No. 509356

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	60.4	73.0	56.9
09:00 AM - 10:00 AM	66.0	105.4	55.9
10:00 AM - 11:00 AM	62.1	83.7	59.9
11:00 AM - 12:00 PM	62.0	83.3	57.6
12:00 PM - 01:00 PM	63.6	90.0	58.0
01:00 PM - 02:00 PM	73.0	88.0	55.8
02:00 PM - 03:00 PM	72.4	92.1	58.3
03:00 PM - 04:00 PM	66.5	83.8	56.8
04:00 PM - 05:00 PM	59.5	68.1	58.1
05:00 PM - 06:00 PM	72.7	94.7	59.8
06:00 PM - 07:00 PM	72.3	89.1	59.6
07:00 PM - 08:00 PM	67.2	90.6	59.6
08:00 PM - 09:00 PM	59.0	69.9	52.8
09:00 PM - 10:00 PM	60.2	72.6	57.8
10:00 PM - 11:00 PM	59.8	81.2	56.1
11:00 PM - 12:00 AM	60.7	67.2	56.9
12:00 AM - 01:00 AM	65.3	101.9	60.1
01:00 AM - 02:00 AM	60.0	70.8	58.4
02:00 AM - 03:00 AM	59.9	66.9	56.6
03:00 AM - 04:00 AM	60.0	75.4	52.6
04:00 AM - 05:00 AM	61.0	74.0	59.7
05:00 AM - 06:00 AM	60.9	68.7	59.2
06:00 AM - 07:00 AM	60.3	71.7	53.7
07:00 AM - 08:00 AM	61.2	71.1	59.7

Leq Average 24 hrs. (dB(A)) 66.6

Lmax (dB(A)) 105.4

L90 (dB(A)) 57.8

Ldn (dB(A)) 69.6

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

Technical Management

*Saranya C.*

Saranya Chalemtamrong  
Scientist (4)

Approved by

*Supt S.*

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279183

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2378987-1

Page 1 of 1

Sample Number 2279183-1  
 Parameter Noise (Leq 24 hrs.)  
 Location บริเวณด้านหน้าโครงการ VRM : MCL4 (GPS 47P 0699917, 1593242)  
 Measurement Date Jul 04 - Jul 05, 2022  
 Measurement by Jatsarawat Pattama  
 Sound Level meter Serial No. 610205

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	57.4	76.4	54.4
09:00 AM - 10:00 AM	58.9	77.0	55.3
10:00 AM - 11:00 AM	59.0	68.2	56.3
11:00 AM - 12:00 PM	57.6	74.6	53.8
12:00 PM - 01:00 PM	55.8	70.4	53.0
01:00 PM - 02:00 PM	59.5	73.8	54.5
02:00 PM - 03:00 PM	58.9	70.4	54.5
03:00 PM - 04:00 PM	57.6	70.2	54.3
04:00 PM - 05:00 PM	58.1	77.9	54.6
05:00 PM - 06:00 PM	57.4	84.6	54.7
06:00 PM - 07:00 PM	60.0	72.3	54.8
07:00 PM - 08:00 PM	57.2	66.2	54.3
08:00 PM - 09:00 PM	57.2	69.8	54.8
09:00 PM - 10:00 PM	59.0	69.0	55.7
10:00 PM - 11:00 PM	58.2	67.4	56.4
11:00 PM - 12:00 AM	58.9	77.7	55.9
12:00 AM - 01:00 AM	58.7	69.3	55.7
01:00 AM - 02:00 AM	59.2	76.7	55.8
02:00 AM - 03:00 AM	61.0	75.2	55.5
03:00 AM - 04:00 AM	59.1	69.9	55.6
04:00 AM - 05:00 AM	55.9	60.4	55.3
05:00 AM - 06:00 AM	57.4	72.9	56.1
06:00 AM - 07:00 AM	56.9	69.4	55.9
07:00 AM - 08:00 AM	57.3	82.4	56.0

Leq Average 24 hrs. (dB(A)) 58.3  
 Lmax (dB(A)) 84.6  
 L90 (dB(A)) 55.3  
 Ldn (dB(A)) 64.9  
 Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
 2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
 โรงงาน พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supt S

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279183

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2378988-1

Page 1 of 1

Sample Number 2279183-2  
 Parameter Noise (Leq 24 hrs.)  
 Location บริเวณด้านหน้าโครงการ VRM : MCL4 (GPS 47P 0699917, 1593242)  
 Measurement Date Jul 05 - Jul 06, 2022  
 Measurement by Jatsarawat Pattama  
 Sound Level meter Serial No. 610205

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	58.2	77.1	55.7
09:00 AM - 10:00 AM	62.6	74.2	56.6
10:00 AM - 11:00 AM	62.8	74.3	56.5
11:00 AM - 12:00 PM	63.0	75.5	56.9
12:00 PM - 01:00 PM	58.6	68.5	54.1
01:00 PM - 02:00 PM	62.1	80.1	55.0
02:00 PM - 03:00 PM	63.9	73.1	55.7
03:00 PM - 04:00 PM	60.1	72.2	54.8
04:00 PM - 05:00 PM	57.4	69.0	55.3
05:00 PM - 06:00 PM	58.6	72.6	55.3
06:00 PM - 07:00 PM	61.3	72.3	60.0
07:00 PM - 08:00 PM	61.9	72.8	60.1
08:00 PM - 09:00 PM	62.7	73.0	60.0
09:00 PM - 10:00 PM	61.5	73.5	59.6
10:00 PM - 11:00 PM	61.8	72.0	60.0
11:00 PM - 12:00 AM	61.9	73.5	60.3
12:00 AM - 01:00 AM	61.4	68.6	60.1
01:00 AM - 02:00 AM	62.0	70.3	60.2
02:00 AM - 03:00 AM	61.1	69.0	57.1
03:00 AM - 04:00 AM	59.1	69.0	56.4
04:00 AM - 05:00 AM	59.9	67.7	55.7
05:00 AM - 06:00 AM	59.2	68.9	56.0
06:00 AM - 07:00 AM	57.9	85.5	55.8
07:00 AM - 08:00 AM	56.3	71.2	54.9

Leq Average 24 hrs. (dB(A)) 61.1  
 Lmax (dB(A)) 85.5  
 L90 (dB(A)) 56.4  
 Ldn (dB(A)) 67.2  
 Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
 2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
 โรงงาน พ.ศ. 2548

Technical Management

Saranya C.

Saranya Chalerthamrong  
Scientist (4)

Approved by

Supt S

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279183

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2378989-1

Page 1 of 1

Sample Number 2279183-3  
 Parameter Noise (Leq 24 hrs.)  
 Location หน้าวัดหนองโสนโครงการ VRM : MCL4 (GPS 47P 0699917, 1593242)  
 Measurement Date Jul 06 - Jul 07, 2022  
 Measurement by Jatsarawat Pattama  
 Sound Level meter Serial No. 610205

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	62.7	79.7	54.9
09:00 AM - 10:00 AM	62.6	78.6	56.1
10:00 AM - 11:00 AM	59.2	76.4	54.0
11:00 AM - 12:00 PM	61.1	70.2	52.6
12:00 PM - 01:00 PM	56.3	69.4	51.5
01:00 PM - 02:00 PM	61.5	73.1	55.0
02:00 PM - 03:00 PM	57.7	68.9	53.8
03:00 PM - 04:00 PM	55.5	80.4	53.7
04:00 PM - 05:00 PM	59.6	79.4	55.0
05:00 PM - 06:00 PM	58.1	71.4	56.4
06:00 PM - 07:00 PM	57.9	74.7	56.1
07:00 PM - 08:00 PM	59.0	69.2	55.9
08:00 PM - 09:00 PM	59.1	65.8	56.5
09:00 PM - 10:00 PM	58.1	66.5	55.5
10:00 PM - 11:00 PM	58.5	68.1	54.8
11:00 PM - 12:00 AM	58.9	68.6	55.1
12:00 AM - 01:00 AM	58.8	74.6	55.8
01:00 AM - 02:00 AM	57.1	67.9	54.8
02:00 AM - 03:00 AM	57.2	70.0	55.4
03:00 AM - 04:00 AM	57.9	65.4	55.1
04:00 AM - 05:00 AM	59.6	67.6	56.1
05:00 AM - 06:00 AM	58.5	78.6	55.3
06:00 AM - 07:00 AM	58.7	86.4	55.2
07:00 AM - 08:00 AM	55.5	80.3	53.8

Leq Average 24 hrs. (dB(A)) 59.1  
 Lmax (dB(A)) 86.4  
 L90 (dB(A)) 55.1  
 Ldn (dB(A)) 65.0  
 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

Technical Management

Saranya C.

Saranya Chaleamthamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279183

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2378990-1

Page 1 of 1

Sample Number 2279183-4  
 Parameter Noise (Leq 24 hrs.)  
 Location หน้าวัดหนองโสนโครงการ VRM : MCL4 (GPS 47P 0699843, 1593041)  
 Measurement Date Jul 04 - Jul 05, 2022  
 Measurement by Jatsarawat Pattama  
 Sound Level meter Serial No. 610204

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	58.4	73.8	55.0
09:00 AM - 10:00 AM	58.9	76.9	55.6
10:00 AM - 11:00 AM	58.4	72.0	56.3
11:00 AM - 12:00 PM	58.5	70.4	56.9
12:00 PM - 01:00 PM	58.0	71.4	55.7
01:00 PM - 02:00 PM	58.6	85.1	55.4
02:00 PM - 03:00 PM	58.0	71.9	55.9
03:00 PM - 04:00 PM	58.8	72.8	56.3
04:00 PM - 05:00 PM	58.9	72.4	56.8
05:00 PM - 06:00 PM	60.4	78.0	57.3
06:00 PM - 07:00 PM	61.0	71.3	58.9
07:00 PM - 08:00 PM	59.5	72.4	58.1
08:00 PM - 09:00 PM	59.6	69.2	58.3
09:00 PM - 10:00 PM	59.6	71.2	58.4
10:00 PM - 11:00 PM	59.8	69.9	58.7
11:00 PM - 12:00 AM	59.5	72.7	58.2
12:00 AM - 01:00 AM	59.3	81.0	57.4
01:00 AM - 02:00 AM	60.0	80.6	57.5
02:00 AM - 03:00 AM	61.5	81.3	58.1
03:00 AM - 04:00 AM	61.8	82.4	58.5
04:00 AM - 05:00 AM	60.8	82.2	57.9
05:00 AM - 06:00 AM	60.9	82.3	57.9
06:00 AM - 07:00 AM	60.8	82.9	57.8
07:00 AM - 08:00 AM	60.5	83.4	57.4

Leq Average 24 hrs. (dB(A)) 59.8  
 Lmax (dB(A)) 85.1  
 L90 (dB(A)) 57.4  
 Ldn (dB(A)) 66.8  
 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

Technical Management

Saranya C.

Saranya Chaleamthamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279183

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2378991-1

Page 1 of 1

Sample Number 2279183-5  
 Parameter Noise (Leq 24 hrs.)  
 Location บริเวณด้านทิศใต้โครงการ VRM : MCL4 (GPS 47P 0699843, 1593041)  
 Measurement Date Jul 05 - Jul 06, 2022  
 Measurement by Jatsarawut Pattama  
 Sound Level meter Serial No. 610204

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	60.7	83.0	56.8
09:00 AM - 10:00 AM	61.3	83.7	57.6
10:00 AM - 11:00 AM	61.1	83.4	57.9
11:00 AM - 12:00 PM	59.9	79.9	57.9
12:00 PM - 01:00 PM	60.7	84.7	56.6
01:00 PM - 02:00 PM	61.6	82.6	58.5
02:00 PM - 03:00 PM	61.4	83.0	58.3
03:00 PM - 04:00 PM	61.4	83.7	58.2
04:00 PM - 05:00 PM	61.2	82.9	58.6
05:00 PM - 06:00 PM	61.8	82.3	58.5
06:00 PM - 07:00 PM	61.1	82.1	58.5
07:00 PM - 08:00 PM	61.5	81.8	59.2
08:00 PM - 09:00 PM	61.9	83.1	59.2
09:00 PM - 10:00 PM	61.5	83.8	58.9
10:00 PM - 11:00 PM	61.2	83.3	58.5
11:00 PM - 12:00 AM	61.0	83.5	58.4
12:00 AM - 01:00 AM	61.0	82.4	57.8
01:00 AM - 02:00 AM	61.1	82.1	58.4
02:00 AM - 03:00 AM	61.7	82.0	59.0
03:00 AM - 04:00 AM	62.3	82.0	60.1
04:00 AM - 05:00 AM	61.1	82.5	58.1
05:00 AM - 06:00 AM	60.6	81.8	57.7
06:00 AM - 07:00 AM	60.9	82.5	57.6
07:00 AM - 08:00 AM	60.7	82.7	57.6

Leq Average 24 hrs. (dB(A)) 61.2  
 Lmax (dB(A)) 84.7  
 L90 (dB(A)) 58.3  
 Ldn (dB(A)) 67.6  
 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

Technical Management

Saranya C.

Saranya Chalemithamrong  
Scientist (4)

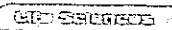
Approved by

Supot S.

Supot Salameh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279183

Date Received : Jul 11, 2022

Date Reported : Jul 19, 2022

Report Number: 2378992-1

Page 1 of 1

Sample Number 2279183-6  
 Parameter Noise (Leq 24 hrs.)  
 Location บริเวณด้านทิศใต้โครงการ VRM : MCL4 (GPS 47P 0699843, 1593041)  
 Measurement Date Jul 06 - Jul 07, 2022  
 Measurement by Jatsarawut Pattama  
 Sound Level meter Serial No. 610204

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:00 AM - 09:00 AM	61.1	83.6	57.3
09:00 AM - 10:00 AM	61.4	82.7	58.5
10:00 AM - 11:00 AM	61.4	84.3	58.2
11:00 AM - 12:00 PM	60.9	84.7	58.0
12:00 PM - 01:00 PM	61.0	86.0	57.5
01:00 PM - 02:00 PM	61.2	84.2	58.1
02:00 PM - 03:00 PM	61.8	86.3	58.9
03:00 PM - 04:00 PM	61.6	84.1	58.7
04:00 PM - 05:00 PM	61.5	84.1	58.7
05:00 PM - 06:00 PM	61.6	82.4	59.0
06:00 PM - 07:00 PM	61.6	82.3	59.0
07:00 PM - 08:00 PM	61.9	82.3	59.4
08:00 PM - 09:00 PM	62.2	83.0	60.0
09:00 PM - 10:00 PM	62.1	82.9	59.6
10:00 PM - 11:00 PM	62.4	83.0	59.1
11:00 PM - 12:00 AM	65.1	82.8	63.1
12:00 AM - 01:00 AM	63.4	82.0	58.4
01:00 AM - 02:00 AM	59.9	75.8	59.0
02:00 AM - 03:00 AM	60.9	76.6	58.9
03:00 AM - 04:00 AM	58.1	76.4	58.4
04:00 AM - 05:00 AM	58.6	61.8	58.3
05:00 AM - 06:00 AM	59.1	70.6	58.3
06:00 AM - 07:00 AM	60.2	76.0	58.4
07:00 AM - 08:00 AM	59.4	74.3	58.2

Leq Average 24 hrs. (dB(A)) 61.5  
 Lmax (dB(A)) 86.3  
 L90 (dB(A)) 58.5  
 Ldn (dB(A)) 67.9  
 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

Technical Management

Saranya C.

Saranya Chalemithamrong  
Scientist (4)

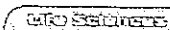
Approved by

Supot S.

Supot Salameh  
Section Head

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# ภาคผนวก ค-5

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ระดับเสียงในบริเวณการทำงาน



## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371911-1

Page 1 of 1

Sample Number 2279137-1  
Parameter Noise (Leq 8 hrs.)  
Location เฉลิม : MCL1  
Measurement Date Jul 04, 2022  
Measurement by Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:44 PM - 11:44 PM	84.8	106.3	75.2
11:44 PM - 12:44 AM	84.8	107.8	77.9
12:44 AM - 01:44 AM	85.0	105.4	78.5
01:44 AM - 02:44 AM	85.0	104.5	78.1
02:44 AM - 03:44 AM	84.4	102.6	78.6
03:44 AM - 04:44 AM	84.9	106.3	77.5
04:44 AM - 05:44 AM	86.2	107.2	79.0
05:44 AM - 06:44 AM	82.6	103.8	76.7

Leq Average 8 hrs. (dB(A))

84.8

Lmax (dB(A))

107.8

Standard (dB(A))

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดระดับเสียง  
ในการประกอบกิจการโรงงานเกี่ยวกับลักษณะแวดล้อมในการทำงาน พ.ศ. ๒๕๔๖



## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371912-1

Page 1 of 1

Sample Number 2279137-2  
Parameter Noise (Leq 8 hrs.)  
Location เฉลิม : MCL2  
Measurement Date Jul 04, 2022  
Measurement by Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:54 PM - 11:54 PM	83.3	98.9	77.5
11:54 PM - 12:54 AM	83.6	105.1	77.2
12:54 AM - 01:54 AM	83.0	103.1	76.6
01:54 AM - 02:54 AM	85.0	108.6	81.3
02:54 AM - 03:54 AM	85.2	100.7	81.1
03:54 AM - 04:54 AM	85.5	109.9	81.2
04:54 AM - 05:54 AM	86.0	110.9	81.3
05:54 AM - 06:54 AM	83.9	103.3	80.3

Leq Average 8 hrs. (dB(A))

84.6

Lmax (dB(A))

110.9

Standard (dB(A))

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดระดับเสียง  
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Technical Management

Sarany C.

Saranya Chalmthamrong  
Scientist (4)

Approved by

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Supot Salamteh  
Section Head

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Technical Management

Sarany C.

Saranya Chalmthamrong  
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Supot Salamteh  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371913-1

Page 1 of 1

Sample Number 2279137-3  
 Parameter Noise (Leq 8 hrs.)  
 Location เครื่องปั้นดินเผา : MCL1  
 Measurement Date Jul 04, 2022  
 Measurement by Aphiwat Turnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:44 PM - 11:44 PM	68.1	83.3	65.8
11:44 PM - 12:44 AM	70.0	82.7	66.1
12:44 AM - 01:44 AM	71.4	83.0	66.7
01:44 AM - 02:44 AM	69.7	79.5	66.8
02:44 AM - 03:44 AM	69.2	81.6	66.0
03:44 AM - 04:44 AM	70.6	84.2	66.5
04:44 AM - 05:44 AM	68.8	78.9	66.6
05:44 AM - 06:44 AM	69.4	80.3	66.3

Leq Average 8 hrs. (dB(A))

69.8

Lmax (dB(A))

84.2

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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Technical Management

Saranya C.

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Supot Salamteh  
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## Analysis / Test Report

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371914-1

Page 1 of 1

Sample Number 2279137-4  
 Parameter Noise (Leq 8 hrs.)  
 Location เครื่องปั้นดินเผา : MCL2  
 Measurement Date Jul 04, 2022  
 Measurement by Aphiwat Turnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:54 PM - 11:54 PM	73.4	87.0	69.7
11:54 PM - 12:54 AM	74.6	86.0	69.8
12:54 AM - 01:54 AM	75.2	88.3	69.5
01:54 AM - 02:54 AM	76.0	86.6	70.3
02:54 AM - 03:54 AM	73.8	83.8	69.0
03:54 AM - 04:54 AM	75.0	87.2	71.2
04:54 AM - 05:54 AM	74.6	86.8	69.4
05:54 AM - 06:54 AM	74.6	86.6	69.2

Leq Average 8 hrs. (dB(A))

74.7

Lmax (dB(A))

88.3

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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Technical Management

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Saranya Chalemtamrong  
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Supot Salamteh  
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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371915-1

Page 1 of 1

Sample Number 2279137-5  
Parameter Noise (Leq 8 hrs.)  
Location เครื่องคัดแยกขนาดชิ้นงาน : MCL1  
Measurement Date Jul 04, 2022  
Measurement by Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:41 PM - 12:41 AM	87.5	98.1	87.0
12:41 AM - 01:41 AM	87.5	98.7	87.0
01:41 AM - 02:41 AM	87.6	96.2	87.0
02:41 AM - 03:41 AM	87.3	99.0	86.8
03:41 AM - 04:41 AM	87.4	99.2	86.7
04:41 AM - 05:41 AM	87.2	98.6	86.7
05:41 AM - 06:41 AM	87.4	101.2	86.8
06:41 AM - 07:41 AM	87.8	100.6	87.1

Leq Average 8 hrs. (dB(A)) 87.5

Lmax (dB(A)) 101.2

Standard (dB(A)) 90 140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย  
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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371916-1

Page 1 of 1

Sample Number 2279137-6  
Parameter Noise (Leq 8 hrs.)  
Location เครื่องคัดแยกขนาดชิ้นงาน : MCL2  
Measurement Date Jul 04, 2022  
Measurement by Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:52 PM - 12:52 AM	87.5	96.7	77.5
12:52 AM - 01:52 AM	87.7	100.5	86.7
01:52 AM - 02:52 AM	88.7	97.3	87.7
02:52 AM - 03:52 AM	88.4	95.9	87.4
03:52 AM - 04:52 AM	88.1	97.2	86.7
04:52 AM - 05:52 AM	87.5	96.4	85.8
05:52 AM - 06:52 AM	87.1	98.0	84.8
06:52 AM - 07:52 AM	86.1	95.1	82.8

Leq Average 8 hrs. (dB(A)) 87.7

Lmax (dB(A)) 100.5

Standard (dB(A)) 90 140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย  
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Technical Management

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Saranya Chalemmthamrong  
Scientist (4)

Approved by

*Supt S.*

Supot Salamteh  
Section Head

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Saranya Chalemmthamrong  
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Approved by

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371918-1

Page 1 of 1

Sample Number	2279137-8
Parameter	Noise (Leq 8 hrs.)
Location	ศาลาเบญจกัณฐ์ : HT2
Measurement Date	Jul 04, 2022
Measurement by	Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:22 AM - 12:22 PM	84.5	91.3	79.6
12:22 PM - 01:22 PM	87.1	95.0	79.6
01:22 PM - 02:22 PM	86.3	95.7	80.2
02:22 PM - 03:22 PM	87.4	94.8	80.7
03:22 PM - 04:22 PM	83.9	93.6	80.5
04:22 PM - 05:22 PM	86.7	95.1	80.4
05:22 PM - 06:22 PM	85.8	95.4	80.4
06:22 PM - 07:22 PM	85.7	93.2	80.5

Leq Average 8 hrs. (dB(A))

86.1

Lmax (dB(A))

95.7

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279137

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371919-1

Page 1 of 1

Sample Number	2279137-9
Parameter	Noise (Leq 8 hrs.)
Location	ศาลาเบญจกัณฐ์ : HT3
Measurement Date	Jul 04, 2022
Measurement by	Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
04:32 PM - 05:32 PM	87.5	98.5	81.7
05:32 PM - 06:32 PM	88.0	101.3	82.5
06:32 PM - 07:32 PM	88.2	99.7	82.6
07:32 PM - 08:32 PM	87.6	98.9	82.0
08:32 PM - 09:32 PM	87.9	98.3	82.8
09:32 PM - 10:32 PM	87.9	98.4	82.9
10:32 PM - 11:32 PM	87.8	99.3	81.3
11:32 PM - 12:32 AM	87.2	98.3	82.1

Leq Average 8 hrs. (dB(A))

87.8

Lmax (dB(A))

101.3

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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Technical Management

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Saranya Chalemrithamrong

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Approved by

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Supot Salamteh

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Saranya Chalemrithamrong

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Supot Salamteh

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## Analysis / Test Report

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P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279184

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371868-1

Page 1 of 1

Sample Number 2279184-1  
Parameter Noise (Leq 8 hrs.)  
Location เสาพหลุม MCL4  
Measurement Date Jul 05, 2022  
Measurement by Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
06:06 PM - 07:06 PM	80.1	87.7	75.4
07:06 PM - 08:06 PM	79.8	86.7	75.2
08:06 PM - 09:06 PM	77.4	89.6	72.6
09:06 PM - 10:06 PM	78.6	87.7	74.2
10:06 PM - 11:06 PM	81.7	90.8	71.7
11:06 PM - 12:06 AM	81.3	95.9	70.3
12:06 AM - 01:06 AM	79.7	93.8	73.1
01:06 AM - 02:06 AM	81.0	92.0	73.2

Leq Average 8 hrs. (dB(A))

80.1

Lmax (dB(A))

95.9

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279184

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2371869-1

Page 1 of 1

Sample Number 2279184-2  
Parameter Noise (Leq 8 hrs.)  
Location เสาพหลุม MCL4  
Measurement Date Jul 06, 2022  
Measurement by Aphiwat Tumnoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:30 AM - 09:30 AM	79.8	94.4	72.8
09:30 AM - 10:30 AM	81.5	94.2	74.9
10:30 AM - 11:30 AM	82.3	97.6	75.1
11:30 AM - 12:30 PM	79.9	99.3	72.5
12:30 PM - 01:30 PM	78.5	87.6	72.5
01:30 PM - 02:30 PM	80.5	96.0	74.6
02:30 PM - 03:30 PM	82.0	94.8	72.6
03:30 PM - 04:30 PM	78.4	89.7	72.2

Leq Average 8 hrs. (dB(A))

80.6

Lmax (dB(A))

99.3

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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Technical Management

*Saranya C.*

Saranya Chalemtamrong  
Scientist (4)

Approved by

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Supot Salamtah  
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Scientist (4)

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Supot Salamtah  
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## Analysis / Test Report

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14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2294457

Date Received : Aug 08, 2022

Date Reported : Aug 11, 2022

Report Number: 2402643-1

Page 1 of 1

Sample Number 2294457-2  
Parameter Noise (Leq 8 hrs.)  
Location เสาปูนกับขังงาน : HT4  
Measurement Date Aug 08, 2022  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:29 AM - 10:29 AM	85.4	104.5	78.1
10:29 AM - 11:29 AM	86.2	100.4	80.2
11:29 AM - 12:29 PM	87.4	100.8	80.0
12:29 PM - 01:29 PM	86.6	102.3	79.8
01:29 PM - 02:29 PM	85.7	101.4	78.9
02:29 PM - 03:29 PM	84.3	99.1	77.5
03:29 PM - 04:29 PM	82.1	99.1	77.3
04:29 PM - 05:29 PM	79.5	94.1	75.2

Leq Average 8 hrs. (dB(A))

85.2

Lmax (dB(A))

104.5

Standard (dB(A))

90

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดระดับความดังเสียง

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O :

Project Name : Environmental Testing

Project Location :

Lot ID: 2295948

Date Received : Aug 08, 2022

Date Reported : Aug 11, 2022

Report Number: 2395688-1

Page 1 of 1

Sample Number 2295948-1  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณเคาน์เตอร์ชั้นงาน MCL4  
Measurement Date Aug 08, 2022  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:13 AM - 10:13 AM	87.0	90.9	86.0
10:13 AM - 11:13 AM	86.5	88.6	85.6
11:13 AM - 12:13 PM	87.0	89.6	86.0
12:13 PM - 01:13 PM	86.7	89.0	85.9
01:13 PM - 02:13 PM	87.3	91.3	86.4
02:13 PM - 03:13 PM	86.7	89.1	85.8
03:13 PM - 04:13 PM	86.8	89.4	86.0
04:13 PM - 05:13 PM	85.6	97.8	81.0

Leq Average 8 hrs. (dB(A))

86.7

Lmax (dB(A))

97.8

Standard (dB(A))

90

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดระดับความดังเสียง

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Technical Management

Saranya C.

Saranya Chalemtamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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Technical Management

Saranya C.

Saranya Chalemtamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118457

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458427-1

Page 1 of 1

Sample Number	22118457-2
Parameter	Noise (Leq 8 hrs.)
Location	เคหะชุมชน : MCL2
Measurement Date	Oct 03, 2022
Measurement by	Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:39 AM - 10:39 AM	87.1	107.8	80.5
10:39 AM - 11:39 AM	84.9	104.3	78.7
11:39 AM - 12:39 PM	84.0	107.0	78.5
12:39 PM - 01:39 PM	86.2	103.2	81.0
01:39 PM - 02:39 PM	85.9	107.1	79.7
02:39 PM - 03:39 PM	84.9	103.9	79.7
03:39 PM - 04:39 PM	85.3	107.0	79.1
04:39 PM - 05:39 PM	84.4	92.9	78.3

Leq Average 8 hrs. (dB(A))

85.6

Lmax (dB(A))

107.8

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118457

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458429-1

Page 1 of 1

Sample Number	22118457-4
Parameter	Noise (Leq 8 hrs.)
Location	เคหะชุมชน : MCL2
Measurement Date	Oct 03, 2022
Measurement by	Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:35 AM - 10:35 AM	75.7	89.5	72.6
10:35 AM - 11:35 AM	76.8	86.9	72.5
11:35 AM - 12:35 PM	74.5	85.5	72.8
12:35 PM - 01:35 PM	76.4	87.6	73.1
01:35 PM - 02:35 PM	75.4	88.9	72.8
02:35 PM - 03:35 PM	75.0	87.8	72.8
03:35 PM - 04:35 PM	75.8	88.5	72.9
04:35 PM - 05:35 PM	76.6	87.3	72.7

Leq Average 8 hrs. (dB(A))

75.8

Lmax (dB(A))

89.5

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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Technical Management

Saranya C.

Saranya Chalemmthamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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Technical Management

Saranya C.

Saranya Chalemmthamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118457

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458431-1

Page 1 of 1

Sample Number	22118457-6
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องคัดแยกขนาดชิ้นงาน : MCL2
Measurement Date	Oct 03, 2022
Measurement by	Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:31 AM - 10:31 AM	90.2	101.9	87.2
10:31 AM - 11:31 AM	90.1	102.0	87.1
11:31 AM - 12:31 PM	89.1	100.8	86.6
12:31 PM - 01:31 PM	89.7	106.0	86.5
01:31 PM - 02:31 PM	89.4	99.9	87.0
02:31 PM - 03:31 PM	88.1	103.2	85.9
03:31 PM - 04:31 PM	88.7	100.6	86.4
04:31 PM - 05:31 PM	88.1	93.4	86.4

Leq Average 8 hrs. (dB(A)) 89.2  
 Lmax (dB(A)) 106.0  
 Standard (dB(A)) 90  
 Reference Method : Based on ISO1996-1 and 1996-2  
 Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118457

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458433-1

Page 1 of 1

Sample Number	22118457-8
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องคัดแยกขนาดชิ้นงาน : HT2
Measurement Date	Oct 04, 2022
Measurement by	Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:36 AM - 09:36 AM	85.6	99.5	76.6
09:36 AM - 10:36 AM	86.4	99.9	77.0
10:36 AM - 11:36 AM	85.6	100.0	76.9
11:36 AM - 12:36 PM	86.8	100.6	76.9
12:36 PM - 01:36 PM	86.1	99.5	77.0
01:36 PM - 02:36 PM	86.9	100.8	77.0
02:36 PM - 03:36 PM	86.5	101.6	76.8
03:36 PM - 04:36 PM	86.1	100.0	77.0

Leq Average 8 hrs. (dB(A)) 86.4  
 Lmax (dB(A)) 101.6  
 Standard (dB(A)) 90  
 Reference Method : Based on ISO1996-1 and 1996-2  
 Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย  
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Technical Management

*Saranya C.*  
 Saranya Chalermtamrong  
 Scientist (4)

Approved by

*Supot S.*  
 Supot Salamteh  
 Section Head

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 Saranya Chalermtamrong  
 Scientist (4)

Approved by

*Supot S.*  
 Supot Salamteh  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22118476

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458013-1

Page 1 of 1

Sample Number	22118476-1
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องปั่นหมากพร้าว MCL4
Measurement Date	Oct 04, 2022
Measurement by	Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:03 PM - 09:03 PM	78.6	91.0	70.8
09:03 PM - 10:03 PM	80.6	89.4	73.8
10:03 PM - 11:03 PM	83.7	89.5	79.6
11:03 PM - 12:03 AM	83.1	94.9	80.4
12:03 AM - 01:03 AM	80.7	93.7	68.4
01:03 AM - 02:03 AM	79.7	93.3	70.8
02:03 AM - 03:03 AM	79.0	88.9	74.1
03:03 AM - 04:03 AM	78.7	90.5	77.1

Leq Average 8 hrs. (dB(A))

80.9

Lmax (dB(A))

94.9

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22118476

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458014-1

Page 1 of 1

Sample Number	22118476-2
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องปั่นหมากพร้าว MCL4
Measurement Date	Oct 04, 2022
Measurement by	Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:11 AM - 10:11 AM	76.8	86.3	69.2
10:11 AM - 11:11 AM	80.7	93.5	71.7
11:11 AM - 12:11 PM	79.9	90.3	67.0
12:11 PM - 01:11 PM	72.6	83.9	65.6
01:11 PM - 02:11 PM	79.3	91.3	71.2
02:11 PM - 03:11 PM	81.3	89.3	71.4
03:11 PM - 04:11 PM	82.6	95.2	68.3
04:11 PM - 05:11 PM	85.4	95.9	72.1

Leq Average 8 hrs. (dB(A))

81.1

Lmax (dB(A))

95.9

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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Technical Management

*Saratat*  
Saratat Mongkonjirawut  
Supervisor

Approved by

*Supot S.*  
Supot Salamatheh  
Section Head

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Saratat Mongkonjirawut  
Supervisor

Approved by

*Supot S.*  
Supot Salamatheh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22118476

Date Received : Oct 05, 2022

Date Reported : Oct 07, 2022

Report Number: 2458015-1

Page 1 of 1

Sample Number	22118476-3
Parameter	Noise (Leq 8 hrs.)
Location	เดาบนถนนชั้นงาน MCL4
Measurement Date	Oct 04, 2022
Measurement by	Phongsini Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:34 AM - 10:34 AM	87.6	89.9	86.4
10:34 AM - 11:34 AM	86.9	90.4	85.6
11:34 AM - 12:34 PM	86.1	88.9	84.8
12:34 PM - 01:34 PM	86.7	89.1	85.8
01:34 PM - 02:34 PM	88.5	93.5	86.7
02:34 PM - 03:34 PM	88.9	94.0	87.5
03:34 PM - 04:34 PM	89.0	94.0	87.5
04:34 PM - 05:34 PM	89.0	94.3	87.5
Leq Average 8 hrs. (dB(A))	88.0		
Lmax (dB(A))		94.3	
Standard (dB(A))	90	140	
Reference Method	: Based on ISO1996-1 and 1996-2		
Standard	: ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖		



## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22133798

Date Received : Nov 21, 2022

Date Reported : Nov 24, 2022

Report Number: 2501539-1

Page 1 of 1

Sample Number	22133798-1
Parameter	Noise (Leq 8 hrs.)
Location	เดาบนถนน : MCL1
Measurement Date	Nov 20, 2022
Measurement by	Artit Srisen

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:43 AM - 10:43 AM	86.8	105.4	82.1
10:43 AM - 11:43 AM	85.8	96.1	80.9
11:43 AM - 12:43 PM	85.6	98.8	80.8
12:43 PM - 01:43 PM	85.8	105.2	81.0
01:43 PM - 02:43 PM	85.4	101.8	80.8
02:43 PM - 03:43 PM	85.2	101.7	80.8
03:43 PM - 04:43 PM	89.5	112.4	81.7
04:43 PM - 05:43 PM	82.3	100.9	79.1
Leq Average 8 hrs. (dB(A))	86.2		
Lmax (dB(A))		112.4	
Standard (dB(A))	90	140	
Reference Method	: Based on ISO1996-1 and 1996-2		
Standard	: ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖		

Technical Management

Sararat Mongkonjirawut  
Supervisor

Approved by

Supot Salamteh  
Section Head

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Technical Management

Saranya Chalemthamrong  
Scientist (4)

Approved by

Supot Salamteh  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22133798

Date Received : Nov 21, 2022

Date Reported : Nov 24, 2022

Report Number: 2501540-1

Page 1 of 1

Sample Number	22133798-2
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องปั้นหม้อหอย : MCL1
Measurement Date	Nov 20, 2022
Measurement by	Artit Srisen

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:41 AM - 10:41 AM	73.1	83.9	70.3
10:41 AM - 11:41 AM	73.5	84.2	70.7
11:41 AM - 12:41 PM	72.4	90.4	69.9
12:41 PM - 01:41 PM	72.3	89.0	69.6
01:41 PM - 02:41 PM	74.6	88.0	70.9
02:41 PM - 03:41 PM	72.2	80.6	69.7
03:41 PM - 04:41 PM	73.2	84.7	70.1
04:41 PM - 05:41 PM	72.3	86.4	69.6

Leq Average 8 hrs. (dB(A)) 73.0  
 Lmax (dB(A)) 90.4  
 Standard (dB(A)) 90  
 Reference Method : Based on ISO1996-1 and 1996-2  
 Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัยในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖



## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22133798

Date Received : Nov 21, 2022

Date Reported : Nov 24, 2022

Report Number: 2501541-1

Page 1 of 1

Sample Number	22133798-3
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องตัดถนนขนาดชิ้นงาน : MCL1
Measurement Date	Nov 20, 2022
Measurement by	Artit Srisen

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:35 AM - 10:35 AM	89.9	101.2	86.0
10:35 AM - 11:35 AM	89.6	101.2	86.0
11:35 AM - 12:35 PM	88.7	101.1	85.7
12:35 PM - 01:35 PM	90.1	101.8	86.2
01:35 PM - 02:35 PM	90.0	99.6	85.9
02:35 PM - 03:35 PM	90.3	104.3	85.4
03:35 PM - 04:35 PM	90.8	102.9	85.8
04:35 PM - 05:35 PM	90.0	103.3	85.7

Leq Average 8 hrs. (dB(A)) 90.0  
 Lmax (dB(A)) 104.3  
 Standard (dB(A)) 90  
 Reference Method : Based on ISO1996-1 and 1996-2  
 Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัยในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖

Technical Management

Saranya C.

Saranya Chalemmthamrong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

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Technical Management

Saranya C.

Saranya Chalemmthamrong  
Scientist (4)

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Supot Salamteh  
Section Head

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O :

Project Name : Environmental Testing

Project Location :

Lot ID: 22134317

Date Received : Nov 21, 2022

Date Reported : Nov 24, 2022

Report Number: 2482321-1

Page 1 of 1

Sample Number	22134317-1
Parameter	Noise (Leq 8 hrs.)
Location	เคาน์เตอร์พนักงาน : HT4
Measurement Date	Nov 20, 2022
Measurement by	Artit Srisen

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:27 AM - 10:27 AM	87.0	103.0	81.9
10:27 AM - 11:27 AM	88.1	103.6	82.4
11:27 AM - 12:27 PM	88.8	104.3	85.9
12:27 PM - 01:27 PM	88.8	102.9	86.3
01:27 PM - 02:27 PM	88.3	101.6	86.2
02:27 PM - 03:27 PM	86.7	99.7	86.0
03:27 PM - 04:27 PM	87.7	96.1	86.0
04:27 PM - 05:27 PM	87.0	96.4	83.2

Leq Average 8 hrs. (dB(A)) 87.9  
 Lmax (dB(A)) 104.3  
 Standard (dB(A)) 90  
 Reference Method : Based on ISO1996-1 and 1996-2  
 Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22145220

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2514433-1

Page 1 of 1

Sample Number	22145220-1
Parameter	Noise (Leq 8 hrs.)
Location	เครื่องคัดแยกขนาดชิ้นงาน : MCL1
Measurement Date	Dec 02, 2022
Measurement by	Narupol Thongnuch

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
01:59 AM - 02:59 AM	86.9	101.2	84.7
02:59 AM - 03:59 AM	87.0	99.9	85.1
03:59 AM - 04:59 AM	87.0	98.3	85.1
04:59 AM - 05:59 AM	87.8	97.8	86.0
05:59 AM - 06:59 AM	87.2	98.1	85.9
06:59 AM - 07:59 AM	87.6	97.2	85.6
07:59 AM - 08:59 AM	87.5	101.1	85.4
08:59 AM - 09:59 AM	88.0	100.5	85.6

Leq Average 8 hrs. (dB(A)) 87.4  
 Lmax (dB(A)) 101.2  
 Standard (dB(A)) 90  
 Reference Method : Based on ISO1996-1 and 1996-2  
 Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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Technical Management

*Sarat*

Sarat Mongkonjirawut  
Supervisor

Approved by

*Supot S.*

Supot Salamteh  
Section Head

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Technical Management

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Sarat Mongkonjirawut  
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## Analysis / Test Report

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22145220

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2514434-1

Page 1 of 1

Sample Number	22145220-2
Parameter	Noise (Leq 8 hrs.)
Location	เคาน์เตอร์รับงาน : HT3
Measurement Date	Dec 02, 2022
Measurement by	Narupol Thongnuch

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
02:08 AM - 03:08 AM	88.5	98.1	84.7
03:08 AM - 04:08 AM	88.4	98.1	84.6
04:08 AM - 05:08 AM	88.3	98.1	84.5
05:08 AM - 06:08 AM	88.7	98.3	84.9
06:08 AM - 07:08 AM	89.1	98.3	85.9
07:08 AM - 08:08 AM	89.1	98.1	86.3
08:08 AM - 09:08 AM	89.5	98.2	86.4
09:08 AM - 10:08 AM	88.3	98.0	81.7

Leq Average 8 hrs. (dB(A))

88.8

Lmax (dB(A))

98.3

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

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Technical Management

Sararat Mongkonjirawut  
Supervisor

Approved by

Supot Salameh  
Section Head

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# ภาคผนวก ค-6

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ระดับความร้อนในบริเวณการทำงาน



## Analysis / Test Report

Client: Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279140

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2357237-1

Page 1 of 2

Sample Number	2279140-4				
Parameter	Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)				
Measurement Date	Jul 04, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 1 ชั้น 1 (พัก-นางสาว สุภัทรีใจงาน : คุณศักดิ์สมาน มอคลาโร แทน : เคาบรณ HT2)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เคาบรณปฏิบัติงาน : HT2	120	31.6	28.4	39.3	39.0
Average (WBGT)	31.6				
Guideline WBGT (°C)	34.0				

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supot S*  
Supot Salamteh  
Section Head

Approved by

*Wichan Ch*  
Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client: Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2279140

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2357237-1

Page 2 of 2

Sample Number	2279140-5				
Parameter	Heat Stress (Sampling Time : 11.15 AM - 01.15 PM)				
Measurement Date	Jul 04, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 1 ชั้น 1 (พัก-นางสาว สุภัทรีใจงาน : คุณศักดิ์สมาน มอคลาโร แทน : เคาบรณ HT3)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เคาบรณปฏิบัติงาน : HT3	120	29.3	27.4	33.8	33.0
Average (WBGT)	29.3				
Guideline WBGT (°C)	34.0				

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

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Supot Salamteh  
Section Head

Approved by

*Wichan Ch*  
Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

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14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279186

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2357301-1

Page 1 of 2

Page 1 of 2

Sample Number	2279186-1				
Parameter	Heat Stress (Sampling Time : 06.20 PM - 08.20 PM)				
Measurement Date	Jul 05, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 2 ชั้น (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : คุณคุณ พงษ์ สมก : ค่าคอม)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน้าอาคาร : MCL4	40	29.8	27.8	34.6	34.2
ห้องควบคุมอาคาร	80	21.9	20.3	25.7	25.7
Average (WBGT)		24.6			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supot S.*  
Supot Salamteh  
Section Head

Approved by

*Wichan Ch.*  
Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

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14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279186

Date Received : Jul 07, 2022

Date Reported : Jul 11, 2022

Report Number: 2357301-1

Page 2 of 2

Page 2

Sample Number	2279186-2				
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)				
Measurement Date	Jul 06, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 2 ชั้น (ค่า-นามสกุล ผู้ปฏิบัติงาน : คุณคุณ พงษ์ สมก : ค่าคอม)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
อาคารชั้นงาน : MCL4	40	29.8	27.8	34.3	34.1
office อาคารงาน	80	19.9	18.3	23.5	23.4
Average (WBGT)		23.2			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

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Supot Salamteh  
Section Head

Approved by

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Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2294463

Date Received : Sep 23, 2022

Date Reported : Sep 27, 2022

Report Number: 2391995-1

Page 1 of 2

Sample Number	2294463-1				
Parameter	Heat Stress (Sampling Time : 01.05 PM - 03.05 PM)				
Measurement Date	Sep 23, 2022				
Measurement by	Artit Srisen				
Location	ปฏิบัติงาน 2 ชั้นที่ (ห้อง-นางสาวกุล ปฏิบัติงาน : อุณหภูมิ ประสิทธิภาพ แขน : เครื่องมือ:MCL2)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน้าอาคาร : MCL2	20	28.4	26.6	32.5	32.4
หน้าควบคุมอาคาร : MCL2	100	20.7	19.3	23.8	23.7
Average (WBGT)		21.9			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

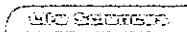
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Supot Salamteh  
Section Head

Approved by

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Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2294463

Date Received : Sep 23, 2022

Date Reported : Sep 27, 2022

Report Number: 2391995-1

Page 2 of 2

Sample Number	2294463-2				
Parameter	Heat Stress (Sampling Time : 01.00 PM - 03.00 PM)				
Measurement Date	Sep 23, 2022				
Measurement by	Artit Srisen				
Location	ปฏิบัติงาน 1 ชั้นที่ (ห้อง-นางสาวกุล ปฏิบัติงาน : อุณหภูมิ ประสิทธิภาพ แขน : เครื่องมือ:MCL2)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน้าอาคาร : HT4	120	28.4	26.6	32.5	32.3
Average (WBGT)		28.4			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

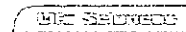
*Supot S*  
Supot Salamteh  
Section Head

Approved by

*Wichan Ch*  
Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118459

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2445736-1

Page 1 of 5

Sample Number	22118459-1				
Parameter	Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)				
Measurement Date	Dec 02, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 2 พื้นที่ (ผ้า-นวมสุกๆ ปฏิบัติงาน : ชุดสุกๆ หมดเวลาพัก : เตาต้ม MCL 2)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน้าเตาต้ม MCL2	30	28.8	26.2	34.7	34.3
หลังเตาต้ม MCL2	90	23.4	21.7	27.5	27.5
Average (WBGT)		24.8			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supot S*  
Supot Salamteh  
Section Head

Approved by

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Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118459

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2445736-1

Page 2 of 5

Sample Number	22118459-2				
Parameter	Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)				
Measurement Date	Dec 02, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 1 พื้นที่ (ผ้า-นวมสุกๆ ปฏิบัติงาน : ชุดสุกๆ หมดเวลาพัก : HT2)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน้าเตาต้มปฏิบัติงาน HT2	120	28.6	25.9	34.9	34.7
Average (WBGT)		28.6			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supot S*  
Supot Salamteh  
Section Head

Approved by

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Wichan Choonharat  
Assistant Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118459

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2445736-1

Page 3 of 5

Sample Number 22118459-3  
Parameter Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)  
Measurement Date Dec 02, 2022  
Measurement by Phongsiri Somkaew  
Location ปรังสีงาน 1 พื้นที่ (ผ้า-บานตาก ปรังสีงาน : อุณหภูมิ บริเวณ แห้ง : HT3)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เตาอบปรังสีงาน HT3	120	30.3	27.2	37.4	36.6
Average (WBGT)		30.3			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

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Supot Salamteh  
Section Head

Approved by

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Assistant Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118459

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2445736-1

Page 4 of 5

Sample Number 22118459-4  
Parameter Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)  
Measurement Date Dec 02, 2022  
Measurement by Phongsiri Somkaew  
Location ปรังสีงาน 1 พื้นที่ (ผ้า-บานตาก ปรังสีงาน : อุณหภูมิ บริเวณ แห้ง : HT4)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เตาอบปรังสีงาน HT4	120	28.9	26.3	35.1	34.9
Average (WBGT)		28.9			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

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Supot Salamteh  
Section Head

Approved by

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Wichan Choonharat  
Assistant Manager

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P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22118459

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2445736-1

Page 5 of 5

Sample Number	22118459-5				
Parameter	Heat Stress (Sampling Time : 07.00 PM - 09.00 PM)				
Measurement Date	Dec 02, 2022				
Measurement by	Phongsiri Somkaew				
Location	ปฏิบัติงาน 2 ชั้น (ห้องควบคุม อุปกรณ์ใช้งาน : ชุดเครื่องวัดอุณหภูมิแบบ : เครื่องวัด MCL4)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เครื่องวัด MCL4	30	28.9	27.2	32.7	32.6
ห้องควบคุมเครื่องวัด MCL4	90	19.7	18.7	22.1	21.9
Average (WBGT)		22.0			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

*Supot S.*

Supot Salamteh  
Section Head

Approved by

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Assistant Manager

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22118477

Date Received : Nov 21, 2022

Date Reported : Nov 24, 2022

Report Number: 2445783-1

Page 1 of 1

Sample Number	22118477-1				
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)				
Measurement Date	Nov 20, 2022				
Measurement by	Arbit Srisen				
Location	ปฏิบัติงาน 2 ชั้น (ห้องควบคุม อุปกรณ์ใช้งาน : ชุดเครื่องวัดอุณหภูมิแบบ : เครื่องวัด MCL4)				
Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณหน้าเครื่องวัด MCL 1	20	28.6	26.6	33.2	33.0
ห้องควบคุมเครื่องวัด MCL 1	100	19.2	18.4	21.0	20.4
Average (WBGT)		20.7			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
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Technical Management

*Supot S.*

Supot Salamteh  
Section Head

Approved by

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Wichan Choonharat  
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## Analysis / Test Report

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22145251

Date Received : Dec 03, 2022

Date Reported : Dec 08, 2022

Report Number: 2507529-1

Page 1 of 1

Sample Number 22145251-1

Parameter Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)

Measurement Date Dec 01, 2022

Measurement by Phongsiri Somkaew

Location ปฎิบัติงาน 2 ชั้นที่ (ห้อง-นวมยกุล) ผู้ปฏิบัติงาน : คุณไพฑรดา ทุยสูง แสง (ควบคุมปฏิบัติงาน)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
บริเวณอาคารปฏิบัติงาน MCL4	30	28.4	26.1	33.9	33.8
ห้องควบคุม/ห้องพักอาคารปฏิบัติงาน MCL4	90	19.9	18.5	23.1	22.7
Average (WBGT)		22.0			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

### Guideline:

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

Technical Management

  
Supot Salamteh  
Section Head

Approved by

  
Wichan Choonharat  
Assistant Manager

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# ภาคผนวก ค-7

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คุณภาพอากาศในสถานประกอบการ



## Analysis / Test Report



TESTING  
No.0009

**Lot ID: 2279187**

Date Received : Jul 07, 2022  
Date Reported : Aug 04, 2022  
Report Number : 2357302-1

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Page 1 of 22

Sample Number 2279187-1  
Sampled Date Jul 05, 2022  
Sample Description Air Quality  
Location หมู่บ้านหนอง : MCL4  
Personal Sampling ชุดทดสอบ ทุบ  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	06:15 PM - 08:15 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO <sub>2</sub> ) *	06:15 PM - 09:15 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	06:15 PM - 09:15 PM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : AnechaTansamai

### 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.

Approved by

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

**Lot ID: 2279187**

Date Received : Jul 07, 2022  
Date Reported : Aug 04, 2022  
Report Number : 2357302-1

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 213751  
Project Name : Environmental Testing  
Project Location :

Page 2 of 22

Sample Number 2279187-2  
Sampled Date Jul 06, 2022  
Sample Description Air Quality  
Location เครื่องสูบลมทราย : MCL4  
Personal Sampling ชุดทดสอบ คั้นช็อค  
Date Analysis Commenced Jul 08, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:00 AM - 11:00 AM	mg/m3	-	0.15	0.18	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO <sub>2</sub> ) *	09:00 AM - 12:00 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:00 AM - 12:00 PM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : AnechaTansamai

### Remark :

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*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279187

Date Received : Jul 07, 2022

Date Reported : Aug 04, 2022

Report Number : 2357302-1

Sample Number	2279187-3	Page 3 of 22						
Sampled Date	Jul 05, 2022							
Sample Description	Air Quality							
Location	พื่นาดม : MCL4							
Date Analysis Commenced	Jul 08, 2022							
Condition of Sample	Drawn into three filter papers placed in each cassette							
Barometric Pressure	755 mmHg							
Atmospheric Temperature	32.0 °C							

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	06:15 PM - 09:15 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	06:15 PM - 08:15 PM	mg/m <sup>3</sup>	-	0.15	0.41	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	06:15 PM - 09:15 PM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : AnechaTansamai

### Remark :

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Saranya Chalerthamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 2279187

Date Received : Jul 07, 2022

Date Reported : Aug 04, 2022

Report Number : 2357302-1

Sample Number	2279187-4	Page 4 of 22						
Sampled Date	Jul 06, 2022							
Sample Description	Air Quality							
Location	เครื่องจักรแบบพกพา : MCL4							
Date Analysis Commenced	Jul 08, 2022							
Condition of Sample	Drawn into three filter papers placed in each cassette							
Barometric Pressure	755 mmHg							
Atmospheric Temperature	32.0 °C							

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	09:00 AM - 12:00 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:00 AM - 11:00 AM	mg/m <sup>3</sup>	-	0.15	0.32	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:00 AM - 12:00 PM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : AnechaTansamai

### Remark :

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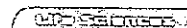
Approved by

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2294467

Date Received : Aug 08, 2022  
Date Reported : Sep 01, 2022  
Report Number : 2392003-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number 2294467-2  
Sampled Date Aug 08, 2022  
Sample Description Air Quality  
Location หน้าเตาหลอม : MCL2  
Personal Sampling ชุดตัวอย่าง หอดำรง  
Date Analysis Commenced Aug 09, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	0.20	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	10:00 AM - 01:00 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	10:00 AM - 12:00 PM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

### Remark :

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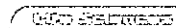
Approved by

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2294467

Date Received : Aug 08, 2022  
Date Reported : Sep 01, 2022  
Report Number : 2392003-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number 2294467-4  
Sampled Date Aug 08, 2022  
Sample Description Air Quality  
Location เครื่องปั้นแบบทราย : MCL2  
Personal Sampling ชุดตัวอย่าง หอดำรง  
Date Analysis Commenced Aug 09, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	10:05 AM - 12:05 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	10:05 AM - 01:05 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	10:05 AM - 12:05 PM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

### Remark :

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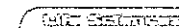
Approved by

*Saranya C.*

Saranya Chalerthamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :



TESTING  
No.0009

Lot ID: 2294467  
Date Received : Aug 08, 2022  
Date Reported : Sep 01, 2022  
Report Number : 2392003-1

Page 3 of 8

Sample Number 2294467-6  
Sampled Date Aug 08, 2022  
Sample Description Air Quality  
Location เครื่องปรับอากาศ : MCL2  
Personal Sampling อุปกรณ์แบบมือ  
Date Analysis Commenced Aug 09, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:45 AM - 11:45 AM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:45 AM - 12:45 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:45 AM - 11:45 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).  
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)  
OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

### Remark :

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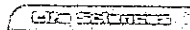
Approved by

*Saranya C.*

Saranya Chalermthamrong  
Scientist (4)

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## Analysis / Test Report

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :



TESTING  
No.0009

Lot ID: 2294467  
Date Received : Aug 08, 2022  
Date Reported : Sep 01, 2022  
Report Number : 2392003-1

Page 4 of 8

Sample Number 2294467-8  
Sampled Date Aug 08, 2022  
Sample Description Air Quality  
Location เครื่องปรับอากาศ : MCL2  
Date Analysis Commenced Aug 09, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO2) *	10:00 AM - 01:00 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	1.19	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	10:00 AM - 12:00 PM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

### Remark :

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Approved by

*Saranya C.*

Saranya Chalermthamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2294467

Date Received : Aug 08, 2022

Date Reported : Sep 01, 2022

Report Number : 2392003-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number 2294467-10  
Sampled Date Aug 08, 2022  
Sample Description Air Quality  
Location เครื่องปั่นแบบพกพา : MCL2  
Date Analysis Commenced Aug 09, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Page 5 of 8

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	10:05 AM - 01:05 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	10:05 AM - 12:05 PM	mg/m <sup>3</sup>	-	0.15	0.80	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	10:05 AM - 12:05 PM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

### Remark :

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Approved by

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 2294467

Date Received : Aug 08, 2022

Date Reported : Sep 01, 2022

Report Number : 2392003-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number 2294467-12  
Sampled Date Aug 08, 2022  
Sample Description Air Quality  
Location เครื่องคิดแบบพกพา : MCL2  
Date Analysis Commenced Aug 09, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 30.0 °C

Page 6 of 8

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	09:45 AM - 12:45 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:45 AM - 11:45 AM	mg/m <sup>3</sup>	-	0.15	0.49	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:45 AM - 11:45 AM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

### Remark :

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Approved by

*Saranya C.*

Saranya Chalermtamrong  
Scientist (4)

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## Analysis / Test Report



TESTING  
No.0009

**Lot ID: 2299415**

Date Received : Aug 20, 2022

Date Reported : Sep 13, 2022

Report Number : 2403104-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number	2299415-1	Page 1 of 6							
Sampled Date	Aug 20, 2022								
Sample Description	Air Quality								
Location	หน้าเตาเผา : MCL1								
Personal Sampling	ชุดอุปกรณ์ หน้าเตาเผา								
Date Analysis Commenced	Aug 22, 2022								
Condition of Sample	Drawn into three filter papers placed in each cassette								
Barometric Pressure	760 mmHg								
Atmospheric Temperature	31.0 °C								

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:00 AM - 11:00 AM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:00 AM - 12:00 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:00 AM - 11:00 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

### Remark :

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Approved by

*Savitree N.*

Savitree Nisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

**Lot ID: 2299415**

Date Received : Aug 20, 2022

Date Reported : Sep 13, 2022

Report Number : 2403104-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number	2299415-2	Page 2 of 6							
Sampled Date	Aug 20, 2022								
Sample Description	Air Quality								
Location	เครื่องปั้นแบบทราย : MCL1								
Personal Sampling	ชุดอุปกรณ์ หน้าเตาเผา								
Date Analysis Commenced	Aug 22, 2022								
Condition of Sample	Drawn into three filter papers placed in each cassette								
Barometric Pressure	760 mmHg								
Atmospheric Temperature	31.0 °C								

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	08:55 AM - 10:55 AM	mg/m3	-	0.15	0.38	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	08:55 AM - 11:55 AM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	08:55 AM - 10:55 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

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Approved by

*Savitree N.*

Savitree Nisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2299415

Date Received : Aug 20, 2022

Date Reported : Sep 13, 2022

Report Number : 2403104-1

Page 3 of 6

Sample Number 2299415-3  
Sampled Date Aug 20, 2022  
Sample Description Air Quality  
Location เครื่องคัดแยกอากาศ : MCL1  
Personal Sampling อุปกรณ์สุ่มตัวอย่าง  
Date Analysis Commenced Aug 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 760 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	08:50 AM - 10:50 AM	mg/m3	-	0.15	0.52	5	Based on NIOSH (1998), D600	OSHA	Bangkok
Silica (SiO2) *	08:50 AM - 11:50 AM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	08:50 AM - 10:50 AM	mg/m3	-	0.002	0.004	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

### Remark :

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Savitree Nisangiam  
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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 2299415

Date Received : Aug 20, 2022

Date Reported : Sep 13, 2022

Report Number : 2403104-1

Page 4 of 6

Sample Number 2299415-4  
Sampled Date Aug 20, 2022  
Sample Description Air Quality  
Location เครื่องคัดแยกอากาศ : MCL1  
Date Analysis Commenced Aug 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 760 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO2) *	08:58 AM - 11:58 AM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	08:58 AM - 10:58 AM	mg/m3	-	0.15	0.81	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	08:58 AM - 10:58 AM	mg/m3	-	0.002	0.008	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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Sampled By : Phongsiri Somkaew

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2299415  
Date Received : Aug 20, 2022  
Date Reported : Sep 13, 2022  
Report Number : 2403104-1

Page 5 of 6

Sample Number 2299415-5  
Sampled Date Aug 20, 2022  
Sample Description Air Quality  
Location เครื่องสูบลมแบบพกพา : MCL1  
Date Analysis Commenced Aug 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 760 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	08:54 AM - 11:54 AM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	08:54 AM - 10:54 AM	mg/m <sup>3</sup>	-	0.15	0.90	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	08:54 AM - 10:54 AM	mg/m <sup>3</sup>	-	0.002	0.005	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

**Guideline :**  
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OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 2299415  
Date Received : Aug 20, 2022  
Date Reported : Sep 13, 2022  
Report Number : 2403104-1

Page 6 of 6

Sample Number 2299415-6  
Sampled Date Aug 20, 2022  
Sample Description Air Quality  
Location เครื่องสูบลมแบบพกพา : MCL1  
Date Analysis Commenced Aug 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 760 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	08:49 AM - 11:49 AM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	08:49 AM - 10:49 AM	mg/m <sup>3</sup>	-	0.15	2.62	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	08:49 AM - 10:49 AM	mg/m <sup>3</sup>	-	0.002	0.004	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 22118464

Date Received : Oct 05, 2022

Date Reported : Oct 31, 2022

Report Number : 2445774-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number 22118464-2  
Sampled Date Oct 03, 2022  
Sample Description Air Quality  
Location หน้าเตาหลอม : MCL2  
Personal Sampling ชุดทดสอบฝุ่น ค่าหายใจ (Respirable dust)  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:50 AM - 11:50 AM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:50 AM - 12:50 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:50 AM - 11:50 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

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Savitree Noisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 22118464

Date Received : Oct 05, 2022

Date Reported : Oct 31, 2022

Report Number : 2445774-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Sample Number 22118464-4  
Sampled Date Oct 03, 2022  
Sample Description Air Quality  
Location เครื่องขึ้นแบบทราย : MCL2  
Personal Sampling ชุดทดสอบฝุ่น ค่าหายใจ (Respirable dust)  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	10:00 AM - 01:00 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	10:00 AM - 12:00 PM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22118464  
Date Received : Oct 05, 2022  
Date Reported : Oct 31, 2022  
Report Number : 2445774-1

Sample Number 22118464-6  
Sampled Date Oct 03, 2022  
Sample Description Air Quality  
Location เครื่องปรับอากาศ : MCL2  
Personal Sampling ฝุ่นละอองที่หายใจได้ (Respirable dust)  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 30.0 °C

Page 3 of 9

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	01:30 PM - 03:30 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	01:30 PM - 04:30 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	01:30 PM - 03:30 PM	mg/m3	-	0.002	0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

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Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22118464  
Date Received : Oct 05, 2022  
Date Reported : Oct 31, 2022  
Report Number : 2445774-1

Sample Number 22118464-8  
Sampled Date Oct 03, 2022  
Sample Description Air Quality  
Location เครื่องปรับอากาศ : MCL2  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Page 4 of 9

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO2) *	09:50 AM - 12:50 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:50 AM - 11:50 AM	mg/m3	-	0.15	1.45	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:50 AM - 11:50 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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Sampled By : Phongsiri Somkaew

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22118464  
Date Received : Oct 05, 2022  
Date Reported : Oct 31, 2022  
Report Number : 2445774-1

Page 5 of 9

Sample Number	22118464-10
Sampled Date	Oct 03, 2022
Sample Description	Air Quality
Location	เครื่องปรับอากาศ : MCL2
Date Analysis Commenced	Oct 06, 2022
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	10:00 AM - 01:00 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	10:00 AM - 12:00 PM	mg/m <sup>3</sup>	-	0.15	0.23	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	10:00 AM - 12:00 PM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22118464  
Date Received : Oct 05, 2022  
Date Reported : Oct 31, 2022  
Report Number : 2445774-1

Page 6 of 9

Sample Number	22118464-12
Sampled Date	Oct 03, 2022
Sample Description	Air Quality
Location	เครื่องปรับอากาศ : MCL2
Date Analysis Commenced	Oct 06, 2022
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	01:30 PM - 04:30 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	01:30 PM - 03:30 PM	mg/m <sup>3</sup>	-	0.15	1.36	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	01:30 PM - 03:30 PM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

**Guideline :**  
ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).  
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)  
OSHA : Occupational Safety and Health Administration  
Sampled By : Phongsiri Somkaew

**Remark :**

- LOD : Limit of Detection
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Approved by

*Sawitree N.*

Sawitree Nisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 22118479

Date Received : Oct 05, 2022

Date Reported : Oct 31, 2022

Report Number : 2445786-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Sample Number 22118479-1  
Sampled Date Oct 04, 2022  
Sample Description Air Quality  
Location หน้าเหมือง : MCL4  
Personal Sampling อุปกรณ์วัดฝุ่น (Respirable dust)  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette.  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Page 1 of 22

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:13 AM - 11:13 AM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	07:30 PM - 10:30 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:13 AM - 11:13 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

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Approved by

*Sawitree N.*

Sawitree Noisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 22118479

Date Received : Oct 05, 2022

Date Reported : Oct 31, 2022

Report Number : 2445786-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Sample Number 22118479-2  
Sampled Date Oct 04, 2022  
Sample Description Air Quality  
Location เครื่องปั่นแบบทราย : MCL4  
Personal Sampling อุปกรณ์วัดฝุ่น (Respirable dust)  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette.  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Page 2 of 22

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:00 AM - 11:00 AM	mg/m3	-	0.15	0.31	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:00 AM - 12:00 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:00 AM - 11:00 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

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*Sawitree N.*

Sawitree Noisangiam  
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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22118479

Date Received : Oct 05, 2022

Date Reported : Oct 31, 2022

Report Number : 2445786-1

Page 3 of 22

Sample Number 22118479-3  
Sampled Date Oct 04, 2022  
Sample Description Air Quality  
Location หมู่บ้านหนองทราย : MCL4  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette.  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	07:30 PM - 10:30 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	07:30 PM - 09:30 PM	mg/m <sup>3</sup>	-	0.15	0.18	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	07:30 PM - 09:30 PM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

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Approved by

*Savitree N.*

Savitree Noisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkhai, Saraburi Thailand 18230

P/O : 213751

Project Name : Environmental Testing

Project Location :

Lot ID: 22118479

Date Received : Oct 05, 2022

Date Reported : Oct 31, 2022

Report Number : 2445786-1

Page 4 of 22

Sample Number 22118479-4  
Sampled Date Oct 04, 2022  
Sample Description Air Quality  
Location หมู่บ้านหนองทราย : MCL4  
Date Analysis Commenced Oct 06, 2022  
Condition of Sample Drawn into three filter papers placed in plastic cassette.  
Barometric Pressure 756 mmHg  
Atmospheric Temperature 29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	09:00 AM - 12:00 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:00 AM - 11:00 AM	mg/m <sup>3</sup>	-	0.15	0.72	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:00 AM - 11:00 AM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration

Sampled By : Phongsiri Somkaew

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Approved by

*Savitree N.*

Savitree Noisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22133799  
Date Received : Nov 21, 2022  
Date Reported : Dec 14, 2022  
Report Number : 2481209-1

Sample Number 22133799-1  
Sampled Date Nov 20, 2022  
Sample Description Air Quality  
Location หมู่บ้านหนอง : MCL1  
Personal Sampling ชุดอุปกรณ์ ตรวจวัด  
Date Analysis Commenced Nov 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:57 AM - 11:57 AM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:57 AM - 12:57 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:57 AM - 11:57 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

**Guideline :**  
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MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)  
OSHA : Occupational Safety and Health Administration  
Sampled By : Artit Srisen

Remark :  
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Approved by

*Sawitree N.*

Sawitree Nisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22133799  
Date Received : Nov 21, 2022  
Date Reported : Dec 14, 2022  
Report Number : 2481209-1

Sample Number 22133799-2  
Sampled Date Nov 20, 2022  
Sample Description Air Quality  
Location เครื่องสูบลม : MCL1  
Personal Sampling ชุดอุปกรณ์ ตรวจวัด  
Date Analysis Commenced Nov 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:48 AM - 11:48 AM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:48 AM - 12:48 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:48 AM - 11:48 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

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OSHA : Occupational Safety and Health Administration  
Sampled By : Artit Srisen

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Sawitree Nisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 22133799

Date Received : Nov 21, 2022

Date Reported : Dec 14, 2022

Report Number : 2481209-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Page 3 of 7

Sample Number	22133799-3
Sampled Date	Nov 20, 2022
Sample Description	Air Quality
Location	เครื่องคัดแยกอากาศ : MCL1
Personal Sampling	อุปกรณ์เก็บตัวอย่าง
Date Analysis Commenced	Nov 22, 2022
Condition of Sample	Drawn into three filter papers placed in each cassette
Barometric Pressure	755 mmHg
Atmospheric Temperature	31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Respirable Dust	09:33 AM - 11:33 AM	mg/m3	-	0.15	0.84	5	Based on NIOSH (1998), 0600	OSHA	Bangkok
Silica (SiO2) *	09:33 AM - 12:33 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
<b>Metals Testing</b>									
Chromium *	09:33 AM - 11:33 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Arjit Srisen

### Remark :

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Sawitree Nisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Lot ID: 22133799

Date Received : Nov 21, 2022

Date Reported : Dec 14, 2022

Report Number : 2481209-1

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Page 4 of 7

Sample Number	22133799-4
Sampled Date	Nov 20, 2022
Sample Description	Air Quality
Location	เครื่องคัดแยก : MCL1
Date Analysis Commenced	Nov 22, 2022
Condition of Sample	Drawn into three filter papers placed in each cassette
Barometric Pressure	755 mmHg
Atmospheric Temperature	31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO2) *	09:55 AM - 12:55 PM	mg/m3	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:55 AM - 11:55 AM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:55 AM - 11:55 AM	mg/m3	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

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OSHA : Occupational Safety and Health Administration

Sampled By : Arjit Srisen

### Remark :

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Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22133799

Date Received : Nov 21, 2022

Date Reported : Dec 14, 2022

Report Number : 2481209-1

Page 5 of 7

Sample Number 22133799-5  
Sampled Date Nov 20, 2022  
Sample Description Air Quality  
Location เครื่องปั่นแบบพกพา : MCL1  
Date Analysis Commenced Nov 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	09:46 AM - 12:46 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:46 AM - 11:46 AM	mg/m <sup>3</sup>	-	0.15	<0.15	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:46 AM - 11:46 AM	mg/m <sup>3</sup>	-	0.002	<0.002	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Artit Srisen

### 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.

Approved by

*Savitree N.*

Savitree Noisangiam  
Manager

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## Analysis / Test Report



TESTING  
No.0009

Client : Magotteaux Co., Ltd.

14 Moo 3, Suwannasom Rd., Bualoy, Nongkae, Saraburi Thailand 18230

P/O : 353624

Project Name : Environmental Testing

Project Location :

Lot ID: 22133799

Date Received : Nov 21, 2022

Date Reported : Dec 14, 2022

Report Number : 2481209-1

Page 6 of 7

Sample Number 22133799-6  
Sampled Date Nov 20, 2022  
Sample Description Air Quality  
Location เครื่องคัดแยกขนาดชิ้นงาน : MCL1  
Date Analysis Commenced Nov 22, 2022  
Condition of Sample Drawn into three filter papers placed in each cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Silica (SiO <sub>2</sub> ) *	09:35 AM - 12:35 PM	mg/m <sup>3</sup>	-	0.020	<0.020	0.025 (R)	NIOSH (1994), 7601	MOL	Bangkok
Total dust	09:35 AM - 11:35 AM	mg/m <sup>3</sup>	-	0.15	2.60	15	Based on NIOSH (1994), 0501	OSHA	Bangkok
<b>Metals Testing</b>									
Chromium *	09:35 AM - 11:35 AM	mg/m <sup>3</sup>	-	0.002	0.004	0.5	NIOSH (2003), 7301	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

OSHA : Occupational Safety and Health Administration

Sampled By : Artit Srisen

### Remark :

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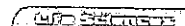
Approved by

*Savitree N.*

Savitree Noisangiam  
Manager

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## Analysis / Test Report

TESTING  
No.0009

Client : Magotteaux Co., Ltd.  
14 Moo 3, Suwannasorn Rd., Bualoy, Nongkhai, Saraburi Thailand 18230  
P/O : 353624  
Project Name : Environmental Testing  
Project Location :

Lot ID: 22133799  
Date Received : Nov 21, 2022  
Date Reported : Dec 14, 2022  
Report Number : 2481209-1

Page 7 of 7

Sample Number 22133799-9  
Sampled Date Nov 20, 2022  
Sample Description Air Quality  
Location หมู่ 3 ถนนสาย 300 : MCL1  
Date Analysis Commenced Nov 22, 2022  
Condition of Sample Drawn into one filter paper placed in plastic cassette  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Metals Testing</b>									
Aluminium (Inhalable Dust) *	10:00 AM - 12:00 PM	mg/m3	-	0.02	<0.02	15	NIOSH (2003), 7301	MOL	Bangkok
Iron *	10:00 AM - 12:00 PM	mg/m3	-	0.002	<0.002	No Standard	NIOSH (2003), 7301	-	Bangkok
Lead *	10:00 AM - 12:00 PM	mg/m3	-	0.002	<0.002	0.05	NIOSH (2003), 7301	MOL	Bangkok
Manganese *	10:00 AM - 12:00 PM	mg/m3	-	0.001	<0.001	0.1(1)	NIOSH (2003), 7301	ACGIH	Bangkok
Zinc (Inhalable dust) *	10:00 AM - 12:00 PM	mg/m3	-	0.001	<0.001	No Standard	NIOSH (2003), 7301	-	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2020).

MDL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

Note : (1)Guideline for Metal and Inorganic compounds as Manganese (2012).

Sampled By : Ardit Srisen

### 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.

Approved by

*Sawitree N.*

Sawitree Nisangiam  
Manager

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# ภาคผนวก ง

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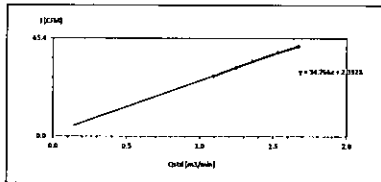
FROM THE EDITORIAL BOARD / 319

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## High Volume Air Sampler Calibration Worksheet

Project Site:	Magnetron Ltd.	Environmental Pressure (mm Hg):	754
Calibration Location:	4649993 (1)	Temperature (°C):	16
Calibration Date:	1-4-22	High Volume (H):	BAK F50163
	7.0 (0.722) H005 F50163	High Volume Model:	TS-1000
Calibration ID:	BAK F5016	High Volume S/N:	4106
Calibration Model:	TS-5016A	Calibration Slope:	2.0442
Calibration S/N:	2.581	Calibration Intercept:	-6.6708

Test No.	Drift (1/2 inch)	Q <sub>u</sub> (lb/2in)	1/G (1/2in)	Linear Regression
1	3.2	1,093.31	48	Slope: 213.3068 Intercept: 2,198.28 Correlation Coefficient: 0.9999
2	4.2	1,238.3	66	
3	5.8	1,279.5	58	
4	6.4	1,231.1	56	
5	7.6	1,665.2	68	



Calibrated by \_\_\_\_\_  
( Mr./of National Postage )  
Field Scientist (A)

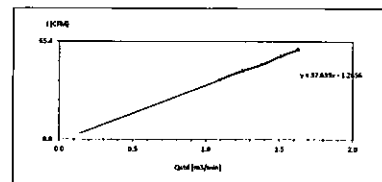
Approved by: \_\_\_\_\_  
(Mr. Klipping Investigator)  
FBI Field Coordinator or Supervisor ( )



## High Volume Air Sampler Calibration Worksheet

Project Site:	Maplehurst, GA	Barometric Pressure (mm Hg):	714
Calibrator Location:	ShyShane (AZ)	Temperature (°C):	16
Calibrate Date:	1-Feb-23	High Volume (L):	PKS-53066
Calibrator Serial No.:	1707222 ABC-VSR344	High Volume Model:	VTS-500PE
Calibrator ID#:	PKS-530624	High Volume S/N:	0156
Calibrator Model:	VTS-50228A	Calibrator Slope:	1.06472
Calibrator S/N:	2581	Calibrator Intercept:	-8.62592

Test No.	Delta H/D (in/s)	Q <sub>net</sub> (m <sup>2</sup> /min)	t:Chart (°F)	Linear Regression
1	3.2	1.0933	48	Slope: 17.5774
2	4.2	1.2483	48	Intercept: -1.2656
3	5.2	1.3853	54	Correlation Coefficient: 0.9979
4	6.2	1.5104	56	
5	7.2	1.6235	60	



Cultured by \_\_\_\_\_  
[ Mr./Miss/Mrs/Ms Part name ]  
Field Number(s) \_\_\_\_\_

Approved by: \_\_\_\_\_  
(Mr. Hopping (unit 1800))  
Executive Field Coordinator Scientist (I)



താഴെപ്പറയുന്നവർക്ക് വിധേയമാകണം / ൧൭൭൭

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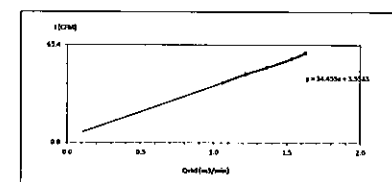
2



## High Volume Air Sampler Calibration Worksheet

Project Site :	Miguelito Co. Ltd.	Barometric Pressure (mm Hg) :	756
Calibrate Location :	San Jose (A3)	Temperature (°C) :	16
Calibrate Date :	1-Jul-22	High Volume ID :	TE53-P0179
Calibrated against H <sub>2</sub> O :	C61-0722-400X-P0270	High Volume Model :	TE-5300K
Calibrator ID :	ROK-P054-21	High Volume S/N :	4798
Calibrator Model :	TE-53-00A	Calibration Slope :	1.04502
Calibrator S/N :	3586	Calibration Intercept :	-0.00032

Test No.	Potential (mV)	Time (min/hrs)	Chart (cm)	Linear Regression
1	1.8	1.0145	49	Slope: 34.4555
2	1.8	1.2149	16	Intercept: 3.5811
3	1.8	1.5144	59	Correlation Coefficient: 0.9999
4	6.4	1.3147	58	
5	7.7	1.4155	54	



Calculated by \_\_\_\_\_  
(Mr. Lawrence F. Fitts)

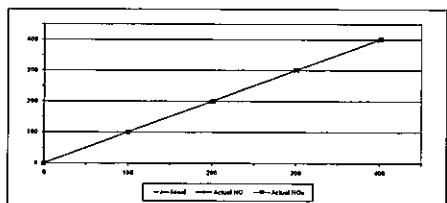
Approved by: \_\_\_\_\_  
[Mr. Neppeng Josephson]  
Executive Field Coordinator and Supervisor (11)







Point	CALCULATION RESULTS							
	Model	Actual MD	Error MD	%Error MD	Actual WOX	Error WOX	%Error WOX	
ZERO	0.00	0.05	0.05	0.10	0.10	0.10	5.10	
1	100.00	\$9.50	-6.50	-5.50	57.50	0.20	0.20	
2	300.00	184.00	-1.70	-0.85	261.60	1.60	0.60	
3	300.00	298.10	-1.90	-0.63	301.10	1.10	0.37	
4	400.00	398.20	-1.80	-0.45	421.80	1.80	0.40	
	AVERAGE (%)			-0.48			0.37	



Collected By  
  
(Mr. Howard Nelson)  
Field Environmental Scientist (2)

Approved By

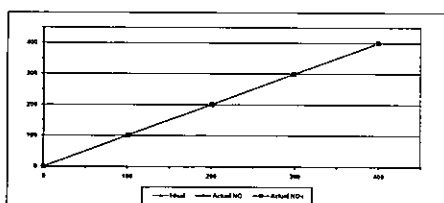



(Mr. Suresh Jitendra)  
Assistant General Manager

ALS Laboratory Group  
FORM NO.: F-15-004 REVISION NO.: 1 (EFFECT DATE: 02/04/01)




Point	CALIBRATION RESULTS							
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx	
CEPO	0.00	0.10	0.10	0.10	0.10	0.10	0.10	
1	100.00	99.80	-0.40	-0.40	100.00	0.00	0.00	
2	200.00	199.70	-0.30	-0.15	201.30	1.30	0.65	
3	300.00	299.50	-0.50	-0.16	298.30	-1.70	-0.57	
4	400.00	398.70	-1.30	-0.33	399.00	-1.00	-0.25	
	IMPROVE (%)							



Collected by  
  
(Mr. James S. Nelson)  
Field Geologist, National Park Service

Approved By

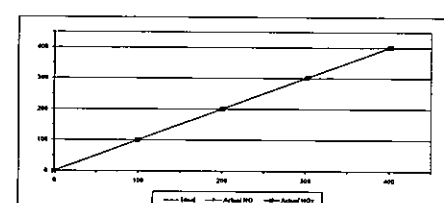



( Mr. Timothy J. Alward )

AS (Military Group)




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	99.10	-0.90	-0.90
2	200.00	198.30	-1.70	-0.85	201.50	1.50	0.75
3	300.00	299.30	-0.70	-0.23	302.20	2.20	0.73
4	400.00	398.00	-2.00	-0.50	401.70	1.70	0.42



Collected By  
  
(McAfee Sales)

Approved By



(Mr. E. J. Smith, Director)

ALB Laboratory Code \_\_\_\_\_  
FORM NO.: 8 06-058 REVISION NO.: 1 ISSUE DATE: 03/2000



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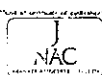
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Sample No.	Sample Name	Age	Estimated Age
1	1.0	1.0	1.0
2	2.0	2.0	2.0
3	3.0	3.0	3.0
4	4.0	4.0	4.0
5	5.0	5.0	5.0
6	6.0	6.0	6.0
7	7.0	7.0	7.0
8	8.0	8.0	8.0
9	9.0	9.0	9.0
10	10.0	10.0	10.0
11	11.0	11.0	11.0
12	12.0	12.0	12.0
13	13.0	13.0	13.0
14	14.0	14.0	14.0
15	15.0	15.0	15.0
16	16.0	16.0	16.0
17	17.0	17.0	17.0
18	18.0	18.0	18.0
19	19.0	19.0	19.0
20	20.0	20.0	20.0
21	21.0	21.0	21.0
22	22.0	22.0	22.0
23	23.0	23.0	23.0
24	24.0	24.0	24.0
25	25.0	25.0	25.0
26	26.0	26.0	26.0
27	27.0	27.0	27.0
28	28.0	28.0	28.0
29	29.0	29.0	29.0
30	30.0	30.0	30.0
31	31.0	31.0	31.0
32	32.0	32.0	32.0
33	33.0	33.0	33.0
34	34.0	34.0	34.0
35	35.0	35.0	35.0
36	36.0	36.0	36.0
37	37.0	37.0	37.0
38	38.0	38.0	38.0
39	39.0	39.0	39.0
40	40.0	40.0	40.0
41	41.0	41.0	41.0
42	42.0	42.0	42.0
43	43.0	43.0	43.0
44	44.0	44.0	44.0
45	45.0	45.0	45.0
46	46.0	46.0	46.0
47	47.0	47.0	47.0
48	48.0	48.0	48.0
49	49.0	49.0	49.0
50	50.0	50.0	50.0
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61	61.0	61.0	61.0
62	62.0	62.0	62.0
63	63.0	63.0	63.0
64	64.0	64.0	64.0
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66	66.0	66.0	66.0
67	67.0	67.0	67.0
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69	69.0	69.0	69.0
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93	93.0	93.0	93.0
94	94.0	94.0	94.0
95	95.0	95.0	95.0
96	96.0	96.0	96.0
97	97.0	97.0	97.0
98	98.0	98.0	98.0
99	99.0	99.0	99.0
100	100.0	100.0	100.0

The interest expense was 10.4 million, compared to 10.2 million in 2014. The effective tax rate was 21.4%, compared to 21.1% in 2014.

Fig.	Surface	Material used	Initial angle	Material used	Equilibrium angle	Conductivity (ohm-cm)	Notes
1	Polished metal	Ag	90°	Ag	90°	1000	
2	Polished metal	Ag	90°	Ag	90°	1000	
3	Polished metal	Ag	90°	Ag	90°	1000	
4	Polished metal	Ag	90°	Ag	90°	1000	
5	Polished metal	Ag	90°	Ag	90°	1000	
6	Polished metal	Ag	90°	Ag	90°	1000	
7	Polished metal	Ag	90°	Ag	90°	1000	
8	Polished metal	Ag	90°	Ag	90°	1000	
9	Polished metal	Ag	90°	Ag	90°	1000	
10	Polished metal	Ag	90°	Ag	90°	1000	
11	Polished metal	Ag	90°	Ag	90°	1000	
12	Polished metal	Ag	90°	Ag	90°	1000	
13	Polished metal	Ag	90°	Ag	90°	1000	
14	Polished metal	Ag	90°	Ag	90°	1000	
15	Polished metal	Ag	90°	Ag	90°	1000	
16	Polished metal	Ag	90°	Ag	90°	1000	
17	Polished metal	Ag	90°	Ag	90°	1000	
18	Polished metal	Ag	90°	Ag	90°	1000	
19	Polished metal	Ag	90°	Ag	90°	1000	
20	Polished metal	Ag	90°	Ag	90°	1000	
21	Polished metal	Ag	90°	Ag	90°	1000	
22	Polished metal	Ag	90°	Ag	90°	1000	
23	Polished metal	Ag	90°	Ag	90°	1000	
24	Polished metal	Ag	90°	Ag	90°	1000	
25	Polished metal	Ag	90°	Ag	90°	1000	
26	Polished metal	Ag	90°	Ag	90°	1000	
27	Polished metal	Ag	90°	Ag	90°	1000	
28	Polished metal	Ag	90°	Ag	90°	1000	
29	Polished metal	Ag	90°	Ag	90°	1000	
30	Polished metal	Ag	90°	Ag	90°	1000	
31	Polished metal	Ag	90°	Ag	90°	1000	
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33	Polished metal	Ag	90°	Ag	90°	1000	
34	Polished metal	Ag	90°	Ag	90°	1000	
35	Polished metal	Ag	90°	Ag	90°	1000	
36	Polished metal	Ag	90°	Ag	90°	1000	
37	Polished metal	Ag	90°	Ag	90°	1000	
38	Polished metal	Ag	90°	Ag	90°	1000	
39	Polished metal	Ag	90°	Ag	90°	1000	
40	Polished metal	Ag	90°	Ag	90°	1000	
41	Polished metal	Ag	90°	Ag	90°	1000	
42	Polished metal	Ag	90°	Ag	90°	1000	
43	Polished metal	Ag	90°	Ag	90°	1000	
44	Polished metal	Ag	90°	Ag	90°	1000	
45	Polished metal	Ag	90°	Ag	90°	1000	
46	Polished metal	Ag	90°	Ag	90°	1000	
47	Polished metal	Ag	90°	Ag	90°	1000	
48	Polished metal	Ag	90°	Ag	90°	1000	
49	Polished metal	Ag	90°	Ag	90°	1000	
50	Polished metal	Ag	90°	Ag	90°	1000	
51	Polished metal	Ag	90°	Ag	90°	1000	
52	Polished metal	Ag	90°	Ag	90°	1000	
53	Polished metal	Ag	90°	Ag	90°	1000	
54	Polished metal	Ag	90°	Ag	90°	1000	
55	Polished metal	Ag	90°	Ag	90°	1000	
56	Polished metal	Ag	90°	Ag	90°	1000	
57	Polished metal	Ag	90°	Ag	90°	1000	
58	Polished metal	Ag	90°	Ag	90°	1000	
59	Polished metal	Ag	90°	Ag	90°	1000	
60	Polished metal	Ag	90°	Ag	90°	1000	
61	Polished metal	Ag	90°	Ag	90°	1000	
62	Polished metal	Ag	90°	Ag	90°	1000	
63	Polished metal	Ag	90°	Ag	90°	1000	
64	Polished metal	Ag	90°	Ag	90°	1000	
65	Polished metal	Ag	90°	Ag	90°	1000	
66	Polished metal	Ag	90°	Ag	90°	1000	
67	Polished metal	Ag	90°	Ag	90°	1000	
68	Polished metal	Ag	90°	Ag	90°	1000	
69	Polished metal	Ag	90°	Ag	90°	1000	
70	Polished metal	Ag	90°	Ag	90°	1000	
71	Polished metal	Ag	90°	Ag	90°	1000	
72	Polished metal	Ag	90°	Ag	90°	1000	
73	Polished metal	Ag	90°	Ag	90°	1000	
74	Polished metal	Ag	90°	Ag	90°	1000	
75	Polished metal	Ag	90°	Ag	90°	1000	
76	Polished metal	Ag	90°	Ag	90°	1000	
77	Polished metal	Ag	90°	Ag	90°	1000	
78	Polished metal	Ag	90°	Ag	90°	1000	
79	Polished metal	Ag	90°	Ag	90°	1000	
80	Polished metal	Ag	90°	Ag	90°	1000	
81	Polished metal	Ag	90°	Ag	90°	1000	
82	Polished metal	Ag	90°	Ag	90°	1000	
83	Polished metal	Ag	90°	Ag	90°	1000	
84	Polished metal	Ag	90°	Ag	90°	1000	
85	Polished metal	Ag	90°	Ag	90°	1000	
86	Polished metal	Ag	90°	Ag	90°	1000	
87	Polished metal	Ag	90°	Ag	90°	1000	
88	Polished metal	Ag	90°	Ag	90°	1000	
89	Polished metal	Ag	90°	Ag	90°	1000	
90	Polished metal	Ag	90°	Ag	90°	1000	
91	Polished metal	Ag	90°	Ag	90°	1000	
92	Polished metal	Ag	90°	Ag	90°	1000	
93	Polished metal	Ag	90°	Ag	90°	1000	
94	Polished metal	Ag	90°	Ag	90°	1000	
95	Polished metal	Ag	90°	Ag	90°	1000	
96	Polished metal	Ag	90°	Ag	90°	1000	
97	Polished metal	Ag	90°	Ag	90°	1000	
98	Polished metal	Ag	90°	Ag	90°	1000	
99	Polished metal	Ag	90°	Ag	90°	1000	
100	Polished metal	Ag	90°	Ag	90°	1000	

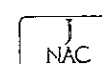
<sup>a</sup>Values are means  $\pm$  SD.



63/14-15, 67/16-36, Soi Petrichasorn 7/71, Petrichasorn Rd.  
Walthapa, Bangkoknoi Bangkok 10200 Thailand  
Tel: (66) 02 46808112413 Fax: (66) 02 46808881 www.braonline.com

## CERTIFICATE OF CALIBRATION

*Continued from p. 6*

[illegible]

Accepted: February 2, 1997



63/14-15.67/35-36, Soi Petchkasem 7/71, Petchkasem Rd.  
Watthana, Bangkok 10600 Thailand.  
Tel: (66) 02-8680812 Fax: (66) 02-8680860 www.jranalee.com

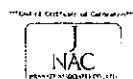
Continuation of Certificate of Calibration Number

Certificate No. JN01122221  
Page 2 of 2 pages

Result of calibration: ☐ In compliance with requirements  
☒ In compliance with requirements  
Certificate is valid for use for the purpose of calibration.  
The equipment is not suitable for use for the purpose of calibration.

No.	Testing Direction	Measured Value (°C)	Standard Reading (°C)	Test Result (°C)	Error (°C)	Uncertainty (°C)
1		0.000	0.00	0.00	0.00	0.00
2		0.00	0.00	0.00	0.00	0.00
3		0.00	0.00	0.00	0.00	0.00
4		0.00	0.00	0.00	0.00	0.00
5		0.00	0.00	0.00	0.00	0.00
6		0.00	0.00	0.00	0.00	0.00
7		0.00	0.00	0.00	0.00	0.00
8		0.00	0.00	0.00	0.00	0.00
9		0.00	0.00	0.00	0.00	0.00
10		0.00	0.00	0.00	0.00	0.00
11		0.00	0.00	0.00	0.00	0.00
12		0.00	0.00	0.00	0.00	0.00
13		0.00	0.00	0.00	0.00	0.00
14		0.00	0.00	0.00	0.00	0.00
15		0.00	0.00	0.00	0.00	0.00
16		0.00	0.00	0.00	0.00	0.00
17		0.00	0.00	0.00	0.00	0.00
18		0.00	0.00	0.00	0.00	0.00
19		0.00	0.00	0.00	0.00	0.00
20		0.00	0.00	0.00	0.00	0.00

NOTE: The equipment is not suitable for use for the purpose of calibration. The equipment is not suitable for use for the purpose of calibration.



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Watthana, Bangkok 10600 Thailand.  
Tel: (66) 02-8680812 Fax: (66) 02-8680860 www.jranalee.com

## CALIBRATION REPORT

Certificate No. JN01122221  
Page 1 of 1 pages

Measurement Item	Resistance, ohm, 1000
Manufacturer	Fluke Corporation
Model/Type	Fluke 1000 Series 1000
Serial Number	Fluke 1000 Series 1000
Lot No.	Fluke 1000 Series 1000
Location	Fluke 1000 Series 1000

Measurement Method  
The measurement is performed by the use of the standard resistor.

Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.

Measured Value	Standard Reading	Test Result	Error	Uncertainty
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00

Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.



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Watthana, Bangkok 10600 Thailand.  
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## CERTIFICATE OF CALIBRATION

Certificate No. JN01122221  
Page 1 of 2

Equipment Name: Data logger with temperature sensor  
Manufacturer: Fluke Corporation  
Model: 1000 Series 1000  
Serial No: 1000 Series 1000  
Lot No: 1000 Series 1000  
Location: Fluke 1000 Series 1000  
Measurement Date: 10/10/2021  
Measurement Date: 10/10/2021  
Measurement Date: 10/10/2021  
Measurement Date: 10/10/2021

Measurement Method  
The measurement is performed by the use of the standard resistor.

Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.



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Watthana, Bangkok 10600 Thailand.  
Tel: (66) 02-8680812 Fax: (66) 02-8680860 www.jranalee.com

Certificate No. JN01122221  
Page 2 of 2

Measurement Method  
The measurement is performed by the use of the standard resistor.

Measurement Date  
The measurement is performed on 10/10/2021.

Measured Value	Standard Reading	Test Result	Error	Uncertainty
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00

Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.



63/14-15.67/35-36, Soi Petchkasem 7/71, Petchkasem Rd.  
Watthana, Bangkok 10600 Thailand.  
Tel: (66) 02-8680812 Fax: (66) 02-8680860 www.jranalee.com

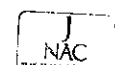
Measurement Method  
The measurement is performed by the use of the standard resistor.

Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.

Measured Value	Standard Reading	Test Result	Error	Uncertainty
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00
1000	1000	1000	0.00	0.00

Measurement Date  
The measurement is performed on 10/10/2021.



Measurement Date  
The measurement is performed on 10/10/2021.

Measurement Date  
The measurement is performed on 10/10/2021.









Reference Stopwatch Data		Console Control Meter Data	
Stopwatch ID No	ET061	Div Gas Meter No	BP-F50017
Model	F406	Model	AC-672-V
Serial No	-	Serial No	1501017
Calibration Date	4 Sep 20		
Certificate No	6-2103018		

Run No	Time Actual (hr.ms.ms)	Time Reading (hr.ms)	Diff (ms)	Diff (ms)
1	5:00:06	5:00	6	0.00013
2	5:00:11	5:00	11	0.00019
3	5:00:10	5:00	10	0.00012
4	5:00:10	5:00	10	0.00017
5	5:00:10	5:00	10	0.00017
6	5:00:19	5:00	19	0.00017
7	5:00:08	5:00	8	0.00013
8	5:00:09	5:00	9	0.00015
9	5:00:11	5:00	11	0.00016
10	5:00:12	5:00	12	0.00020
			Average	0.00017
			SD	0.00002

Catered by: Robert S. Approved by: [Signature]  
Mr Robert Surinhan Mr Simon Koonpin  
Field Scientist (S) Supervisor (S)



Calibration Date:	3 Jul 22	Ambient Temperature (°C):	31
Calibration Used No.:	CALIB72246K_F2006	Relative Humidity (%):	62
Digital Temperature ID:	BKA_F3000	Reference Temperature ID:	BKA_F3000
Serial No:	1022017	Serial No.:	TR0604
Model:	BD-572 V	Model:	Fluke 714
		Test Cell/Date:	28 Jul 23

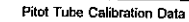
  

Location	Reference Temperature		Digital Temperature		Error	Remarks
	°C	°F	°C	°F		
Stack	9	48	1	34	1	
	25	77	26	79	1	
	50	122	51	124	1	
	100	212	101	214	1	
	150	302	149	300	-1	
	200	392	201	394	1	
	250	482	252	486	2	
	300	572	302	576	2	
	350	662	350	662	0	
	400	752	402	756	2	
Probe	100	212	101	214	1	
	125	259	126	261	1	
	150	302	151	304	1	
	100	212	100	212	0	
Down	125	259	126	261	1	
	150	302	151	304	1	
	175	345	176	349	4	
Flow	150	302	151	304	1	
	175	345	176	349	4	
	125	259	126	261	1	
Exit	5	41	1	34	4	
	10	50	11	52	1	
	20	68	21	70	1	
Water	5	41	5	41	0	
	25	77	25	77	0	
	50	122	50	122	0	
AUX	5	41	5	41	0	
	25	77	25	77	0	
	50	122	50	122	0	

Calculated by P. S.  
(NA Project Supervisor)  
Field Scientist (2)

Approved by [Signature]  
(NA Senior Bioprocessing  
Specialist) (1)

When not a project supervisor, a BSE staff member



Type S Reed Tube Coefficient Data					
	Type S pilot tube Log A/B	Standard pilot tube (IDP, mm in O)	Type A pilot tube (IDP, mm in O)	Cap (t) Log A	Cap (t) Log B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
		Cap	Cap	0.842	0.842

$$\begin{aligned} \gamma_{\text{eff}} &= \gamma_{\text{eff}} \sqrt{\frac{\Delta P_{\text{max}}}{\Delta P(t)}} \\ \left| \bar{\gamma}_{\text{eff}} - \bar{\gamma}_{\text{eff}} \right|_{\text{max}} &\leq \epsilon \\ \text{Average deviation} [A \text{ or } B] &= \frac{\sum \left[ \gamma_{\text{eff}}(t) - \gamma_{\text{eff}} \text{ or } \bar{\gamma}_{\text{eff}} \right]}{3} \text{ max } \text{SE} \leq \epsilon \end{aligned}$$

Created By: Pat S.      Approved By: [Signature]  
 (Mr. Patrick Sullivan)      (Mr. Sam M. Foggins)  
 Field Training (1)      Supervisor (1)



Type S Profit Tube Coefficient Data						
	Type S profit tube Log A/B	Standard profit tube (S/P, mm H <sub>2</sub> O)	Type S profit tube (S/P, mm H <sub>2</sub> O)	Co (S)	Co (S)	
				Log A	Log B	
Test # 1	A	12.00	16.60	0.842	-	
	B	12.00	16.60	-	0.842	
Test # 2	A	12.00	16.60	0.842	-	
	B	12.00	16.60	-	0.842	
Test # 3	A	12.00	16.60	0.842	-	
	B	12.00	16.60	-	0.842	
				$\bar{C}_p$	0.842	0.842

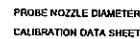
$$C_p(\omega) = C_p = \sqrt{\frac{\Delta F(\omega h)}{\Delta P}} \quad (1)$$

$$[\bar{C}_{p(i)} - \bar{C}_{p(j)}]_{\max RE \leq 0.1}$$

$$\sum [C_p(i) - C_p(j \text{ or } B)]$$

$$\text{Average deviation } (A \text{ or } B) = \frac{\quad}{\quad} \quad \max RE \leq 0.1$$

Calculated by	<u>Phaset S.</u>	Approved by	<u>[Signature]</u>
	(Mr Phaset Suranant)		(Mr Suranant Pongnual)
	Field Scientist (I)		Specialist (I)




Caldwell Data (H)		3 M 12		NGC 2410		B1 + F5013	
Caldwell Data (H)		C100722-01-F52013		Verner Data (H)		B1 + F5029	
Notation (H)	NGC Diameter (cm)			H - Lo	B1 + F5013 + F5029		
	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	ΔD	D <sub>avg</sub>		
1	0.315	0.315	0.315	0.000	0.315		
2	0.476	0.475	0.475	0.009	0.475		
3	0.636	0.636	0.615	0.020	0.635		
4	0.790	0.790	0.790	0.000	0.790		
5	0.950	0.950	0.950	0.000	0.950		
6	1.110	1.110	1.110	0.000	1.110		
7	1.270	1.270	1.270	0.000	1.270		

Where

- $D_1, D_2, D_3$  = Three different nozzle diameters, at 50 deg. given to each other, each measured the nominal 0.25 mm.
- $M_1$  = Maximum distance between any two diameters, that is (0.50 mm).
- $D_{max}$  =  $(D_1 + D_2 + D_3) / 3$

Controlled by P. S. S. (Mr. Praveen Singhania)  
Field Scientist (C)

Accepted by Dr. P. S. S. (Mr. Sanjay Singhania)  
Specialist (II)





<u>Canine Control Meter Data</u>		<u>Reference Dog Gas Meter Data</u>	
Calibration No	C-00722-BK_F50427	Reference Dog Gas Meter ID	BK_F51122
Dog Gas Meter No	BK_F50427	Serial No	A2093240
Serial No	1012	Correction Factor (x1)	1.0180
Model No	C-0005 SOURCE SAMPLE-H	Next Canine Gas Day	25-Nov-23

[illegible]

1) Rate of marking of reference to dry gas meter. Temperature for individual values  $\pm 0.2$  from average

Procedure: 40 CFR 159.104 PART 159, SECS 159.1 & 159.2

Consent by: P. S. S. Approved by: [Signature]

for Project Supervisor for Supervisor

Field Supervisor (S) Supervisor (S)



### Reference Stopwatch Data

### Console Control Meter Data

Run No.	Time Actual (m:ss.ms)	Time Flaring (m:ss.ms)	DET (ms)	DET (ms)
1	5:00:56	5:00	A	0.00013
2	5:00:11	5:00	11	0.0009*8
3	5:00:10	5:00	10	0.00017
4	5:00:10	5:00	10	0.00017
5	5:00:04	5:00	A	0.00013
6	5:00:08	5:00	A	0.00013
7	5:00:07	5:00	7	0.00012
8	5:00:11	5:00	11	0.00018
9	5:00:10	5:00	10	0.00017
10	5:00:10	5:00	10	0.00017

Continue to try

14500030

592/2002/411



Reviewed by

Appendix

**SERVICES (9)**



	Type 1 port Node Log A/B	Standard node type (3P, mm H <sub>2</sub> O)	Type 2 port type (2P, mm H <sub>2</sub> O)	Cap (p)	Cap (s)
				Log A	Log B
Test 1	A	12.05	16.60	0.842	-
	B	12.09	16.63	-	0.842
Test 2	A	12.05	16.60	0.842	-
	B	12.10	16.61	-	0.842
Test 3	A	12.00	16.61	0.842	-
	B	12.10	16.60	-	0.842

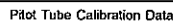
$$[\bar{C}_{p,LO} - \bar{C}_{p,HS}]_{mean} \pm SE \leq 0.01$$

Pent:

**Campes**

## Appendix

● 2007年9月1日起 施行(2007年8月31日以前)

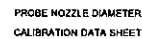


	Type of prior tube log AB	Starting prior tube (AB, mm Hg)	Type of prior tube (1/3 P mm Hg)	Co (b1) log A	Co (b2) log B
Test 1	A	12.00	15.50	0.942	-
	B	12.00	15.50	-	0.942
Test 2	A	12.00	15.50	0.942	-
	B	12.00	15.50	-	0.942
Test 3	A	12.00	15.50	0.942	-
	B	12.00	15.50	-	0.942
Tap				0.942	0.942

$$\left\{ \bar{C}_{T(A)} - \bar{C}_{T(S)} \right\}_{\max} \leq 0.01$$

D.

• **Samuel McCoy**



Wings

**D**

**Çalışma Alanı**

مفتی محمد رفیع

(ب)



### Compact Control Meter Data

Reference Dry Gas Meter Data

[illegible]

12.10

Case no 76

**F. & B. Farnberger Print**

19 August 1999

**【参考文献】**





### Stopwatch Calibration Test Report

Calibration Date: 3 Jul 22 Test Cal Date: 3 Jun 23  
 Barometric Pressure (mmHg): 756 Temperature (°C): 31.0  
 Relative Humidity (%): 62.0

#### Reference Stopwatch Data

Stopwatch ID No: E16061  
 Model: F69P  
 Serial No: 556620  
 Calibration Date: 5 Sep 20  
 Certificate No: E 2009386

#### Console Control Meter Data

Dry Gas Meter No: BKH\_F50536  
 Model: XG672-V  
 Serial No: 1924

Run No.	Time Accepted (s)	Time Reading (s)	DR (ms)	GR (s)
1	5:00:12	5:00	12	0.0020
2	5:00:12	5:00	12	0.0020
3	5:01:11	5:00	10	0.0017
4	5:00:12	5:00	12	0.0020
5	5:00:11	5:00	11	0.0018
6	5:00:12	5:00	10	0.0017
7	5:00:11	5:00	11	0.0018
8	5:00:12	5:00	10	0.0017
9	5:00:12	5:00	10	0.0017
10	5:00:12	5:00	11	0.0018
Average				0.0018
SD				0.0001

Calibrated by

*Robert S.*

Mr Robert Sutherland

Field Scientist (3)

Approved by

*Mr Sutherland*

Mr Robert Sutherland

Supervisor (1)



### DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date: 3 Jul 22		Ambient Temperature (°C): 31	
Calibration Sheet No: C-030722-BKH_F50537		Relative Humidity (%): 62	
Digital Temperature ID: BKH_F50537	Reference Temperature ID: BKH_F51144		
Console Serial No: 1506054	Serial No: 20100000913		
Console Model: FE-172-V	Model: Digen-CC-VT-M2		
		Next Calibration: 31 Jun 23	
Location	Reference Temperature	Digital Temperature	Error
Block			
	15	15	0
	25	25	0
	50	50	0
	100	100	0
	150	150	0
	200	200	0
	250	250	0
	300	300	0
	400	400	1
	1000	1000	1
	1200	1200	2
Probe			
	100	101	1
	125	126	1
	138	139	1
	160	161	1
	175	176	1
Film			
	100	101	1
	125	126	1
	150	151	1
Ref			
	0	1	1
	10	11	1
	20	21	1
Water			
	0	0	0
	25	25	0
	50	50	0
	75	75	0
	100	100	0

Calibrated by

*Robert S.*

Mr Robert Sutherland

Field Scientist (2)

Approved by

*Mr Sutherland*

Mr Robert Sutherland

Supervisor (1)

Printed on: 03/07/22 10:00 AM - 03/07/22 10:00 AM



### Pitot Tube Calibration Data

Pitot Tube Identification Number: BKH\_F50549 Calibration Date: 3 Jul 22  
 Lab Worksheet Number: 258-1-13-01 Standard Pitot ID: BKH\_F50441  
 Calibration Sheet No: C-030722-BKH\_F50549 Cp Standard: 0.99

Type S Pitot Tube Coefficient Data					
	Type S pitot tube Log A/B	Standard pitot tube (ΔP, mm H <sub>2</sub> O)	Type S pitot tube (ΔP, mm H <sub>2</sub> O)	Cp (A)	Cp (B)
Test 1					
	A	12.00	18.50	0.842	-
	B	12.00	15.60	-	0.842
Test 2					
	A	12.00	18.50	0.842	-
	B	12.00	15.60	-	0.842
Test 3					
	A	12.00	18.50	0.842	-
	B	12.00	15.60	-	0.842
	Cp			0.842	0.842

$$CpSD = \sqrt{\frac{\Delta P_{max}}{\Delta P_{min}}}$$

$$|Cp_{min} - Cp_{max}| \leq RE \leq 0.01$$

$$\text{Average deviation of B} = \frac{\sum (Cp_{A1} - Cp_{A2} + B)}{5} \text{ must } RE \leq 0.01$$

Calibrated by

*Robert S.*

Mr Robert Sutherland

Field Scientist (3)

Approved by

*Mr Sutherland*

Mr Robert Sutherland

Supervisor (1)

Printed on: 03/07/22 10:00 AM - 03/07/22 10:00 AM



### Pitot Tube Calibration Data

Pitot Tube Identification Number: BKH\_F50541 Calibration Date: 3 Jul 22  
 Lab Worksheet Number: 258-1-13-01 Standard Pitot ID: BKH\_F50441  
 Calibration Sheet No: C-030722-BKH\_F50541 Cp Standard: 0.99

Type S Pitot Tube Coefficient Data					
	Type S pitot tube Log A/B	Standard pitot tube (ΔP, mm H <sub>2</sub> O)	Type S pitot tube (ΔP, mm H <sub>2</sub> O)	Cp (A)	Cp (B)
Test 1					
	A	12.00	15.60	0.842	-
	B	12.00	15.60	-	0.842
Test 2					
	A	12.00	15.60	0.842	-
	B	12.00	15.60	-	0.842
Test 3					
	A	12.00	15.60	0.842	-
	B	12.00	15.60	-	0.842
	Cp			0.842	0.842

$$CpSD = \sqrt{\frac{\Delta P_{max}}{\Delta P_{min}}}$$

$$|Cp_{min} - Cp_{max}| \leq RE \leq 0.01$$

$$\text{Average deviation of B} = \frac{\sum (Cp_{A1} - Cp_{A2} + B)}{5} \text{ must } RE \leq 0.01$$

Calibrated by

*Robert S.*

Mr Robert Sutherland

Field Scientist (3)

Approved by

*Mr Sutherland*

Mr Robert Sutherland

Supervisor (1)

Printed on: 03/07/22 10:00 AM - 03/07/22 10:00 AM



### PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date: 3 Jul 22		Probe Set ID: BKH_F50542			
Calibration Sheet No: C-030722-BKH_F50542		Version Category ID: BKH_F50542			
Probe Diameter (mm)					
Probe ID #	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	ΔC <sub>1</sub>	D <sub>max</sub>
1	0.315	0.315	0.315	0.000	0.315
2	0.475	0.475	0.475	0.000	0.475
3	0.635	0.635	0.635	0.000	0.635
4	0.790	0.790	0.790	0.000	0.790
5	0.950	0.950	0.950	0.000	0.950
6	1.110	1.110	1.110	0.000	1.110
7	1.270	1.270	1.270	0.000	1.270

Notes:

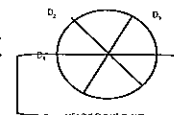
D<sub>1</sub>, D<sub>2</sub>, D<sub>3</sub>

= Three different probe diameters at 0.1mm intervals

= Each probe must be measured at the required 0.1mm intervals

= Maximum clearance between any two diameters must be 0.1mm

D<sub>avg</sub> = (D<sub>1</sub> + D<sub>2</sub> + D<sub>3</sub>) / 3



Printed on: 03/07/22 10:00 AM - 03/07/22 10:00 AM



### CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration Date		3 Jul 22		Barometric Pressure (mm Hg)		756	
First Calibration Date		3 Jun 23		Relative Humidity (%)		62.0	
				Temperature (°C)		31.0	
Console Control Meter Data							
Calibration No		C-030722-BKH_F50546		Reference Dry Gas Meter ID		BKH_F50546	
Dry Gas Meter No		BKH_F50546		Serial No		1907099	
Serial No		1907099		Correction Factor (ppm)		1.0000	
Model No		C-030722		Next Calibration Date		1 Jul 23	

331	#	ID	Meters	Reference Dry Gas Meter Calibration						Console Control Dry Gas Meter						Dry Gas Meter Comparison		Offset Calibration	
				In (mmHg)			°C			In (mmHg)			°C			Factor	ppm	Factor	ppm
				Final	Initial	Total	Final	Initial	Total	Final	Initial	Total	Final	Initial	Total				
15	12.25	150.00	0.00	150.00	31.0	157.000	157.000	150.00	31.0	31.0	0.9727	0.9727	0.9727	0.9727	0.9727	0.9727			
25	12.25	150.00	0.00	150.00	31.0	157.000	157.000	150.00	31.0	31.0	0.9727	0.9727	0.9727	0.9727	0.9727	0.9727			
50	12.25	150.00	0.00	150.00	31.0	157.000	157.000	150.00	31.0	31.0	0.9727	0.9727	0.9727	0.9727	0.9727	0.9727			
80	12.25	150.00	0.00	150.00	31.0	157.000	157.000	150.00	31.0	31.0	0.9727	0.9727	0.9727	0.9727	0.9727	0.9727			
125	12.25	150.00	0.00	150.00	31.0	157.000	157.000	150.00	31.0	31.0	0.9727	0.9727	0.9727	0.9727	0.9727	0.9727			

= Ratio of number of reference to dry gas meter. Reference for individual is 1.0000

= Offset is positive or negative that equals to 21.24 mm of Hg @ 25.0 °C and 756 mm of mercury. Offset is the individual offset @ 2.0 mm from average

Procedure: 01-01-01-01-01-01-01

Calibrated by

*Robert S.*

Mr Robert Sutherland

Field Scientist (1)

Approved by

*Mr Sutherland*

Mr Robert Sutherland

Supervisor (1)

Printed on: 03/07/22 10:00 AM - 03/07/22 10:00 AM



### Stopwatch Calibration Test Report

Calibration Date: 3 Jul 22  
 Biometric Pressure (mmHg): 756  
 Relative Humidity (%): 62.9

Next Cal Date: 3 Jul 23  
 Temperature (°C): 31.0

#### Reference Stopwatch Data

Stopwatch ID No: E19461  
 Model: F904  
 Serial No: A Sep 20  
 Calibration Date: 1 Jun 20  
 Certificate No: E-2009014

#### Console Control Meter Data

Dry Gas Meters No: B14-J50496  
 Model: J-C5924V  
 Serial No: K310928

Run No	Time Actual (m:ss.ms)	Time Reading (m:ss)	Diff. (ms)	Diff. (mm)
1	5:00:11	5:00	11	0.00018
2	5:00:04	5:00	4	0.00013
3	5:00:09	5:00	9	0.00016
4	5:00:11	5:00	11	0.00018
5	5:00:10	5:00	10	0.00017
6	5:00:04	5:00	4	0.00013
7	5:00:06	5:00	6	0.00013
8	5:00:12	5:00	12	0.00020
9	5:00:04	5:00	4	0.00013
10	5:00:06	5:00	6	0.00013
Average			0.00016	
SD			0.00003	

Calibrated by: P. S.

Approved by: [Signature]

Field Scientist (A)

Approved by: [Signature]

Specialist (B)



### DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date: 3 Jul 22	Ambient Temperature (°C): 31
Calibration sheet No.: C-00722-BK-F50496	Relative Humidity (%): 62
Digital Temperature ID: BAK_F50496	Reference Temperature ID: BAK_F50496
Serial No: 170055	Serial No: 700004
Model: XC-873V	Model: FLUXE 714
Next Calibration: 31 Jul 23	

Location	Reference Temperature	Digital Temperature	Error	Remark
Stick	°C	°C	°C	
	0	0	0	
	25	24	-1	
	50	48	-2	
	100	98	-2	
	150	148	-2	
	200	198	-2	
	250	248	-2	
	300	298	-2	
	350	348	-2	
	400	398	-2	
Probe	°C	°C	°C	
	100	98	-2	
	125	123	-2	
	150	148	-2	
	175	173	-2	
	200	198	-2	
	225	223	-2	
	250	248	-2	
	275	273	-2	
	300	298	-2	
Chim	°C	°C	°C	
	100	98	-2	
	125	123	-2	
	150	148	-2	
	175	173	-2	
	200	198	-2	
	225	223	-2	
	250	248	-2	
	275	273	-2	
	300	298	-2	
Filter	°C	°C	°C	
	100	98	-2	
	125	123	-2	
	150	148	-2	
	175	173	-2	
	200	198	-2	
	225	223	-2	
	250	248	-2	
	275	273	-2	
	300	298	-2	
EAL	°C	°C	°C	
	100	98	-2	
	125	123	-2	
	150	148	-2	
	175	173	-2	
	200	198	-2	
	225	223	-2	
	250	248	-2	
	275	273	-2	
	300	298	-2	
Meter	°C	°C	°C	
	100	98	-2	
	125	123	-2	
	150	148	-2	
	175	173	-2	
	200	198	-2	
	225	223	-2	
	250	248	-2	
	275	273	-2	
	300	298	-2	
ALX	°C	°C	°C	
	100	98	-2	
	125	123	-2	
	150	148	-2	
	175	173	-2	
	200	198	-2	
	225	223	-2	
	250	248	-2	
	275	273	-2	
	300	298	-2	

Calibrated by: P. S.

Approved by: [Signature]

Field Scientist (A)

Approved by: [Signature]

Specialist (B)

Specialist (B)



### Pitot Tube Calibration Data

Pitot Tube Identification Number: B14-J50496  
 Calibration Date: 3 Jul 22  
 Lab Worksheet Number: 25A-1-13-01  
 Standard Pitot ID: B14-J50496  
 Calibration Sheet No: C-00722-BK-F50496  
 Co-Operator: 0.94

Type S Pitot Tube Coefficient Data					
Test	Type S pitot tube Leg A/B	Standard pitot tube (AP mm H <sub>2</sub> O)	Type S pitot tube (AP mm H <sub>2</sub> O)	Co (A)	Co (B)
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Co				0.842	0.842

$$Co = \sqrt{\frac{\Delta P_{Pitot}}{\Delta P_{Ref}}}$$

$$Co_{(A)} = Co_{(B)} = \frac{\sum [Co_{(A)} - Co_{(B)}]}{n}$$

$$Average deviation = B = \frac{\sum [Co_{(A)} - Co_{(B)}]}{n}$$

Calibrated by: P. S.

Approved by: [Signature]

Field Scientist (A)

Approved by: [Signature]

Specialist (B)

Specialist (B)



### Pitot Tube Calibration Data

Pitot Tube Identification Number: B14-J50496  
 Calibration Date: 3 Jul 22  
 Lab Worksheet Number: 25A-1-13-01  
 Standard Pitot ID: B14-J50496  
 Calibration Sheet No: C-00722-BK-F50496  
 Co-Operator: 0.94

Type S Pitot Tube Coefficient Data					
Test	Type S pitot tube Leg A/B	Standard pitot tube (AP mm H <sub>2</sub> O)	Type S pitot tube (AP mm H <sub>2</sub> O)	Co (A)	Co (B)
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Co				0.842	0.842

$$Co = \sqrt{\frac{\Delta P_{Pitot}}{\Delta P_{Ref}}}$$

$$Co_{(A)} = Co_{(B)} = \frac{\sum [Co_{(A)} - Co_{(B)}]}{n}$$

$$Average deviation = B = \frac{\sum [Co_{(A)} - Co_{(B)}]}{n}$$

Calibrated by: P. S.

Approved by: [Signature]

Field Scientist (A)

Approved by: [Signature]

Specialist (B)

Specialist (B)



### PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date: 3 Jul 22	Probe Set ID: B14-J50496
Calibration sheet No: C-00722-BK-F50496	Version Co-Op ID: B14-J50496

Probe ID	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>
1	0.315	0.315	0.315	0.315	0.315	0.315
2	0.475	0.475	0.475	0.475	0.475	0.475
3	0.635	0.635	0.635	0.635	0.635	0.635
4	0.795	0.795	0.795	0.795	0.795	0.795
5	0.955	0.955	0.955	0.955	0.955	0.955
6	1.115	1.115	1.115	1.115	1.115	1.115
7	1.275	1.275	1.275	1.275	1.275	1.275
8	1.435	1.435	1.435	1.435	1.435	1.435

Where:  
 D<sub>1</sub>, D<sub>2</sub>, D<sub>3</sub>, D<sub>4</sub>, D<sub>5</sub>, D<sub>6</sub> = Three different nozzle diameters of 10 different sizes  
 each other, each measured to nearest 0.001 mm

ΔD = Max. mean distance between any two diameters, must be ≥ 0.141 mm

D<sub>max</sub> = D<sub>1</sub> + D<sub>2</sub> / 3

D<sub>min</sub> = D<sub>5</sub> + D<sub>6</sub> / 3

Calibrated by: P. S.

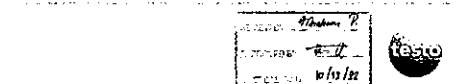
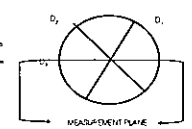
Approved by: [Signature]

Field Scientist (A)

Approved by: [Signature]

Specialist (B)

Specialist (B)



### Calibration certificate Kalibrier-Zertifikat

4322368

Object: TESTO 550  
 Manufacturer: TESTO SE & Co. KG  
 Type description: 0532 3510  
 Serial no: 0532 3510  
 Inventory no: 0532 3510  
 Location: 0532 3510  
 Test equipment no: 0532 3510  
 Equipment no: 14073408  
 Location: 14073408

Customer: ALS Laboratory Group (Thailand) Co., Ltd.  
 Address: 154 Phrasarakon Rd., Phrasarakon Rd., 10150 Bangkok, Thailand  
 Customer ID no: 103194  
 Order no: 10642006 / 0530 0558  
 Date of calibration: 10/12/2021  
 Date of the measurement: 10/12/2022

Conformity statement:  
 (X) Measured values within the allowable deviation, measured by a calibrated measuring instrument.  
 ( ) Measured values outside the allowable deviation, measured by a calibrated measuring instrument.

The expanded measurement uncertainty was determined according to EN ISO 17025:2017 and is a statement of the reliability of the measurement results. It is not a statement of the reliability of the measurement results. It is a statement of the reliability of the measurement results.

The calibration certificate may not be used as a statement of the measurement results. It is a statement of the reliability of the measurement results. It is a statement of the reliability of the measurement results.

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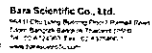
The calibration certificate may not be used as a statement of the measurement results. It is a statement of the reliability of the measurement results. It is a statement of the reliability of the measurement results.

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**Bara Scientific Co., Ltd.**  
943 U Chu Leng Building Floor 7 Ramat Road  
53090 Bangkok Bangkok Thailand 12500  
Tel : 02-632 6300 Fax : 02-6375406-7  
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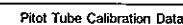
(Applicant's Name) (Mr./Mrs./Miss) (Full Street Address) (Postcode)	Approved by: _____ (Mr./Mrs./Miss) (Full Street Address) (Postcode)
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Approved: \_\_\_\_\_  
 (Mr./Mrs./Miss)  
 (Full Street Address)  
 (Postcode)



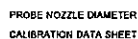
	Type of prior Sube Log A-B	Change in prior Sube ( $\Delta P_{A-B}$ , $\sigma = H_{A-B}$ )	Type of prior Sube Log A	Cin (1)	Cin (1)
				Log A	Log B
Test 1	A	12.00	15.60	0.842	-
	B	12.00	15.60	-	0.842
Test 2	A	12.00	15.60	0.842	-
	B	12.00	15.60	-	0.842
Test 3	A	12.00	15.60	0.842	-
	B	12.00	15.60	-	0.842
	$\Sigma$			0.842	0.842

Source: *Journal of the American Statistical Association*, 1997, 92, 1037-1046.



Type 3-FRM Type Coefficient Data					
	Type 3 panel New Log A,B	Standard panel size 1.5P mm H(3)	Type 3 panel size 1.8P mm H(3)	Co(11)	Co(13) Log B
Test 1	A	12.00	18.50	0.842	-
	B	32.00	16.60	-	0.842
Test 2	A	12.90	30.90	0.842	-
	B	12.90	16.90	-	0.842
Test 3	A	82.93	16.10	0.842	-
	B	12.09	16.60	-	0.842
				0.842	0.842

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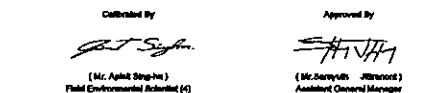
1. **Wiring**  
 $D_1, D_2, D_3$  : 3 different different diameters of 1/8" diameter to meet other data mentioned in the question (20 mm)  
 $\Delta D$  : Maximum difference between any two diameters  
 $D_{avg}$  :  $A(D_1 + D_2 + D_3) / 3$

**Calculation**  
 (Minimum Variation)  
 (Maximum Variation)

**Answer**  
 (Minimum of Requirement)  
 (Maximum of Requirement)



CALIBRATION RESULTS				
Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.04	0.04	0.04
SPAN	193.00	192.75	-0.25	-0.13
AVERAGE (%)				-0.04



4308179

**Conformity statement:** I hereby declare that:

☒ Measured values within the allowable deviation, therefore the material is suitable for use as specified.

☐ Measured values outside of the allowable deviation, therefore the material is not suitable for use as specified.

The proposed measurement instruments were submitted according to 1.6.1 of 2011 with a coverage probability of 95% (95% are relevant for the variability of the proposed measurement and the variability of the used instrument). The instrument of variability is listed in the attached table "Measurement of the variability of the proposed measurement".

The instrument of variability is listed in the attached table "Measurement of the variability of the proposed measurement". The instrument of variability is listed in the attached table "Measurement of the variability of the proposed measurement".

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# ROTA METER CALIBRATION RESULT OCTOBER 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKQ_FS0577	01 Oct 22	$Y = 1.0020x + 0.1976$	1.0000
BKQ_FS0579	01 Oct 22	$Y = 1.0073x + 0.4789$	0.9996
BKQ_FS0583	01 Oct 22	$Y = 1.0168 + 0.3922$	1.0000
BKQ_FS0584	01 Oct 22	$Y = 1.0039x + 2.2992$	0.9997
BKQ_FS0585	01 Oct 22	$Y = 1.0189x + 5.6476$	0.9997
BKQ_FS0586	01 Oct 22	$Y = 1.0089x + 1.1524$	0.9995
BKQ_FS0587	01 Oct 22	$Y = 1.0134x + 3.5619$	0.9995
BKQ_FS0588	01 Oct 22	$Y = 1.0154x + 4.8357$	0.9999
BKQ_FS0589	01 Oct 22	$Y = 0.9918x + 4.8095$	0.9999
BKQ_FS0590	01 Oct 22	$Y = 1.0039x + 0.4857$	0.9996
BKQ_FS0591	01 Oct 22	$Y = 0.9705x + 52.174$	0.9996
BKQ_FS0592	01 Oct 22	$Y = 0.9649x + 37.642$	0.9985
BKQ_FS0593	01 Oct 22	$Y = 0.9787x + 58.445$	0.9980
BKQ_FS0594	01 Oct 22	$Y = 0.9902x + 62.87$	0.9999
BKQ_FS0595	01 Oct 22	$Y = 1.0249x + 96.182$	0.9999
BKQ_FS0596	01 Oct 22	$Y = 0.9843x + 26.806$	0.9991
BKQ_FS0597	01 Oct 22	$Y = 0.9802x + 61.653$	0.9978
BKQ_FS1004	01 Oct 22	$Y = 0.9755x + 11.724$	0.9999
BKQ_FS1005	01 Oct 22	$Y = 1.0081x + 1.5143$	1.0000
BKQ_FS1006	01 Oct 22	$Y = 1.0068 + 3.9327$	0.9999
BKQ_FS1007	01 Oct 22	$Y = 0.9911x + 1.6592$	1.0000
BKQ_FS1008	01 Oct 22	$Y = 1.0132x + 0.7307$	1.0000
BKQ_FS1009	01 Oct 22	$Y = 1.0132x + 1.1633$	0.9996
BKQ_FS1010	01 Oct 22	$Y = 1.0034x + 0.5758$	0.9999
BKQ_FS1011	01 Oct 22	$Y = 1.0024x + 0.1759$	0.9999
BKQ_FS1012	01 Oct 22	$Y = 1.0109x + 2.0048$	0.9997
BKQ_FS1013	01 Oct 22	$Y = 0.9977x + 35.851$	0.9997
BKQ_FS1014	01 Oct 22	$Y = 1.0021x + 0.3148$	0.9998
BKQ_FS1015	01 Oct 22	$Y = 0.9994x + 1.786$	1.0000
BKQ_FS1016	01 Oct 22	$Y = 1.0105x + 80.256$	0.9998
BKQ_FS1017	01 Oct 22	$Y = 0.9992x + 0.649$	1.0000
BKQ_FS1018	01 Oct 22	$Y = 1.0011x + 1.1786$	1.0000
BKQ_FS1019	01 Oct 22	$Y = 1.0023x + 68.424$	0.9996
BKQ_FS1020	01 Oct 22	$Y = 1.0547x + 0.858$	0.9998
BKQ_FS1021	01 Oct 22	$Y = 1.0184x + 3.3286$	0.9998
BKQ_FS1022	01 Oct 22	$Y = 0.9932x + 57.635$	0.9986
BKQ_FS1023	01 Oct 22	$Y = 1.0094x + 0.0217$	0.9999
BKQ_FS1024	01 Oct 22	$Y = 1.0042x + 0.4086$	0.9997
BKQ_FS1025	01 Oct 22	$Y = 1.0132x + 88.507$	0.9995

Page 1 of 2

ALS Laboratory Group



# ROTA METER CALIBRATION RESULT OCTOBER 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKQ_FS1026	01 Oct 22	$Y = 1.0018x + 1.0776$	0.9997
BKQ_FS1027	01 Oct 22	$Y = 1.0053x + 0.231$	0.9995
BKQ_FS1028	01 Oct 22	$Y = 0.9790x + 60.312$	0.9982
BKQ_FS1029	01 Oct 22	$Y = 0.9835x + 0.8234$	1.0000
BKQ_FS1030	01 Oct 22	$Y = 1.0039x + 0.515$	0.9999
BKQ_FS1031	01 Oct 22	$Y = 1.0096x + 79.295$	0.9998
BKQ_FS1036	01 Oct 22	$Y = 0.9967x + 4.5048$	0.9999
BKQ_FS1040	01 Oct 22	$Y = 0.9903x + 32.694$	0.9998
BKQ_FS1041	01 Oct 22	$Y = 1.0674 + 1.999$	1.0000
BKQ_FS1042	01 Oct 22	$Y = 1.0019x + 2.1571$	1.0000
BKQ_FS1043	01 Oct 22	$Y = 1.1569x + 96.479$	0.8412
BKQ_FS1044	01 Oct 22	$Y = 1.0318x + 0.9374$	0.9999
BKQ_FS1101	01 Oct 22	$Y = 1.0125x + 0.7738$	0.9999
BKQ_FS1102	01 Oct 22	$Y = 0.9994x + 2.6357$	0.9995
BKQ_FS1103	01 Oct 22	$Y = 0.9779 + 55.03$	0.9987
BKQ_FS1104	01 Oct 22	$Y = 0.9914x + 0.8427$	0.9997
BKQ_FS1105	01 Oct 22	$Y = 0.9892x + 5.5919$	0.9998
BKQ_FS1200	01 Oct 22	$Y = 1.0031x + 77.881$	0.9995
BKQ_FS1201	01 Oct 22	$Y = 1.0045x + 0.15$	0.9995
BKQ_FS1202	01 Oct 22	$Y = 0.9702x + 44.156$	0.9994
RYG_FS0107	01 Oct 22	$Y = 1.0039x + 0.179$	0.9999
RYG_FS0108	01 Oct 22	$Y = 0.9964x + 21.757$	1.0000
RYG_FS0109	01 Oct 22	$Y = 1.0571x + 17.486$	1.0000

Review By:

*Wichan Choonharat*  
(Mr. Wichan Choonharat)  
Envo Field Services Manager

Approved By:

*(Mr. Sareyut Jitramont)*  
(Mr. Sareyut Jitramont)  
Assistant General Manager

Page 1 of 1

ALS Laboratory Group

## SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-45171 Sathorn Rd, Bangkok, Bangkok 10120 THAILAND  
Tel: 0-2435-8820 Fax: 0-2435-8829 e-mail: cal\_center@sithiporn.com Web: www.sithiporn.com



Cert. No.: ACC22012  
Page: 1 of 3

## Calibration Certificate

Equipment: SOUND CALIBRATOR  
Manufacturer: RION  
Model: NC-74  
Serial No.: 3417017  
ID No.: HKC 124040

Condition As Found: GOOD

Customer: ALS LABORATORY GROUP (THAI) AND CO., LTD.  
104 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KIYATONG PHATHANAKAN, KID T SUAN LUANG,  
BANGKOK, 10250 THAILAND

Location: 1 23.0 ± 3.3 °C  
Ambient Temperature: 1 101.3 ± 1.3 kPa  
Pressure: 1 50.0 ± 2.0 %  
Relative Humidity: 22 APRIL 2022  
Received Date: 28 APRIL 2022  
Calibration Date: 29 APRIL 2022  
Date of Issue:

*Kasane P.*  
Kasane P.  
29/04/22

Calibrated by: Natchanon Pongpanom

Approved by: *T. Petchai*  
(Thanakul Petchai)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard. It may not be reproduced or altered in any way, except with the prior written approval of the head of Calibration Laboratory.

QP-1512-04-04-02004

## SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

### Continuation of Calibration Certificate

Cert. No.: ACC22012  
Job No.: VC65AC0055  
Page: 1 of 3

Calibration Procedure: GP-AC-01

### Calibration Method:

This equipment was calibrated by based on IEC 61642:2002 Standard.  
The sound pressure level, frequency and total duration 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.	Exp. Date
Waveform Generator	33511H	SV52382742	11-0608-22	04-Feb-23
Digital Multimeter	33601A	SV53229104	111-06-04-2024	09-Feb-23
Digital Multimeter	33601A	SV53229076	111-06-05-0765	09-Feb-23
Digital Multimeter	33601A	SV54924273	111-06-05-0265	09-Feb-23
Programmable Attenuator	MA1-1070	62100114	11-0608-22	07-Feb-23
Condenser Microphone	4180	79779001	AS-10013-22	24-Feb-23
Acoustic Absorber	NX-428-A1	34766095	AS-5006-22	22-Feb-23
Acoustic Absorber	SVR-336A	V74466697	11-0610-22	07-Feb-23

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).

QP-1512-04-04-02004

*T. Petchai*

## SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

### Continuation of Calibration Certificate

Cert. No.: ACC22012  
Job No.: VC65AC0055  
Page: 1 of 3

### Result of Calibration:

#### 1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.13	0.13	0.14	0.40

#### 2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1000.7	0.2	0.1	1.0

#### 3. Total duration

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.75	0.10	3.0

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$  or any value following calculation using a level of confidence of approximately 95 %.

End of Calibration Certificate

QP-1512-04-04-02004

*T. Petchai*

## SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-45171 Sathorn Rd, Bangkok, Bangkok 10120 THAILAND  
Tel: 0-2435-8820 Fax: 0-2435-8829 e-mail: cal\_center@sithiporn.com Web: www.sithiporn.com



Cert. No.: ACC22012  
Page: 1 of 3

## Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RION  
Model: NL-21 Microphone UC-52 : Pre-amplifier NL-21  
Serial No.: 05-00976 12402 12732  
ID No.: HKC 124040

Condition As Found: GOOD

Customer: ALS LABORATORY GROUP (THAI) AND CO., LTD.  
104 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KIYATONG PHATHANAKAN, KID T SUAN LUANG,  
BANGKOK, 10250 THAILAND

Location: 1 23.0 ± 3.3 °C  
Ambient Temperature: 1 101.3 ± 1.3 kPa  
Pressure: 1 50.0 ± 2.0 %  
Relative Humidity: 29 APRIL 2022  
Received Date: 12-14 APRIL 2022  
Calibration Date: 15 APRIL 2022  
Date of Issue:

*Kasane P.*  
Kasane P.  
15/04/22

Calibrated by: Natchanon Pongpanom

Approved by: *T. Petchai*  
(Thanakul Petchai)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard. It may not be reproduced or altered in any way, except with the prior written approval of the head of Calibration Laboratory.

QP-1512-04-04-02004



SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL210120  
Job No. : VCM4AC0071  
Page : 2 of 9

Calibration Procedure : I.P.M-02

Calibration Method:

This equipment was calibrated by based on IEC 61672-3 (2013) standard for sound level meter (SLM).  
The SLM includes Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument display and also with SLM's display.

Condition of this result of calibration:

1. Reference Standard Instruments:

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Western Calibrator	3320A	W40012076	11-0012-21	10-Feb-22
Western Calibrator	3351B	W555402142	11-0012-21	10-Feb-22
Digital Multimeter	3446A	W555220104	11-0101-21	10-Feb-22
Digital Multimeter	3446A	W555220076	11-0101-21	10-Feb-22
Digital Multimeter	3446A	1009025	11-0101-21	10-Feb-22
Digital Multimeter	3446A	1009025	11-0101-21	10-Feb-22
Programmable Attenuator	MA1-1070	62160114	1004077740	08-Mar-22
Condenser Microphone	4189	2972601	AA-1048-21	05-Feb-22
Measuring Amplifier	NA-428A1	34560495	AA-3003-21	16-Feb-22

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 mentioned at:

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR)

QR-1512-01-0120044

T. R. R. R.

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Cert. No. : ACL210120  
Job No. : VCM4AC0071  
Page : 3 of 9

4. Electrical signal tests of frequency weightings

Weighting network response with reference to 1 kHz.

Frequency (Hz)	Filt.	Un-weight	A-weight	Acceptance Limits
63	-12	0.0	0.0	+2.0
125	-9.1	0.0	0.0	+1.5
250	-6.1	0.0	0.0	+1.5
500	-3.1	0.0	0.0	+1.5
1000	0.0	0.0	0.0	+1.0
2000	0.0	0.1	0.1	+2.0
4000	0.0	0.1	0.1	+3.0
8000	0.0	0.2	0.2	+5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	+0.5
C-weight	94.0	0.0	+0.5
Flat	94.1	0.1	+0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	+0.5
Slow	94.0	0.0	+0.5
Imp	94.0	0.0	+0.5

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	+0.5

QR-1512-01-0120044

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CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL210120  
Job No. : VCM4AC0071  
Page : 3 of 9

Summary of Measurement Results:

Parameter	Pass	Fail	Uncertainty (dB)	Maximum permitted uncertainty of measurement (dB)
1. Unbalance sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings	✓	-	0.3	0.6
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	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For 4 kHz to 10 kHz	✓	-	0.3	0.7
For 10 kHz to 20 kHz	✓	-	0.3	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.5
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.5
8. Level linearity including the level range extend	✓	-	0.2	0.5
9. Time burst response	✓	-	0.2	0.5
10. Peak C-weight level	✓	-	0.2	0.5
11. Overload indication	✓	-	0.2	0.5
12. High level stability	✓	-	0.1	0.1

QR-1512-01-0120044

T. R. R. R.

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CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL210120  
Job No. : VCM4AC0071  
Page : 4 of 9

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
135.0	135.0	0.0	+1.1
130.0	130.0	0.0	+1.1
125.0	125.0	0.0	+1.1
120.0	120.0	0.0	+1.1
115.0	115.0	0.0	+1.1
110.0	110.0	0.0	+1.1
105.0	105.0	0.0	+1.1
100.0	100.0	0.0	+1.1
95.0	95.0	0.0	+1.1
90.0	90.0	0.0	+1.1
85.0	85.0	0.0	+1.1
80.0	80.0	0.0	+1.1
75.0	75.0	0.0	+1.1
70.0	70.0	0.0	+1.1
65.0	65.0	0.0	+1.1
60.0	60.0	0.0	+1.1
55.0	55.0	0.0	+1.1
50.0	50.0	0.0	+1.1
45.0	45.0	0.0	+1.1
40.0	40.0	0.0	+1.1
35.0	35.0	0.0	+1.1
30.0	30.0	0.0	+1.1
25.0	25.0	0.0	+1.1
20.0	20.0	0.0	+1.1
15.0	15.0	0.0	+1.1
10.0	10.0	0.0	+1.1
5.0	5.0	0.0	+1.1

QR-1512-01-0120044

T. R. R. R.

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL210120  
Job No. : VCM4AC0071  
Page : 4 of 9

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.8 (93.9)	93.9	0.0	+0.3

2. Self-generated noise

2.1 Normal use

Measured Value (dB)
22.3

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

Frequency Weighting	Measured Value (dB)
A-weight	21.5
C-weight	22.3
Flat	24.9

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.6	0.7	+1.5
1000	0.1	0.1	0.1	+1.0
8000	1.3	1.2	1.2	+3.0

QR-1512-01-0120044

T. R. R. R.

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Continuation of Calibration Certificate

Cert. No. : ACL210120  
Job No. : VCM4AC0071  
Page : 5 of 9

8. Level linearity including the level range extend

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
150	94.0	94.0	0.0	+0.5
120	94.0	94.1	0.1	+0.5
110	94.0	94.1	0.1	+0.5
100	94.0	94.1	0.1	+0.5
90	94.0	94.1	0.1	+0.5

Level linearity on each level range

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
150	43.0	43.0	0.0	+0.5
120	33.0	33.2	0.2	+0.5

9. Time burst response

Time Weighting	Time burst duration, 10 ms	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	100.0	100.0	0.0	+1.5, -5.0
	2	8	117.0	117.0	0.0	+1.0, -2.5
Slow	200	300	134.0	134.1	0.1	+1.0
	5	5	100.0	100.0	0.0	+1.5, -5.0
SLI	200	300	127.0	127.0	0.0	+1.5, -5.0
	0.25	1	96.0	96.0	0.0	+1.0, -2.5
	2	8	100.0	100.0	0.0	+1.0, -2.5
	200	300	128.0	128.1	0.1	+1.0

QR-1512-01-0120044

T. R. R. R.

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Continuation of Calibration Certificate

Cert. No. : ACL22128  
Job No. : VC04AC0079  
Page : 2 of 2

10. Peak C-united level

Number of cycle in test signal	Adjusted Value (dB)	Measured Value, 1 peak (dB)	Deviated Value (dB)	Acceptance Limits
Continuous	135.0	135.0	0.0	-
One	135.4	136	-0.4	±3.0

Number of cycle in test signal	Adjusted Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
Continuous	135.0	135.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload Indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits
Positive one half cycle	135.4	±3.0
Negative one half cycle	135.2	±2.0

Q1-1512-04-04-02044

T. Petchum

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22128  
Job No. : VC04AC0083  
Page : 2 of 2

Calibration Procedure : (P-AC-01)

Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM And level is Acoustical and Electrical signal level of frequency weighting with A-weighting and Reference  
Standard Instruments.

For test results of each item were made by observation of each instrument display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Exp. No.	Due Date
Waveform Generator	33210A	31514017079	11-09-22	04-Feb-23
Waveform Generator	33211H	31512302742	11-09-22	04-Feb-23
Digital Multimeter	33461A	NV122210104	ELL-09-04-2023	09-Feb-23
Digital Multimeter	33461A	NV122220776	ELL-09-04-2023	09-Feb-23
Digital Multimeter	34801A	81140021273	ELL-09-04-2023	09-Feb-23
Programmable Metre	MAT-1070	4210014	TF-09-09-22	07-Feb-23
Condenser Microphone	4102	297790	AA-10-12-22	24-Feb-23
Measuring Amplifier	NA-42KA1	34560085	AA-09-05-22	22-Feb-23

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 metrological system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Q1-1512-04-04-02044

T. Petchum

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Continuation of Calibration Certificate

Cert. No. : ACL22128  
Job No. : VC04AC0079  
Page : 2 of 2

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits
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 an  $\alpha$  value below the calculation, providing a level of confidence of approximately 95 %.

Tail of Calibration Certificate

Q1-1512-04-04-02044

T. Petchum

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Continuation of Calibration Certificate

Cert. No. : ACL22128  
Job No. : VC04AC0083  
Page : 2 of 2

Summary of Measurement Results:

Parameter	Pass	Fail	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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.7
Free 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	✓	-	0.3	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.3
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. Low level response	✓	-	0.2	0.3
10. Peak C-united level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.3	0.4

Q1-1512-04-04-02044

T. Petchum

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY



651-45171 Srinakharin Rd, Bangkok, Bangkok 10110 THAILAND  
Tel: 02-2151-8021 Fax: 02-2151-1529 e-mail: sithiporn@photon.com http://www.sithiporn.com

Cert. No. : ACL22128  
Page : 1 of 2

Calibration Certificate

Equipment : MUNDI TEST METER  
Manufacturer : RUM  
Model : NT-42; Amplifier UC-52 / Pre-amplifier NT-24  
Serial No. : 0070640 / 170525 / 17077  
ID No. : BKE 150924

Condition As Found : (A000)

Customer : ASST. SITHIPORN ASSOCIATES CO.,LTD.  
101 PHAT THUAN KAN 60 PHATHANAKAN ROAD,  
KHU BAN PHAT THUAN KAN, KHU THUAN KAN,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature : ( 23.0 ± 1.3 ) °C  
Pressure : ( 1013.3 ± 1.3 ) hPa  
Relative Humidity : ( 50.0 ± 20.4 ) %

Received Date : 26 MAY 2022  
Calibration Date : 09-JUN-2022  
Date of Issue : 14 JUN 2022

Calibrated by : Naitakorn Petchum

Approved by : T. Petchum

( Thiradit Petchum )

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Q1-1512-04-04-02044

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CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22128  
Job No. : VC04AC0083  
Page : 1 of 2

Result of calibration :

1. Absolute sensitivity

Reference Acoustic signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.9 (93.9)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.4

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

Frequency Weighting	Measured value (dB)
A-weight	12.6
C-weight	12.8
Flat	12.6

3. Acoustical signal tests of frequency weightings

More free field response required at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	±1.5
1000	-0.1	-0.1	-0.1	±1.0
1000	0.3	0.4	0.4	±0.9

Q1-1512-04-04-02044

T. Petchum

Continuation of Calibration Certificate

Cert.No.: ACL22136  
Job No.: VCSAC0063  
Pages: 5 of 8

4. Electrical signal tests of frequency weighting

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±0.0
125	-0.1	0.0	-0.1	±0.5
250	-0.1	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±3.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	-
C-weight	94.1	0.0	±0.2
Flat	94.1	0.0	±0.2

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.1	0.1	±0.3

08-1512-04-01-02964

T. Rth.

Continuation of Calibration Certificate

Cert.No.: ACL22136  
Job No.: VCSAC0063  
Pages: 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±1.1
136.0	136.1	0.1	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.1	0.1	±1.1
109.0	109.1	0.1	±1.1
104.0	104.1	0.1	±1.1
99.0	99.1	0.1	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	0.0	±1.1
24.0	24.0	0.0	±1.1
19.0	19.0	0.0	±1.1

08-1512-04-01-02964

T. Rth.

Continuation of Calibration Certificate

Cert.No.: ACL22136  
Job No.: VCSAC0063  
Pages: 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, $T_b$ (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -1.5
	2	5	112.0	111.9	-0.1	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	5	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	2	5	108.0	107.9	-0.1	1.0; -2.5
SCL	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leqpk (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.6	-0.8	±1.0

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	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

08-1512-04-01-02964

T. Rth.

Continuation of Calibration Certificate

Cert.No.: ACL22203  
Job No.: VCSAC0063  
Pages: 1 of 8

11. On-screen indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	99.6	0.0
Negative one-half cycle	99.6	0.0

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2 or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

08-1512-04-01-02964

T. Rth.

4149/71 Subhorn Rd, Bangkok, Registered Number 7448440  
Tel: 2415-8810 Fax: 2415-1628 e-mail: sithiporn@thai.com Web: www.sithiporn.com



Cert.No.: ACL22203  
Pages: 1 of 8

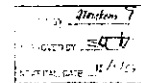
Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RMC  
Model: SL-21 Microphone UC 52 / Pre-amplifier N1021  
Serial No.: 0961058 / 132596 / 32093  
ID No.: BKC-PS014

Condition As Found: GOOD

Customer: AI S LABORATORY GROUP THAILAND CO., LTD.  
104 PHAI THANAKAN 40, PHAI THANAKAN ROAD,  
KHUANG PHAI THANAKAN, KHUANG LUANG,  
BANGKOK, 10250 THAILAND

Location: -  
Ambient Temperature: 1 23.0 ± 3.5 °C  
Pressure: 1 101.3 ± 3.3 kPa  
Relative Humidity: 1 50.0 ± 20.0 %  
Received Date: 05 JANUARY 2022  
Calibration Date: 12-14 JANUARY 2022  
Date of Issue: 17 JANUARY 2022



Calibrated by: Nathakorn Pongprasan

Approved by: T. Rth.  
(Tharakul 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

08-1512-04-01-02964

Continuation of Calibration Certificate

Cert.No.: ACL22203  
Job No.: VCSAC0063  
Pages: 2 of 8

Calibration Procedure: CP-AC-02

Calibration Method:

The equipment was calibrated by based on IEC 61672-1:2013 Standard for sound level meter (SLM). The SLM was tested by Acoustic and 1/1 Octave signal test of frequency weighting with A-weight chamber and Reference Standard Instruments.

The test results of each item were made by observation of each instrument display and also with SLM display.

Condition of this result of calibration:

1. Reference Standard Instruments

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY18015676	11-0012-21	10-Feb-22
Waveform Generator	33111H	MY1240792	11-0011-21	10-Feb-22
Digital Multimeter	33161A	MY1220104	11-0010-24	09-Feb-22
Digital Multimeter	33401A	MY1225076	11-0010-24	09-Feb-22
Digital Multimeter	33401A	MY1225127	11-0010-24	09-Feb-22
Programmable Attenuator	MAF-107H	62101014	10-007724E	08-Mar-21
Condenser Microphone	4190	2077600	AA-1466-21	05-Feb-22
Measuring Amplifier	NAN-20A1	34560495	AA-0903-21	16-Feb-22

2. The result of calibration was found accurate as shown on the display of calibration for this calibrated item only.  
3. This certificate is traceable to the International System of Units (SI).

11 National Institute of Metrology (NIM)  
12 Thailand Institute of Scientific and Technological Research (TISTR)

08-1512-04-01-02964

T. Rth.

Summary of Measurement Results

Parameter	Pass	Fail	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
6300 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	-
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. Time burst response	✓	-	±0.2	±0.3
10. Peak C sound level	✓	-	±0.2	±0.3
11. On overload indication	✓	-	±0.2	±0.3
12. High level stability	✓	-	±0.1	±0.1

09-19-2024/04-20/24

T. Rth.

7.1 Level linearity on the reference level range

Assigned Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
135.0	134.9	-0.1	±1.3
134.0	133.9	-0.1	±1.3
133.0	132.9	-0.1	±1.3
132.0	131.9	-0.1	±1.3
131.0	130.9	-0.1	±1.3
129.0	128.9	-0.1	±1.3
127.0	126.9	-0.1	±1.3
119.0	118.9	-0.1	±1.3
114.0	113.9	-0.1	±1.3
109.0	108.9	-0.1	±1.3
104.0	103.9	-0.1	±1.3
99.0	99.0	0.0	±1.3
94.0	94.0	0.0	±1.3
89.0	89.0	0.0	±1.3
84.0	84.0	0.0	±1.3
79.0	79.0	0.0	±1.3
74.0	74.0	0.0	±1.3
69.0	69.0	0.0	±1.3
64.0	64.0	0.0	±1.3
59.0	59.0	0.0	±1.3
54.0	54.0	0.0	±1.3
49.0	49.0	0.0	±1.3
44.0	44.0	0.0	±1.3
39.0	39.0	0.0	±1.3

09-19-2024/04-20/24

T. Rth.

Results of Calibration

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.0 (1500)	93.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
24.9

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

Frequency Weighting	Measured value (dB)
A-weight	23.4
C-weight	23.4
Flat	20.3

3. Acoustical signal tests of frequency weightings

Notes: 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	±0.2	±0.3	±0.2	±1.5
1000	±0.0	±0.0	±0.0	±1.0
6300	±0.1	±0.0	±0.0	±1.0

09-19-2024/04-20/24

T. Rth.

8. Level linearity including the level range control

Range	Assigned Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.5
120	94.0	94.0	0.0	±0.5
110	94.0	94.0	0.0	±0.5
100	94.0	94.0	0.0	±0.5
90	94.0	94.0	0.0	±0.5

Level linearity on each level range

Range	Assigned Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	43.0	43.1	+0.1	±0.5
120	33.0	32.7	-0.3	±0.5

9. Time burst response

Time Weighting	Burst duration, T <sub>b</sub> (ms)	Cycle	Assigned Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.8	+1.8	±3.5
	2	8	117.0	117.0	0.0	±3.0
	200	800	134.0	134.1	+0.1	±1.0
Slow	2	8	106.0	106.0	0.0	±1.5
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	96.0	96.0	0.0	±1.5
Flat	2	8	106.0	106.0	0.0	±3.0
	200	800	128.0	128.0	0.0	±1.0

09-19-2024/04-20/24

T. Rth.

4. Electrical signal tests of frequency weightings

Weighting network response within 10 Hz to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	±0.1	±0.1	±0.0	±2.0
125	±0.1	±0.0	±0.0	±1.5
250	±0.0	±0.0	±0.1	±1.5
500	±0.0	±0.0	±0.3	±1.5
1000	±0.0	±0.0	±0.0	±1.0
2000	±0.1	±0.1	±0.1	±2.0
4000	±0.1	±0.1	±0.1	±3.0
8000	±0.1	±0.2	±0.2	±3.0

A. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

A. Long-term stability

Frequency Weighting	SLM Display at start (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

09-19-2024/04-20/24

T. Rth.

10. Peak C sound level

Number of cycle in test signal	Assigned Value (dB)	Measured Value, 1 sec (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±
One	136.0	136.0	0.0	±0.0

Number of cycle in test signal	Assigned Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one half cycle	90.2	±1.5
Negative one half cycle	90.2	±1.5

09-19-2024/04-20/24

T. Rth.

Continuation of Calibration Certificate

Cert. No. : ACL22003  
Job No. : VC65AC0011  
Page : 9 of 9

12. High level stability

Frequencies Weighting	SIM Display at initial (dB)	SIM 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 the criteria using a level of confidence of approximately 95 %.

End of Calibration Certificate

QR-1512-01-01-020002

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22004  
Job No. : VC65AC0011  
Page : 3 of 9

Summary of Measurement Result:

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty (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
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 instability on the reference level range	✓	-	0.2	0.3
8. Level instability including the level range control	✓	-	0.2	0.3
9. Time base response	✓	-	0.2	0.3
10. Peak-to-peak level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.2
12. High level stability	✓	-	0.1	0.1

QR-1512-01-01-020002

T. Petch

431-451/5, Sathuwan Rd., Bangkok, Bangkok 10260 THAILAND  
Tel: 02-015-8100 Fax: 02-015-1879 E-mail: central@sitthiporn.com Http://www.sitthiporn.com



Cert. No. : ACL22004  
Page : 1 of 9

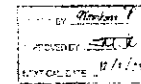
Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NR-20 Microphone UC-52 / Pre-amplifier SR-21  
Serial No. : 0906020 / 13520 / 35504  
ID No. : RSC 150815

Condition As Found : GPO-93

Customer : AUST LABORATORY GROUP (THAI) AND CO., LTD.  
101 PHATHANUKAN RD. PHATHANUKAN ROAD,  
SATHUWAN PHATHANUKAN, KHEE SUAN PHANG,  
BANGKOK, 10250 (THAILAND)

Location :  
Ambient Temperature : 1 23.0 ± 3.3 °C  
Pressure : 1 101.3 ± 3.3 kPa  
Relative Humidity : 1 90.4 ± 2.9 %  
Received Date : 05 JANUARY 2022  
Calibration Date : 12-14 JANUARY 2022  
Date of Issue : 17 JANUARY 2022



Calibrated by : Natchanon Pongprue

Approved by : T. Petch  
(Thamkol Petchum)

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other than as full, except with the prior written approval of the head of calibration laboratory.

QR-1512-01-01-020002

Continuation of Calibration Certificate

Cert. No. : ACL22004  
Job No. : VC65AC0011  
Page : 4 of 9

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.0 (93.0)	93.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
23.8

2.2 The interference of the sound level meter is replaced by electrical signal input device.

Frequencies Weighting	Measured value (dB)
A-weight	23.8
C-weight	25.2
Flat	26.6

3. Acoustical signal tests of frequency weightings

Mean 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	0.2	0.3	0.3	±1.5
1000	-0.1	-0.1	-0.1	±1.0
1000	-0.2	-0.3	-0.3	±5.0

QR-1512-01-01-020002

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22004  
Job No. : VC65AC0011  
Page : 2 of 9

Calibration Procedure : 1.0-10-02

Calibration Method:

This equipment was calibrated by based on IEC 61672-1 (2013) Standard for sound level meter (SLM).  
The SLM had tests in Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference  
Standard Instruments.

For test results of each item were made by observation of each Instruments display and also with SLMs display.

Condition of this result of calibration:

1. Reference Standard Instruments:

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY20017076	34-0015-21	15-Feb-22
Waveform Generator	33310B	MY22002742	41-0015-21	10-Feb-22
Digital Multimeter	10401A	MY32207001	131-01P-030204	10-Feb-22
Digital Multimeter	10401A	MY32207076	131-01P-030204	08-Feb-22
Digital Multimeter	10401A	MY40124273	1-131-01P-25251-1	15-Sep-22
Programmable Attenuator	MA3-1070	62106114	1-131-07722-0E	08-Mar-22
Condenser Microphone	4150	7077001	AA-1008-21	05-Feb-22
Measuring Amplifier	NY-425A1	11560495	AA-1005-21	16-Feb-22

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 units maintained in:

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

QR-1512-01-01-020002

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22004  
Job No. : VC65AC0011  
Page : 5 of 9

4. Electrical signal tests of frequency weightings

Weighting network response substitution at 1 kHz

Frequencies (Hz)	Deviation from various frequency weighting response curve (dB)				Acceptance Limits
	Flat	C-weight	A-weight		
63	-0.3	-0.1	0.0		±2.0
125	-0.1	0.1	-0.1		±1.5
250	-0.1	-0.1	-0.1		±1.5
500	0.0	0.0	-0.1		±1.5
1000	0.0	0.0	0.0		±1.0
2000	0.1	0.1	0.1		±2.0
4000	0.1	0.1	0.1		±3.0
8000	0.1	0.2	0.2		±3.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequencies Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	±0.1
Imp	94.0	0.0	±0.1

6. Long-term stability

Frequencies Weighting	SIM Display at initial (dB)	SIM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QR-1512-01-01-020002

T. Petch

Cert. No. : AUL22004  
Job No. : VCSAC0041  
Pages : 6 of 9

7. Level Biasity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
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
128.0	128.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
118.0	118.0	-0.1	± 1.1
109.0	109.0	0.0	± 1.1
108.0	108.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
98.0	98.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
88.0	88.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
78.0	78.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
68.0	68.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
58.0	58.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
48.0	48.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1

Cert. No. : AUL22004  
Job No. : VCSAC0041  
Pages : 7 of 9

8. Level Biasity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	± 0.5
120	94.0	94.0	0.0	± 0.5
110	94.0	94.0	0.0	± 0.5
100	94.0	94.0	0.0	± 0.5
90	94.0	94.0	0.0	± 0.5

Level biasity on each level range

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	113.0	113.0	0.0	± 0.5
120	113.0	113.0	0.0	± 0.5

9. Time burst response

Time	Long burst duration, 10	Cycle	Anticipated Value	Measured Value	Deviated Value	Acceptance Limits
Weighting	0.25	1	106.0	107.0	1.0	1.5, -3.0
Fast	2	8	117.0	117.0	0.0	1.0, -2.5
	200	100	134.0	134.1	0.1	1.0
Slow	2	8	106.0	106.0	0.0	1.5, -3.0
	200	100	127.6	127.6	0.0	1.0
SI	0.25	1	99.0	99.0	0.0	1.5, -3.0
	2	8	106.0	106.0	0.0	1.0, -2.5
	200	100	128.0	128.1	0.1	1.0

Cert. No. : AUL22004  
Job No. : VCSAC0041  
Pages : 8 of 9

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leqpk (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	± 1.0
One	134.4	134.0	-0.4	± 1.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	± 1.0
Positive half cycle	135.4	135.1	-0.3	± 2.0
Negative half cycle	135.4	135.1	-0.3	± 2.0

11. Overall indication

Measured value (dB)	Deviated Value	Acceptance Limits
Positive	Negative	
one half cycle	one half cycle	(dB) (dB)
137.3	136.2	-1.1 ± 1.5

QP-1512-01-04-020404

T. Reth...

Cert. No. : AUL22004  
Job No. : VCSAC0041  
Pages : 9 of 9

12. High level stability

Frequency Weighting	SI-M Display at initial (dB)	SI-M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weighting	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 category according a level of confidence of approximately 95%.

End of Calibration Certificate

431-451/8 Sanichom Rd, Bangchuan, Bangkok, 10700 THAILAND  
Tel: 02-2655-8400 Fax: 02-2655-1679 E-mail: sithiporn@sihthiporn.com http://www.sithiporn.com



Cert. No. : AUL22004  
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR  
Manufacturer : RION  
Model : NC-74  
Serial No. : 34422566  
ID No. : BUK\_750617

Condition As Found : GOOD

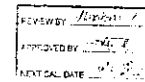
Customer : AUST LABORATORY GROUP (HAI) AND CO., LTD.  
101 PHATHANAKAN 45, PHATHANAKAN ROAD,  
KHAO SANG PHATHANAKAN USULI TIANPANG,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature : 23.0 ± 3.1 °C  
Pressure : 101.2 ± 3.1 kPa  
Relative Humidity : 50.0 ± 20.1 %

Received Date : 05 AUGUST 2021  
Calibration Date : 09 AUGUST 2021  
Date of Issue : 31 AUGUST 2021

Calibrated by : Nishatun Nisatun

Approved by : T. Reth...



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QP-1512-01-04-020404

T. Reth...

QP-1512-01-04-020404

Cert. No. : AUL22004  
Job No. : VCSAC0041  
Pages : 2 of 3

Calibration Procedure : JISAC-03

Calibration Method :

This equipment was calibrated by based on JIS C-9912:2003 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	33511H	MY52102742	11-0911-21	10-Feb-22
Digital Multimeter	33561A	MY52201034	11-101-05-0264	19-Feb-22
Digital Multimeter	8848A	1807825	11-101-08-0264	05-Feb-22
Digital Multimeter	13461A	MY52201016	11-101-04-0264	19-Feb-22
Programmable Acoustics	MA1-1070	02700114	1906-077141	09-Mar-22
Condenser Microphone	4130	2077000	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42K-M	34560384	AA-3002-21	16-Feb-22
Audio Analyser	AVR-3360A	074406090	17-0910-21	16-Feb-22

2. This result of calibration was issued accurate as shown on date and place of calibration, for this calibrated item only.

3. This certificate is traceable to the international system of units maintained at :

- 3.1 National Institute of Metrology (NIM)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR)

QP-1512-01-04-020404

T. Reth...

Continuation of Calibration Certificate

Cert. No. : ACC21012  
Job No. : VCMAC0066  
Pages : 3 of 3

Result of calibration:

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	92.1	0.19	0.22	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1001.9	0.2	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.14	0.10	3.0

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$   
i.e. any value following this calibration is at a level of confidence of approximately 95 %

End of Calibration Certificate

Q9-FS12-04-00-00-04

Continuation of Calibration Certificate

Cert. No. : ACC22113  
Job No. : VCMAC0063  
Pages : 3 of 3

Summary of Measurement Result:

Parameter	Pass	Fail	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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
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
1. Level of linearity on the reference level range	✓	-	0.2	0.3
3. Level of linearity including the level range control	✓	-	0.2	0.3
9. Time-based response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.35
12. High level stability	✓	-	0.1	0.1

Q9-FS12-04-00-00-04

431-451/17 Sathorn Rd.,Bangkok, Bangkok 10700 THAILAND  
Tel:0-2413-4030 Fax:0-2413-1679 e-mail:info@sithiporn.com http://www.sithiporn.com



Cert. No. : ACC22114  
Pages : 1 of 1

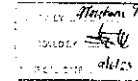
Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42 Microphone CC-02 / Pre-amplifier NL-24  
Serial No. : 00710637 / 133654 / 10634  
ID No. : BKC-F50021

Condition As Found : OK/OK

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PIAT THANAKAN 91, PIAT THANAKAN ROAD,  
KIWAJAI PIAT THANAKAN, KHUET SUAN YONG,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature :  $(23.0 \pm 3.1) ^\circ\text{C}$   
Pressure :  $(101.3 \pm 3.3) \text{ hPa}$   
Relative Humidity :  $(50.0 \pm 2.0) \%$



Received Date : 26 MAY 2022  
Calibration Date : 09-19 JUNI 2022  
Date of Issue : 14 JUNI 2022

Calibrated by : Nithakorn Petchum

Approved by : T. Petchum  
( Nithakorn Petchum )

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Q9-FS12-04-00-00-04

Continuation of Calibration Certificate

Cert. No. : ACC22113  
Job No. : VCMAC0063  
Pages : 4 of 8

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.9)	91.9	0.6	$\pm 0.3$

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Measured value (dB)
A-weight	15.4
C-weight	26.1
Flat	25.3

3. Acoustical signal tests of frequency weightings

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	0.2 0.2 0.2 $\pm 1.5$
1000	0.0 0.0 0.0 $\pm 1.0$
1000	-1.4 -1.4 -1.2 $\pm 0.0$

Q9-FS12-04-00-00-04

Continuation of Calibration Certificate

Cert. No. : ACC22113  
Job No. : VCMAC0063  
Pages : 1 of 8

Calibration Procedure : CP-AU-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-2 (2013) Standard for sound level meter (SLM). The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Attached charters and Reference Standard Instruments.  
The test results of each item were made by observation of each instruments display and also with SLAT's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY40017076	11-0007-22	04-Feb-23
Waveform Generator	33511H	MY32307742	11-0008-22	04-Feb-23
Digital Multimeter	33461A	MY33209104	11-1100-23	09-Feb-23
Digital Multimeter	33461A	MY33209104	11-1100-23	09-Feb-23
Digital Multimeter	33461A	MY30022173	11-1100-23	09-Feb-23
Programmable Attenuator	SLAT-1070	82100114	11-0400-22	07-Feb-23
Condenser Microphone	4109	297790	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-43C-4	34500955	AA-3005-22	22-Feb-23

2. This result of calibration was found accurate as shown in date and place of calibration for this calibration item only.

3. This certificate is acceptable to the international system of unit maintained at :

- National Institute of Metrology (Thailand)
- Thailand Institute of Scientific and Technological Research (TISTR)

Q9-FS12-04-00-00-04

Continuation of Calibration Certificate

Cert. No. : ACC22113  
Job No. : VCMAC0063  
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	$\pm 2.0$
125	0.0	0.0	0.0	$\pm 1.5$
250	0.0	0.0	0.0	$\pm 1.5$
500	0.0	0.1	0.0	$\pm 1.5$
1000	0.0	0.0	0.0	$\pm 1.0$
2000	0.0	0.1	0.0	$\pm 2.0$
4000	0.0	0.2	0.0	$\pm 3.0$
8000	0.0	0.1	0.1	$\pm 3.0$

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	$\pm 0.2$
C-weight	94.0	0.0	$\pm 0.2$
Flat	94.0	0.0	$\pm 0.2$

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	$\pm 0.1$
Imp	94.0	0.0	$\pm 0.1$

6. Long-term stability

Frequency Weighting	SLM Display as initial (dB)	SLM Display at End (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	$\pm 0.1$

Q9-FS12-04-00-00-04

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
128.0	128.0	0.0	+1.1
119.0	119.0	0.0	+1.1
118.0	118.0	0.0	+1.1
106.0	106.0	0.0	+1.1
104.0	104.0	0.0	+1.1
99.0	99.0	0.0	+1.1
98.0	98.0	0.0	+1.1
89.0	89.0	0.0	+1.1
88.0	88.0	0.0	+1.1
79.0	79.0	0.0	+1.1
78.0	78.0	0.0	+1.1
69.0	69.0	0.0	+1.1
68.0	68.0	0.0	+1.1
59.0	59.0	0.0	+1.1
58.0	58.0	0.0	+1.1
49.0	49.0	0.0	+1.1
48.0	48.0	0.0	+1.1
39.0	39.0	-0.1	+1.1
38.0	38.0	-0.1	+1.1
29.0	29.0	-0.1	+1.1
28.0	28.0	-0.1	+1.1
23.0	23.0	-0.1	+1.1
22.0	22.0	-0.1	+1.1
21.0	21.0	-0.2	+1.1

QR-1512-001-04-02064

T. Reth.

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

651-45171 Srinakharin Rd.,Bangkok, Bangkok 10700 THAILAND  
Tel: 0-2435-8030 Fax: 0-2435-1629 e-mail: sithiporn@thai.com Http://www.sithiporn.com



Cert. No. : ACL22134  
Page : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RIGOL  
Model : NL-42 Microphone UC-52 / Pre-amplifier SM-24  
Serial No. : 00710658 / 136956 / 10639  
ID No. : NCR 150022

Condition As Found : GOOD

Customer : A.S.I. LABORATORY GROUP (THAI) AND CO., LTD.  
104 PHAI THANAKASARU PHAI THANAKASARU ROAD,  
KIWAENG PHAI THANAKASARU 1 SHANIKANG,  
BANGKOK, 10250 THAILAND

Location : -

Ambient Temperature : 29.0 ± 3.3 °C

Pressure : 101.4 ± 1.1 kPa

Relative Humidity : 65.0 ± 2.0 %

Received Date : 26 MAY 2022

Calibration Date : 09-10 JUNE 2022

Date of Issue : 14 JUNI 2022

Calibrated by : Nithakorn Poraporn

Approved by : T. Reth.  
(Thasak Porchum)

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QR-1512-001-04-02064

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	98.0	98.0	0.0	+1.1

9. Time level response

Time	Time level duration, T <sub>90</sub> (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	107.9	-0.1	1.5 ± 5.0
	200	800	127.0	127.0	0.0	+1.0
	0.25	1	99.0	99.0	-0.1	1.5 ± 5.0
N.I.	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, L <sub>peak</sub> (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Imp	134.1	134.1	-0.3	+1.0

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	-
Positive half cycle	135.4	135.2	-0.2	+2.0
Negative half cycle	135.4	135.2	-0.2	+2.0

QR-1512-001-04-02064

T. Reth.

SITHIPORN, SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Calibration Procedure : JIS A4011

Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM). The SLM had been tested Acoustical and Electrical signal levels of frequency weighting with Acoustic chamber and Reference Standard Instrument.

For test results of each item were made by observation of each instrument's display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Exp. Date	Due Date
Waveform Generator	33210A	SV148017926	11-09-22	04-09-23
Waveform Generator	33511B	SV132302342	12-09-22	04-09-23
Digital Multimeter	34481A	SV133220104	11-10-22	09-09-23
Digital Multimeter	34461A	SV133220076	11-10-22	09-09-23
Digital Multimeter	34461A	SV140024274	11-10-22	09-09-23
Programmable Attenuator	MAT-7070	80180114	11-09-22	07-09-23
Condenser Microphone	4130	2973900	NA-10-22	24-09-23
Measuring Amplifier	NA-42K-M	34560095	NA-09-22	22-09-23

2. The 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 units maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
99.6	99.6	0.0	+1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	+0.5

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2 or any value following calculation regarding a level of confidence of approximately 95 %.

End of Calibration Certificate

QR-1512-001-04-02064

T. Reth.

SITHIPORN, SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Summary of Measurement Result :

Parameter	Pass	Fail	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
1000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 1 kHz	✓	-	0.3	0.6
For > 1 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	0.2
8. Level linearity including the level range control	✓	-	0.2	0.2
9. Time base response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.2
12. High level stability	✓	-	0.1	0.1

QR-1512-001-04-02064

T. Reth.



Continuation of Calibration Certificate

Cert. No. : ACL22134  
Job No. : VC65AC0063  
Pages : 4 of 8

Result Calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
91.9(91.9)	91.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Measured value (dB)
A-weight	16.8
C-weight	17.3
Flat	22.9

3. Acoustical signal tests of frequency weightings

Meat 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	0.2	0.3	0.3	±1.5
1000	0.0	0.0	0.0	±1.0
3000	-1.2	-0.2	-0.1	±5.0

QR-1512-04-04-02964

T. Pich.

Continuation of Calibration Certificate

Cert. No. : ACL22134  
Job No. : VC65AC0063  
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±2.0
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	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	01.0	0.0	-
C-weight	01.0	0.0	±0.2
Flat	01.0	0.0	±0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	01.0	0.0	-
Slow	01.0	0.0	±0.1
Leq	01.0	0.0	±0.1

6. Long-term stability

Frequency Weighting	SI-M Display at Initial (dB)	SI-M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QR-1512-04-04-02964

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Continuation of Calibration Certificate

Cert. No. : ACL22134  
Job No. : VC65AC0063  
Pages : 6 of 8

7. Level accuracy on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.0	0.0	±1.1
114.0	114.0	0.0	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.0	±1.1
103.0	103.0	0.0	±1.1
102.0	102.0	0.0	±1.1
101.0	101.0	0.0	±1.1
100.0	100.0	0.0	±1.1
99.0	99.0	0.0	±1.1
98.0	98.0	0.0	±1.1
97.0	97.0	0.0	±1.1
96.0	96.0	0.0	±1.1
95.0	95.0	0.0	±1.1
94.0	94.0	0.0	±1.1
93.0	93.0	0.0	±1.1
92.0	92.0	0.0	±1.1
91.0	91.0	0.0	±1.1
90.0	90.0	0.0	±1.1
89.0	89.0	0.0	±1.1
88.0	88.0	0.0	±1.1
87.0	87.0	0.0	±1.1
86.0	86.0	0.0	±1.1
85.0	85.0	0.0	±1.1
84.0	84.0	0.0	±1.1
83.0	83.0	0.0	±1.1
82.0	82.0	0.0	±1.1
81.0	81.0	0.0	±1.1
80.0	80.0	0.0	±1.1
79.0	79.0	0.0	±1.1
78.0	78.0	0.0	±1.1
77.0	77.0	0.0	±1.1
76.0	76.0	0.0	±1.1
75.0	75.0	0.0	±1.1
74.0	74.0	0.0	±1.1
73.0	73.0	0.0	±1.1
72.0	72.0	0.0	±1.1
71.0	71.0	0.0	±1.1
70.0	70.0	0.0	±1.1
69.0	69.0	0.0	±1.1
68.0	68.0	0.0	±1.1
67.0	67.0	0.0	±1.1
66.0	66.0	0.0	±1.1
65.0	65.0	0.0	±1.1
64.0	64.0	0.0	±1.1
63.0	63.0	0.0	±1.1
62.0	62.0	0.0	±1.1
61.0	61.0	0.0	±1.1
60.0	60.0	0.0	±1.1
59.0	59.0	0.0	±1.1
58.0	58.0	0.0	±1.1
57.0	57.0	0.0	±1.1
56.0	56.0	0.0	±1.1
55.0	55.0	0.0	±1.1
54.0	54.0	0.0	±1.1
53.0	53.0	0.0	±1.1
52.0	52.0	0.0	±1.1
51.0	51.0	0.0	±1.1
50.0	50.0	0.0	±1.1
49.0	49.0	0.0	±1.1
48.0	48.0	0.0	±1.1
47.0	47.0	0.0	±1.1
46.0	46.0	0.0	±1.1
45.0	45.0	0.0	±1.1
44.0	44.0	0.0	±1.1
43.0	43.0	0.0	±1.1
42.0	42.0	0.0	±1.1
41.0	41.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	39.0	0.0	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1
35.0	35.0	0.0	±1.1
34.0	34.0	0.0	±1.1
33.0	33.0	0.0	±1.1
32.0	32.0	0.0	±1.1
31.0	31.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1
24.0	24.0	0.0	±1.1
23.0	23.0	0.0	±1.1
22.0	22.0	0.0	±1.1
21.0	21.0	0.0	±1.1
20.0	20.0	0.0	±1.1
19.0	19.0	0.0	±1.1
18.0	18.0	0.0	±1.1
17.0	17.0	0.0	±1.1
16.0	16.0	0.0	±1.1
15.0	15.0	0.0	±1.1
14.0	14.0	0.0	±1.1
13.0	13.0	0.0	±1.1
12.0	12.0	0.0	±1.1
11.0	11.0	0.0	±1.1
10.0	10.0	0.0	±1.1
9.0	9.0	0.0	±1.1
8.0	8.0	0.0	±1.1
7.0	7.0	0.0	±1.1
6.0	6.0	0.0	±1.1
5.0	5.0	0.0	±1.1
4.0	4.0	0.0	±1.1
3.0	3.0	0.0	±1.1
2.0	2.0	0.0	±1.1
1.0	1.0	0.0	±1.1
0.0	0.0	0.0	±1.1

QR-1512-04-04-02964

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Continuation of Calibration Certificate

Cert. No. : ACL22134  
Job No. : VC65AC0063  
Pages : 7 of 8

8. Level accuracy 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	±1.3

9. Time burst response

Time Weighting	Time burst duration, $t_b$ (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; $\pm 5.0$
	2	3	117.0	117.0	0.0	1.0; $\pm 2.5$
	200	800	134.0	134.1	0.1	$\pm 1.0$
Slow	2	3	108.0	108.0	0.0	1.5; $\pm 5.0$
	200	800	127.0	127.0	0.0	$\pm 1.0$
	0.25	1	99.0	98.9	-0.1	1.5; $\pm 5.0$
SPL	2	3	108.0	108.0	0.0	1.0; $\pm 2.5$
	200	800	126.0	126.1	0.1	$\pm 1.0$

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.1	-0.3	±1.0

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	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QR-1512-04-04-02964

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Continuation of Calibration Certificate

Cert. No. : ACL22134  
Job No. : VC65AC0063  
Pages : 8 of 8

11. Deviated indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	99.0	99.0	0.0
Negative one-half cycle	99.0	99.0	0.0

12. High level stability

Frequency Weighting	SI-M Display at Initial (dB)	SI-M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2  
or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

431-45171 Srinakharin Rajavidyalaya, Bangkok Bangkok 10100 THAILAND  
Tel: 0-2435-0810 Fax: 0-2435-1479 E-mail: cal@central.sithiporn.com Web: www.sithiporn.com

Cert. No. : ACL22134  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : SL-42 Microphone UC-52 / Pre-amplifier N1-24  
Serial No. : 00710639 / 134097 / 10640  
ID No. : RSK-15007

Condition As Found : GOOD

Customer : AIS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHANUSAN RD., PHATHANUSAN ROAD,  
SUKHUMVIT PHATHANUSAN RD. 11, MOON TOWN,  
BANGKOK, 10260 THAILAND

Location :  
Ambient Temperature : 23.0 ± 0.1 °C  
Pressure : 1013.2 ± 0.1 hPa  
Relative Humidity : 58.0 ± 2.0 %  
Received Date : 29 MAY 2022  
Calibration Date : 09-10 JUNE 2022  
Date of Issue : 14 JUNE 2022

Calibrated by : Nithakorn Pichum

Approved by : T. Pich.  
( Nithakorn Pichum )

This certificate is issued in accordance with the requirements of ISO/IEC 17025 (metrology), may not be reproduced  
other than in full, except with the prior written approval of the head of Calibration Laboratory.

QR-1512-04-04-02964

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## Continuation of Calibration Certificate

Cert. No. : ACL22135  
Job No. : VCSAC0063  
Pages : 2 of 2

Calibration Procedure : I.P.AC-01

## Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had been to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each Instruments display and also with SLM's display.

## Condition of this result of calibration :

## 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	50210A	NY14001876	11-0907-22	04-10-23
Waveform Generator	53511B	NY33250242	11-0907-22	04-10-23
Digital Multimeter	34461A	NY33220104	11-1109-047C65	09-10-23
Digital Multimeter	34461A	NY33220106	11-1109-047C65	09-10-23
Digital Multimeter	34461A	NY33220107	11-1109-047C65	09-10-23
Digital Multimeter	34461A	NY33220113	11-1109-047C65	09-10-23
Programmable Attenuator	MA1-1070	62100114	11-0907-22	07-10-23
Condenser Microphone	4160	2977900	AA-1013-22	24-10-23
Measuring Amplifier	NA-42KAT	34306009	AA-3009-22	22-10-23

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 acceptable 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).

ID-1512-01-01-02064

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## Continuation of Calibration Certificate

Cert. No. : ACL22135  
Job No. : VCSAC0063  
Pages : 3 of 3

## 4. Electrical signal tests of frequency weightings

Weighting curve response with relative to 1 kHz.

Frequencies (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	-0.1	0.0	-0.1	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

Frequencies Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	93.0	0.0	-
C-weight	93.0	0.0	±0.2
Flat	93.0	0.0	±0.2

## 5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	93.0	0.0	-
Slow	93.0	0.0	±0.1
1 sec	93.0	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	93.0	93.0	0.0	±0.3

ID-1512-01-01-02064

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## Continuation of Calibration Certificate

Cert. No. : ACL22135  
Job No. : VCSAC0063  
Pages : 3 of 3

## Summary of Measurement Results

Parameter	Pass	Fail	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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1250 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 10 kHz	✓	-	0.3	0.7
For 5 Hz to 10 kHz	✓	-	0.3	1.0
For 10 Hz to 20 kHz	✓	-	0.2	0.2
5. Frequency and time weightings at 1 kHz	✓	-	0.1	0.1
6. Long-term stability	✓	-	0.2	0.3
7. Level linearity on the reference level of range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

ID-1512-01-01-02064

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## Continuation of Calibration Certificate

Cert. No. : ACL22135  
Job No. : VCSAC0063  
Pages : 4 of 4

## 7. Level linearity on the reference level of 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	-0.1	±1.1
132.0	131.9	-0.1	±1.1
131.0	130.9	-0.1	±1.1
129.0	128.9	-0.1	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	0.0	±1.1
24.0	24.0	-0.1	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1
4.0	4.0	0.0	±1.1

ID-1512-01-01-02064

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## Continuation of Calibration Certificate

Cert. No. : ACL22135  
Job No. : VCSAC0063  
Pages : 4 of 4

## Result of calibration :

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.0 (93.0)	93.0	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
19.2

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

Frequency Weighting	Measured value (dB)
A-weight	12.6
C-weight	16.5
Flat	24.5

## 3. Acoustical signal tests of frequency weightings

More five field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	-0.1	0.1	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-0.3	-0.2	-0.2	±5.0

ID-1512-01-01-02064

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## Continuation of Calibration Certificate

Cert. No. : ACL22135  
Job No. : VCSAC0063  
Pages : 7 of 8

## 8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

## 9. Time burst response

Time Weighting	Time burst duration, Th	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.2	1	106.0	107.0	-0.1	1.5 ± 5.0
	2	8	113.0	112.0	0.0	1.0 ± 2.5
Slow	200	800	134.0	134.0	0.0	±1.0
	2	8	106.0	106.0	0.0	1.5 ± 5.0
SIL	200	800	127.0	127.0	0.0	±1.0
	0.25	1	94.0	94.0	-0.1	1.5 ± 5.0
	2	8	106.0	106.0	0.0	1.0 ± 2.5
	200	800	126.0	126.0	0.0	±1.0

## 10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Peak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Time	136.4	135.7	-0.7	±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	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

ID-1512-01-01-02064

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Cert. No. : ACL21118  
Job No. : VCA5AC003  
Page : 8 of 8

11. Overall Indication

Measured value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	
89.7	89.3	-0.2
		87.5

12. High level stability

Frequency Weighting	SI M Display at initial (dB)	SI M Display at final (dB)	Deviation 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 follows my calculation providing a 1 in 4 confidence of approximately 95 %

End of Calibration Certificate

41-41175 Sathorn Rd. Bangkok, Bangkok 10700 THAILAND  
Tel: 2415-8200 Fax: 2411-1609 e-mail: cal@sthpn.com http://www.sthpn.com



Cert. No. : ACL21118  
Page : 1 of 8

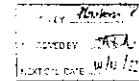
Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : B&K  
Model : NL-42 Microphone UC-52 / Pre-amplifier NH-24  
Serial No. : 003518 / 13870 / 1871  
ID No. : B&K 150109

Condition As Found : GPOD

Customer : AIST LABORATORY UNDER THE AIST CO., LTD.  
101 PHA THANAKAN 40, PHA THANAKAN ROAD,  
SIRWANG PHA THANAKAN KHEW WANG LUANG,  
BANGKOK 10250 THAILAND

Location :  
Ambient Temperature :  $\pm 23.0 \pm 0.1$  °C  
Pressure :  $\pm 101.3 \pm 0.1$  kPa  
Relative Humidity :  $\pm 50.0 \pm 2.0$  %



Recd of Date : 09 DEC 2021  
Calibration Date : 14-15 DECEMBER 2021  
Date of Issue : 14 DECEMBER 2021

Calibrated by : Natchorn Porporan

Approved by : *T. Petch...*  
(Thonakul Petchurak)

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.

QI-1512-04-04-02004

Cert. No. : ACL21118  
Job No. : VCA5AC003  
Page : 3 of 8

Summary of Measurement Results

Parameter	Pass	Fail	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 level of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal level of frequency weightings				
Free 10 Hz to 4 kHz	✓	-	0.3	0.6
Free 24 kHz to 10 kHz	✓	-	0.3	0.3
Free 5 kHz to 20 kHz	✓	-	0.2	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 extend	✓	-	0.2	0.3
9. Fast burst response	✓	-	0.2	0.3
10. Peak-C sound level	✓	-	0.2	0.35
11. Chirped indication	✓	-	0.2	0.35
12. High level stability	✓	-	0.1	0.1

Cert. No. : ACL21118  
Job No. : VCA5AC003  
Page : 4 of 8

Result of calibration

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.0 (93.0)	93.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.3

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

Frequency Weighting	Measured value (dB)
A-weight	13.1
C-weight	19.6
Flat	25.8

3. Acoustical signal level of frequency weightings

3.1 Free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.5	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-1.0	-1.1	0.0	±3.0

Cert. No. : ACL21118  
Job No. : VCA5AC003  
Page : 2 of 8

Calibration Procedure : CP-02-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-2 (2013) Standard for sound level meter (SLM). The SLM had tests in Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments. Test results of each item were made by observation of each Instruments display and also with SLMs display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY54017376	FF-0012-21	10-Feb-22
Waveform Generator	33311B	MY52302742	FF-0011-21	10-Feb-22
Digital Multimeter	33401A	MY53220104	111-01-03-0244	10-Feb-22
Digital Multimeter	33401A	MY53220178	111-01-03-0264	06-Feb-22
Digital Multimeter	3040A	1947025	111-01-06-0264	05-Feb-22
Programmable Attenuator	NA31-0705	62101114	1504-077747	08-Mar-22
Condenser Microphone	4100	2079001	AA-1008-21	05-Feb-22
Measuring Amplifier	NA3-02CM	34560055	AA-3003-21	10-Feb-22

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 measurable in the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

QI-1512-04-04-02004

Cert. No. : ACL21118  
Job No. : VCA5AC003  
Page : 5 of 8

4. Electrical signal level of frequency weightings

Weighting network response with reference to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	±2.0
125	-0.1	0.0	-0.1	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SI M Display at initial (dB)	SI M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QI-1512-04-04-02004

QI-1512-04-04-02004

QI-1512-04-04-02004

Cert. No. : ACL231048  
Job No. : VCMAC0033  
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
128.0	128.0	0.0	+1.1
126.0	126.0	0.0	+1.1
124.0	124.0	0.0	+1.1
122.0	122.0	0.0	+1.1
120.0	120.0	0.0	+1.1
118.0	118.0	0.0	+1.1
116.0	116.0	0.0	+1.1
114.0	114.0	0.0	+1.1
112.0	112.0	0.0	+1.1
110.0	110.0	0.0	+1.1
108.0	108.0	0.0	+1.1
106.0	106.0	0.0	+1.1
104.0	104.0	0.0	+1.1
102.0	102.0	0.0	+1.1
100.0	100.0	0.0	+1.1
98.0	98.0	0.0	+1.1
96.0	96.0	0.0	+1.1
94.0	94.0	0.0	+1.1
92.0	92.0	0.0	+1.1
90.0	90.0	0.0	+1.1
88.0	88.0	0.0	+1.1
86.0	86.0	0.0	+1.1
84.0	84.0	0.0	+1.1
82.0	82.0	0.0	+1.1
80.0	80.0	0.0	+1.1
78.0	78.0	0.0	+1.1
76.0	76.0	0.0	+1.1
74.0	74.0	0.0	+1.1
72.0	72.0	0.0	+1.1
70.0	70.0	0.0	+1.1
68.0	68.0	0.0	+1.1
66.0	66.0	0.0	+1.1
64.0	64.0	0.0	+1.1
62.0	62.0	0.0	+1.1
60.0	60.0	0.0	+1.1
58.0	58.0	0.0	+1.1
56.0	56.0	0.0	+1.1
54.0	54.0	0.0	+1.1
52.0	52.0	0.0	+1.1
50.0	50.0	0.0	+1.1
48.0	48.0	0.0	+1.1
46.0	46.0	0.0	+1.1
44.0	44.0	0.0	+1.1
42.0	42.0	0.0	+1.1
40.0	40.0	0.0	+1.1
38.0	38.0	0.0	+1.1
36.0	36.0	0.0	+1.1
34.0	34.0	0.0	+1.1
32.0	32.0	0.0	+1.1
30.0	30.0	0.0	+1.1
28.0	28.0	0.0	+1.1
26.0	26.0	0.0	+1.1
24.0	24.0	0.0	+1.1
22.0	22.0	0.0	+1.1
20.0	20.0	0.0	+1.1
18.0	18.0	0.0	+1.1
16.0	16.0	0.0	+1.1
14.0	14.0	0.0	+1.1
12.0	12.0	0.0	+1.1
10.0	10.0	0.0	+1.1
8.0	8.0	0.0	+1.1
6.0	6.0	0.0	+1.1
4.0	4.0	0.0	+1.1
2.0	2.0	0.0	+1.1
0.0	0.0	0.0	+1.1

UP-1512-00-00-02044

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

51-4517 Sathorn Rd, Bangkok, Bangkok 10730 THAILAND  
Tel: 0-2415-4200 Fax: 0-2415-1679 e-mail: info@sithiporn.co.th http://www.sithiporn.co.th



Cert. No. : ACL231049  
Job No. : VCMAC0033  
Pages : 1 of 8

Calibration Certificate

Equipment : SIGMA LEVEL METER  
Manufacturer : RUM  
Model : RT-42 Microphone UC-52 / Pre-amplifier 520-24  
Serial No. : 10054520 / 157331 / 15732  
ID No. : BKK F50110

Condition As Found : GARD

Customer : SITHIPORN ASSOCIATES CO.,LTD.  
100/100TH ANAKAN 40, PHATHANAKAN ROAD,  
KIRKALING PHATHANAKAN, SITHIPORN LARG,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature : 23.0 ± 1.1 °C  
Pressure : 1013.2 ± 1.1 hPa  
Relative Humidity : 50.0 ± 1.1 %

Received Date : 09 DECEMBER 2021  
Calibration Date : 14-15 DECEMBER 2021  
Date of Issue : 16 DECEMBER 2021

Calibrated by : Natchanon Pongman

Approved by : T. Petchai  
1. Thanakul Petchai

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced or altered in full, except with the prior written approval of the head of Calibration Laboratory.

UP-1512-00-00-02044

Cert. No. : ACL231048  
Job No. : VCMAC0033  
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	+1.1

9. Time burst response

Time Weighting	Time burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	105.0	107.9	-2.9	-3.1; -5.0
	2	5	112.0	117.0	-5.0	-3.1; -2.5
Slow	200	800	134.0	134.0	0.0	+1.0
	2	8	106.0	106.0	0.0	-3.1; -5.0
SEL	200	800	127.6	127.6	0.0	+1.0
	0.25	1	99.0	99.0	-0.1	-1.1; -5.0
	2	8	108.0	108.0	0.0	-1.0; -2.5
	200	800	129.0	129.0	0.0	+1.0

10. Peak C sound level

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	-
Free	136.4	136.0	-0.4	+1.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	-0.1	-
Positive half cycle	135.4	135.2	-0.2	+2.0
Negative half cycle	135.4	135.3	-0.1	+2.0

UP-1512-00-00-02044

Cert. No. : ACL231049  
Job No. : VCMAC0033  
Pages : 2 of 8

Calibration Procedure : CP-01-00

Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM test was in Acoustical and Electrical signal tests of frequency weighting with A-weight chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each instrument display and also with SLM display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	M1540417076	11-0012-21	10-Feb-22
Waveform Generator	33511B	M155201742	11-0111-21	10-Feb-22
Digital Multimeter	34461A	M15322104	11-1101-05-0264	10-Feb-22
Digital Multimeter	34461A	M153221076	11-1101-05-0264	08-Feb-22
Digital Multimeter	8506A	1909025	11-1101-06-0264	05-Feb-22
Programmable Attenuator	MT-1070	62100114	15-0127-04	08-Mar-22
Condenser Microphone	4150	2979800	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-62K-A1	34966095	AA-0001-21	18-Feb-22

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 acceptable to the international system of units measurement.

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

UP-1512-00-00-02044

Cert. No. : ACL231048  
Job No. : VCMAC0033  
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.5	0.5
Negative one-half cycle	89.5	-1.5

12. High level stability

Frequency Weighting	SLM Display as found (dB)	SLM Display as find (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 a coverage factor  $k = 2$  or any value following calculation providing a level of confidence of approximately 95 %.

End of Calibration Certificate

UP-1512-00-00-02044

Cert. No. : ACL231049  
Job No. : VCMAC0033  
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	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	✓	-	0.1	0.6
3.1 125 Hz	✓	-	0.1	0.6
3.2 1000 Hz	✓	-	0.1	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.1	0.7
4.1 Fast 10 Hz to 4 kHz	✓	-	0.1	0.6
4.2 Free > 4 kHz to 10 kHz	✓	-	0.1	0.7
4.3 Free > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Temp. - temp. 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. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.5	0.15
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

UP-1512-00-00-02044

Continuation of Calibration Certificate

Cert. No. : ACL21109  
Job No. : YV05AC0033  
Pages : 4 of 8

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.9 (92.96)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.8

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	10.8
C-weight	16.9
Flat	22.6

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.5	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-1.2	-1.2	-1.2	±0.0

QH-1512-01-04-029-04

T. Pichai

Continuation of Calibration Certificate

Cert. No. : ACL21109  
Job No. : YV05AC0033  
Pages : 7 of 8

4. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

5. Time interval response

Time Weighting	Time burst duration, 1/3 sec	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.0	-0.1	±5.5; ±5.0
	2	8	117.0	117.0	0.0	±0.0; ±2.5
	200	80	133.0	134.1	-0.1	±1.0
Slow	2	5	106.0	106.0	0.0	±2.5; ±3.0
	200	80	127.8	127.8	0.0	±1.0
	0.25	1	95.0	96.9	-0.1	±3.5; ±5.0
Stk.	2	8	106.0	106.0	0.0	±0.0; ±2.5
	200	80	126.0	126.0	0.0	±1.0

6. Peak, C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	112.0	112.0	0.0	-
Fast	116.4	116.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	112.0	113.0	0.0	-
Positive half cycle	115.4	115.2	-0.2	±2.0
Negative half cycle	115.4	115.2	-0.2	±2.0

QH-1512-01-04-029-04

T. Pichai

Continuation of Calibration Certificate

Cert. No. : ACL21109  
Job No. : YV05AC0033  
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with reference to IEC 6101.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.3
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.5
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±2.0
8000	0.0	0.1	0.1	±2.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	S.M. Display at initial (dB)	S.M. Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.2

QH-1512-01-04-029-04

T. Pichai

Continuation of Calibration Certificate

Cert. No. : ACL21109  
Job No. : YV05AC0033  
Pages : 6 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
99.5	95.5	0.0	±1.5

12. High level stability

Frequency Weighting	S.M. Display at initial (dB)	S.M. Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2  
or any value following calculation providing a level of confidence of approximately 95%

----- End of Calibration Certificate -----

QH-1512-01-04-029-04

T. Pichai

Continuation of Calibration Certificate

Cert. No. : ACL21109  
Job No. : YV05AC0033  
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.0	0.0	±1.1
114.0	114.0	0.0	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.0	±1.1
103.0	103.0	0.0	±1.1
102.0	102.0	0.0	±1.1
101.0	101.0	0.0	±1.1
100.0	100.0	0.0	±1.1
99.0	99.0	0.0	±1.1
98.0	98.0	0.0	±1.1
97.0	97.0	0.0	±1.1
96.0	96.0	0.0	±1.1
95.0	95.0	0.0	±1.1
94.0	94.0	0.0	±1.1
93.0	93.0	0.0	±1.1
92.0	92.0	0.0	±1.1
91.0	91.0	0.0	±1.1
90.0	90.0	0.0	±1.1
89.0	89.0	0.0	±1.1
88.0	88.0	0.0	±1.1
87.0	87.0	0.0	±1.1
86.0	86.0	0.0	±1.1
85.0	85.0	0.0	±1.1
84.0	84.0	0.0	±1.1
83.0	83.0	0.0	±1.1
82.0	82.0	0.0	±1.1
81.0	81.0	0.0	±1.1
80.0	80.0	0.0	±1.1
79.0	79.0	0.0	±1.1
78.0	78.0	0.0	±1.1
77.0	77.0	0.0	±1.1
76.0	76.0	0.0	±1.1
75.0	75.0	0.0	±1.1

QH-1512-01-04-029-04

T. Pichai

451-451/1 Sathorn 96, Bangkok, Bangkok 10700 THAILAND  
Tel: 02-2415-8800 Fax: 02-2415-1679 e-mail: cal-center@sithiporn.com http://www.sithiporn.com



Cert. No. : ACL21109  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RMCY  
Model : NL-42 Microphone UC-52 / Pre-amplifier NH-24  
Serial No. : 0657246 / 120403 / 120404  
ID No. : BSK, 150975

Condition As Found : OK

Customer : AT LABORATORY GROUP (THAILAND) CO., LTD.  
101 PHATHANAKAN 40 PHATHANAKAN ROAD,  
KUNSAENG PHATHANAKAN, KUPAT SAN LUNG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : 23.0 ± 3.0 °C  
Pressure : 1013.3 ± 3.0 hPa  
Relative Humidity : 50.0 ± 20.0 %  
Received Date : 01 NOVEMBER 2021  
Calibration Date : 02-04 NOVEMBER 2021  
Date of Issue : 05 NOVEMBER 2021

Calibrated by : Nattanon Pichaiwan

Approved by : T. Pichai  
T. Pichai

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.

QH-1512-01-04-029-04

Continuation of Calibration Certificate

Cert. No. : AUL21146  
Job No. : VCA5AC001  
Page : 1 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on JIS C 41672-3 (2011) Standard for sound level meter (SLM).  
The SLM has been tested in Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each instrument display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Wavemeter Generator	33210A	MY40017016	11-0012-21	10-Feb-22
Wavemeter Generator	33311B	MY32304342	11-0011-21	10-Feb-22
Digital Multimeter	34461A	MY32220104	111-0010-21	10-Feb-22
Digital Multimeter	34461A	MY32220076	111-0010-21	10-Feb-22
Digital Multimeter	34461A	1970125	111-0010-21	05-Feb-22
Programmable Intermittent	MA1-1070	62102114	130-077242	08-Sep-22
Condenser Microphone	4134	2077040	AA-1006-21	05-Feb-22
Measuring Amplifier	NA-42EM	34500495	AA-1003-21	16-Feb-22

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 :

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

CP-1512-01-01-02064

T. P. L.

Continuation of Calibration Certificate

Cert. No. : AUL21146  
Job No. : VCA5AC001  
Page : 2 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with reference to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±2.0
125	0.0	0.0	-0.1	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.0	0.0	-
Slow	0.0	0.0	±0.1
Freq	0.0	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	0.0	0.0	0.0	±0.3

CP-1512-01-01-02064

T. P. L.

Continuation of Calibration Certificate

Cert. No. : AUL21146  
Job No. : VCA5AC001  
Page : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	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	✓	-	0.2	0.6
125 Hz	✓	-	0.2	0.6
630 Hz	✓	-	0.2	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.2	0.6
For 10 Hz to 4 kHz	✓	-	0.2	0.6
For > 4 kHz to 10 kHz	✓	-	0.2	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. Time burst response	✓	-	0.2	0.3
10. Peak-C sound level	✓	-	0.2	0.25
11. C-sound level	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

CP-1512-01-01-02064

T. P. L.

Continuation of Calibration Certificate

Cert. No. : AUL21146  
Job No. : VCA5AC001  
Page : 4 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
132.0	132.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
137.0	137.0	0.0	± 1.1
138.0	138.0	0.0	± 1.1
139.0	139.0	0.0	± 1.1
140.0	140.0	0.0	± 1.1
141.0	141.0	0.0	± 1.1
142.0	142.0	0.0	± 1.1
143.0	143.0	0.0	± 1.1
144.0	144.0	0.0	± 1.1
145.0	145.0	0.0	± 1.1
146.0	146.0	0.0	± 1.1
147.0	147.0	0.0	± 1.1
148.0	148.0	0.0	± 1.1
149.0	149.0	0.0	± 1.1
150.0	150.0	0.0	± 1.1
151.0	151.0	0.0	± 1.1
152.0	152.0	0.0	± 1.1
153.0	153.0	0.0	± 1.1
154.0	154.0	0.0	± 1.1
155.0	155.0	0.0	± 1.1
156.0	156.0	0.0	± 1.1
157.0	157.0	0.0	± 1.1
158.0	158.0	0.0	± 1.1
159.0	159.0	0.0	± 1.1
160.0	160.0	0.0	± 1.1
161.0	161.0	0.0	± 1.1
162.0	162.0	0.0	± 1.1
163.0	163.0	0.0	± 1.1
164.0	164.0	0.0	± 1.1
165.0	165.0	0.0	± 1.1
166.0	166.0	0.0	± 1.1
167.0	167.0	0.0	± 1.1
168.0	168.0	0.0	± 1.1
169.0	169.0	0.0	± 1.1
170.0	170.0	0.0	± 1.1
171.0	171.0	0.0	± 1.1
172.0	172.0	0.0	± 1.1
173.0	173.0	0.0	± 1.1
174.0	174.0	0.0	± 1.1
175.0	175.0	0.0	± 1.1
176.0	176.0	0.0	± 1.1
177.0	177.0	0.0	± 1.1
178.0	178.0	0.0	± 1.1
179.0	179.0	0.0	± 1.1
180.0	180.0	0.0	± 1.1
181.0	181.0	0.0	± 1.1
182.0	182.0	0.0	± 1.1
183.0	183.0	0.0	± 1.1
184.0	184.0	0.0	± 1.1
185.0	185.0	0.0	± 1.1
186.0	186.0	0.0	± 1.1
187.0	187.0	0.0	± 1.1
188.0	188.0	0.0	± 1.1
189.0	189.0	0.0	± 1.1
190.0	190.0	0.0	± 1.1
191.0	191.0	0.0	± 1.1
192.0	192.0	0.0	± 1.1
193.0	193.0	0.0	± 1.1
194.0	194.0	0.0	± 1.1
195.0	195.0	0.0	± 1.1
196.0	196.0	0.0	± 1.1
197.0	197.0	0.0	± 1.1
198.0	198.0	0.0	± 1.1
199.0	199.0	0.0	± 1.1
200.0	200.0	0.0	± 1.1
201.0	201.0	0.0	± 1.1
202.0	202.0	0.0	± 1.1
203.0	203.0	0.0	± 1.1
204.0	204.0	0.0	± 1.1
205.0	205.0	0.0	± 1.1
206.0	206.0	0.0	± 1.1
207.0	207.0	0.0	± 1.1
208.0	208.0	0.0	± 1.1
209.0	209.0	0.0	± 1.1
210.0	210.0	0.0	± 1.1
211.0	211.0	0.0	± 1.1
212.0	212.0	0.0	± 1.1
213.0	213.0	0.0	± 1.1
214.0	214.0	0.0	± 1.1
215.0	215.0	0.0	± 1.1
216.0	216.0	0.0	± 1.1
217.0	217.0	0.0	± 1.1
218.0	218.0	0.0	± 1.1
219.0	219.0	0.0	± 1.1
220.0	220.0	0.0	± 1.1
221.0	221.0	0.0	± 1.1
222.0	222.0	0.0	± 1.1
223.0	223.0	0.0	± 1.1
224.0	224.0	0.0	± 1.1
225.0	225.0	0.0	± 1.1
226.0	226.0	0.0	± 1.1
227.0	227.0	0.0	± 1.1
228.0	228.0	0.0	± 1.1
229.0	229.0	0.0	± 1.1
230.0	230.0	0.0	± 1.1
231.0	231.0	0.0	± 1.1
232.0	232.0	0.0	± 1.1
233.0	233.0	0.0	± 1.1
234.0	234.0	0.0	± 1.1
235.0	235.0	0.0	± 1.1
236.0	236.0	0.0	± 1.1
237.0	237.0	0.0	± 1.1
238.0	238.0	0.0	± 1.1
239.0	239.0	0.0	± 1.1
240.0	240.0	0.0	± 1.1
241.0	241.0	0.0	± 1.1
242.0	242.0	0.0	± 1.1
243.0	243.0	0.0	± 1.1
244.0	244.0	0.0	± 1.1
245.0	245.0	0.0	± 1.1
246.0	246.0	0.0	± 1.1
247.0	247.0	0.0	± 1.1
248.0	248.0	0.0	± 1.1
249.0	249.0	0.0	± 1.1
250.0	250.0	0.0	± 1.1
251.0	251.0	0.0	± 1.1
252.0	252.0	0.0	± 1.1
253.0	253.0	0.0	± 1.1
254.0	254.0	0.0	± 1.1
255.0	255.0	0.0	± 1.1
256.0	256.0	0.0	± 1.1
257.0	257.0	0.0	± 1.1
258.0	258.0	0.0	± 1.1
259.0	259.0	0.0	± 1.1
260.0	260.0	0.0	± 1.1
261.0	261.0	0.0	± 1.1
262.0	262.0	0.0	± 1.1
263.0	263.0	0.0	± 1.1
264.0	264.0	0.0	± 1.1
265.0	265.0	0.0	± 1.1
266.0	266.0	0.0	± 1.1
267.0	267.0	0.0	± 1.1
268.0	268.0	0.0	± 1.1
269.0	269.0	0.0	± 1.1
270.0	270.0	0.0	± 1.1
271.0	271.0	0.0	± 1.1
272.0	272.0	0.0	± 1.1
273.0	273.0	0.0	± 1.1
274.0	274.0	0.0	± 1.1
275.0	275.0	0.0	± 1.1
276.0	276.0	0.0	± 1.1
277.0	277.0	0.0	± 1.1
278.0	278.0	0.0	± 1.1
279.0	279.0	0.0	± 1.1
280.0	280.0	0.0	± 1.1
281.0	281.0	0.0	± 1.1
282.0	282.0	0.0	± 1.1
283.0	283.0	0.0	± 1.1
284.0	284.0	0.0	± 1.1
285.0	285.0	0.0	± 1.1
286.0	286.0	0.0	± 1.1
287.0	287.0	0.0	± 1.1
288.0	288.0	0.0	± 1.1
289.0	289.0	0.0	± 1.1
290.0	290.0	0.0	± 1.1
291.0	291.0	0.0	± 1.1
292.0	292.0	0.0	± 1.1
293.0	293.0	0.0	± 1.1
294.0	294.0	0.0	± 1.1
295.0	295.0	0.0	± 1.1
296.0	296.0	0.0	± 1.1
297.0	297.0	0.0	± 1.1
298.0	298.0	0.0	± 1.1
299.0	299.0	0.0	± 1.1
300.0	300.0	0.0	± 1.1
301.0	301.0	0.0	± 1.1
302.0	302.0	0.0	± 1.1
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305.0	305.0	0.0	± 1.1
306.0	306.0	0.0	± 1.1
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322.0	322.0	0.0	± 1.1
323.0	323.0	0.0	± 1.1
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325.0	325.0	0.0	± 1.1
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328.0	328.0	0.0	± 1.1
329.0	329.0	0.0	± 1.1
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410.0	410.0	0.0	± 1.1
411.0	411.0	0.0	± 1.1
412.0	412.0	0.0	± 1.1
413.0	413.0	0.0	± 1.1
414.0	414.0	0.0	± 1.1
415.0	415.0	0.0	± 1.1
416.0	416.0	0.0	± 1.1
417.0	417.0	0.0	± 1.1
418.0	418.0	0.0	± 1.1
419.0	419.0	0.0	± 1.1
420.0	420.0	0.0	± 1.1
421.0	421.0	0.0	± 1.1
422.0	422.0	0.0	± 1.1
423.0	423.0	0.0	± 1.1
424.0	424.0	0.0	± 1.1
425.0	4		

## Continuation of Calibration Certificate

Cert. No. : ACL23008  
Job No. : VCA54C9001  
Page : 2 of 8

## 10. Deviated Indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Positive one-half cycle	Negative one-half cycle	
29.6	29.7	±1.5

## 12. High level stability

Frequency Weighting	SI M Display at start (dB)	SI M Display at final (dB)	Deviated Value (dB)	Acceptance Limit (dB)
A-weight	137.0	137.0	0.0	±0.5

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

QR-1512-04-04-02604

T. Pich.

## Continuation of Calibration Certificate

Cert. No. : ACL23008  
Job No. : VCA54C9001  
Page : 3 of 8

## Summary of Measurement Result

Parameter	Pass	Fail	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
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.7
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 around	✓	-	0.2	0.3
9. Time based response	✓	-	0.2	0.3
10. Peak-C level level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QR-1512-04-04-02604

T. Pich.

451-45111 Sathorn Rd.,Bangkok, Bangkok 10110 THAILAND  
Tel: 0-2415-8100 Fax: 0-2415-1609 e-mail: info@sithiporn.com Web: www.sithiporn.comCert. No. : ACL23008  
Job No. : VCA54C9001  
Page : 1 of 8

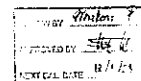
## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : SL-422 Microphone UC-52 - Pre-amplifier NH-24  
Serial No. : 00290514 / 170116 / 87523  
ID No. : BCK 170991

Condition As Found : 14000

Customer : SITHIPORN ASSOCIATES CO.,LTD.  
194 PHA THIAN MEAN RD., PHRA THIAN MEAN RD.,  
KHU AI NG PHAI THIAN MEAN, KHU 1 NOAN LUANG,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature :  $(23.0 \pm 1.1) ^\circ\text{C}$   
Pressure :  $(1013.2 \pm 1.1) \text{ hPa}$   
Relative Humidity :  $(50.0 \pm 20.1) \%$   
Received Date : 09 JANUARY 2022  
Calibration Date : 12-14 JANUARY 2022  
Date of Issue : 17 JANUARY 2022



Calibrated by : Nithakorn Pichaporn

Approved by : T. Pich.

T. Pich.

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced  
otherwise in full, except with the prior written approval of the head of Calibration Laboratory.

QR-1512-04-04-02604

## Continuation of Calibration Certificate

Cert. No. : ACL23008  
Job No. : VCA54C9001  
Page : 4 of 8

## Result of calibration :

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
92.0 (93.06)	91.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal use

Measured Value (dB)
14.1

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

Frequency Weighting	Measured value (dB)
A-weight	12.0
C-weight	13.7
Flat	24.2

## 3. Acoustical signal tests of frequency weightings

Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.5	-0.5	±1.5
1000	-0.1	-0.1	-0.1	±1.0
2000	-1.1	-1.0	-1.0	±2.0

QR-1512-04-04-02604

T. Pich.

## Continuation of Calibration Certificate

Cert. No. : ACL23008  
Job No. : VCA54C9001  
Page : 2 of 8

Calibration Procedure : 1. P-SC-01

## Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had been Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each instrument 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	33350A	MY45017056	11-0012-21	10-Feb-22
Waveform Generator	33311B	MY5326742	11-0013-21	10-Feb-22
Digital Multimeter	33461A	MY5320016	11-0016-22	10-Feb-22
Digital Multimeter	33461A	MY5323076	11-0018-22	08-Feb-22
Digital Multimeter	33461A	MY5320277	11-0019-22	18-Sep-22
Programmable Attenuator	MA3-1070	42109114	18-002706	08-Mar-22
Condenser Microphone	4100	2937500	AA-1000-21	09-Feb-22
Measuring Amplifier	NA-42K-M	3456605	AA-5005-21	16-Feb-22

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 as :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

QR-1512-04-04-02604

T. Pich.

## Continuation of Calibration Certificate

Cert. No. : ACL23008  
Job No. : VCA54C9001  
Page : 5 of 8

## 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±2.0
8000	0.0	0.1	0.1	±3.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
A-weight	14.0	0.0	±0.2
C-weight	16.0	0.0	±0.2
Flat	26.0	0.0	±0.2

## 5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Flat	26.0	0.0	±0.2
Slow	26.0	0.0	±0.2
Fast	26.0	0.0	±0.2

## 6. Long-term stability

Frequency Weighting	SI M Display at start (dB)	SI M Display at final (dB)	Deviated Value (dB)	Acceptance Limit (dB)
A-weight	14.0	14.0	0.0	±0.3

QR-1512-04-04-02604

T. Pich.

Cert. No. : AUL22008  
Job No. : VCA5A00041  
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
128.0	128.0	0.0	+1.1
119.0	119.0	0.0	+1.1
111.0	111.0	0.0	+1.1
109.0	109.0	0.0	+1.1
104.0	104.0	0.0	+1.1
92.0	92.0	0.0	+1.1
91.0	91.0	0.0	+1.1
85.0	85.0	0.0	+1.1
84.0	84.0	0.0	+1.1
74.0	74.0	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
50.0	50.0	0.0	+1.1
54.0	54.0	0.0	+1.1
44.0	44.0	0.0	+1.1
44.0	44.0	0.0	+1.1
39.0	39.0	0.0	+1.1
34.0	34.0	0.0	+1.1
30.0	30.0	0.0	+1.1
29.0	29.0	0.0	+1.1
25.0	25.0	0.0	+1.1
25.0	25.0	0.0	+1.1
26.0	26.0	0.0	+1.1
25.0	25.0	0.0	+1.1

QR-1542-00041-02004

T. Petch.

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

411-15171 Sirinthee Rd, Jungsom, Bangkok 10130 THAILAND  
Tel: 02-2435 8300 Fax: 02-2431 1679 e-mail: sithiporn@sithiporn.com Web: www.sithiporn.com



Cert. No. : AUL21099  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42; Microphone UC-92 / Pre-amplifier K11-24  
Serial No. : 0597163 / 160406 / 88176  
ID No. : BKK / N9078

Condition As Found : G4000

Customer : AUSTRIAN LABORATORY GROUP LTD., LTD.  
104 PRAKARAN KAN AR PRAKARAN KAN ROAD,  
KHUANG PRAKARAN KAN, KHUANG PRAKARAN,  
BANGKOK 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3.3 ) °C  
Pressure : ( 101.3 ± 3.3 ) kPa  
Relative Humidity : ( 50.0 ± 2.0 ) %

Received Date : 26 AUGUST 2021  
Calibration Date : 07-08 SEPTEMBER 2021  
Date of Issue : 08 SEPTEMBER 2021

Calibrated by : Natchanon Petcharai

Approved by : T. Petch.  
( Thanakorn Petcharai )

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.

QR-1542-00041-02004

Cert. No. : AUL22008  
Job No. : VCA5A00041  
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	+1.1

9. Time burst response

Time Weighting	Time burst duration, 10 ms	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	109.0	109.0	0.0	+1.1
	2	8	117.0	117.0	0.0	+1.1
	250	300	134.0	134.0	0.0	+1.1
Slow	2	8	109.0	109.0	0.0	+1.1
	250	300	127.0	127.0	0.0	+1.1
	0.25	1	99.0	99.0	0.0	+1.1
MIL	2	8	109.0	109.0	0.0	+1.1
	250	300	128.0	128.0	0.0	+1.1

10. Peak C second level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	+1.1
Pulse	136.4	136.4	0.0	+1.1

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	+1.1
Positive half cycle	133.4	133.4	0.0	+1.1
Negative half cycle	133.4	133.4	0.0	+1.1

QR-1542-00041-02004

T. Petch.

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Cert. No. : AUL21099  
Job No. : VCA5A00041  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by using an IEC 61672-1:2013 Standard for sound level meters (SLM). The SLM had been to Acoustical and Electrical signal level of frequency weighting with Ambient, A-weight and B-weight Standard Instruments.

For test results of each item were made by observation of each instrument display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33270A	MY40017076	11-0012-21	10-Feb-22
Waveform Generator	33311B	MY5202742	11-0012-21	10-Feb-22
Digital Multimeter	3344A	MY5320104	11-0012-21	10-Feb-22
Digital Multimeter	3344A	1997025	11-0012-21	05-Feb-22
Digital Multimeter	3344A	MY5320118	11-0012-21	10-Feb-22
Programmable Attenuator	8211-1070	62107114	15-0012-21	08-Mar-22
Condenser Microphone	4142	2977000	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42K-01	24902455	AA-3005-21	16-Feb-22

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 measurement system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Cert. No. : AUL22008  
Job No. : VCA5A00041  
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive : one half cycle	107	0.1
Negative : one half cycle	107	0.1

12. High level stability

Frequency Weighting	SLM Display at start (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 an value following calculation providing a level of confidence of approximately 95%.

End of Calibration Certificate

QR-1542-00041-02004

T. Petch.

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

Cert. No. : AUL21099  
Job No. : VCA5A00041  
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	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 level of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.7
4. Electrical signal level of frequency weightings				
10 Hz to 20 kHz	✓	-	0.3	0.6
10 Hz to 20 kHz	✓	-	0.3	0.7
10 Hz to 20 kHz	✓	-	0.3	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Time burst response	✓	-	0.2	0.3
10. Peak C second level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.35
12. High level stability	✓	-	0.1	0.1

QR-1542-00041-02004

T. Petch.

T. Petch.



Cert. No. : ACL21090  
Job No. : VC64AC0662  
Pages : 4 of 8

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (0.96)	93.8	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 (dB)	Measured value (dB)
A-weight	11.2
C-weight	17.5
Flat	23.0

3. Acoustical signal tests of frequency weightings

Vector free-field acoustic response at a level of 64 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.8	0.4	0.4	± 1.5
1000	0.0	0.0	-0.1	± 1.0
5000	-0.3	-0.2	-0.2	± 0.0

QR-1512-04-01-02064

T. Reth...

Cert. No. : ACL21090  
Job No. : VC64AC0662  
Pages : 7 of 8

8. Level Diversity 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. Time burst response

Time Weighting	Time burst duration, (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	108.0	0.0	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.1	0.1	±1.0
Mid	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.0	127.0	0.0	±1.0
	0.25	1	99.0	99.9	-0.1	1.5; -5.0
SLE	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 spread level

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	-
One	136.4	136.4	0.0	±0.1

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QR-1512-04-01-02064

T. Reth...

Cert. No. : ACL21090  
Job No. : VC64AC0662  
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting test of 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	0.1	0.0	±2.0
4000	0.0	0.1	0.0	±3.0
8000	0.0	0.1	0.1	±3.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	S1 M Display at initial (dB)	S2 M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.1	0.1	±0.3

QR-1512-04-01-02064

T. Reth...

Cert. No. : ACL21090  
Job No. : VC64AC0662  
Pages : 6 of 8

11. Overload indication

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.6	89.7	0.1	±1.5

12. High level stability

Frequency Weighting	S1 M Display at final (dB)	S2 M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.1	137.0	0.1	±0.3

The reported uncertainty is based on a weighted uncertainty multiplied by coverage factor k = 2 or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

Cert. No. : ACL21090  
Job No. : VC64AC0662  
Pages : 6 of 8

7. Level Diversity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
135.0	135.0	0.0	±1.1
136.0	136.0	0.0	±1.1
137.0	137.0	0.0	±1.1
138.0	138.0	0.0	±1.1
139.0	139.0	0.0	±1.1
140.0	140.0	0.0	±1.1
141.0	141.0	0.0	±1.1
142.0	142.0	0.0	±1.1
143.0	143.0	0.0	±1.1
144.0	144.0	0.0	±1.1
145.0	145.0	0.0	±1.1
146.0	146.0	0.0	±1.1
147.0	147.0	0.0	±1.1
148.0	148.0	0.0	±1.1
149.0	149.0	0.0	±1.1
150.0	150.0	0.0	±1.1
151.0	151.0	0.0	±1.1
152.0	152.0	0.0	±1.1
153.0	153.0	0.0	±1.1
154.0	154.0	0.0	±1.1
155.0	155.0	0.0	±1.1
156.0	156.0	0.0	±1.1
157.0	157.0	0.0	±1.1
158.0	158.0	0.0	±1.1
159.0	159.0	0.0	±1.1
160.0	160.0	0.0	±1.1
161.0	161.0	0.0	±1.1
162.0	162.0	0.0	±1.1
163.0	163.0	0.0	±1.1
164.0	164.0	0.0	±1.1
165.0	165.0	0.0	±1.1
166.0	166.0	0.0	±1.1
167.0	167.0	0.0	±1.1
168.0	168.0	0.0	±1.1
169.0	169.0	0.0	±1.1
170.0	170.0	0.0	±1.1
171.0	171.0	0.0	±1.1
172.0	172.0	0.0	±1.1
173.0	173.0	0.0	±1.1
174.0	174.0	0.0	±1.1
175.0	175.0	0.0	±1.1
176.0	176.0	0.0	±1.1
177.0	177.0	0.0	±1.1
178.0	178.0	0.0	±1.1
179.0	179.0	0.0	±1.1
180.0	180.0	0.0	±1.1
181.0	181.0	0.0	±1.1
182.0	182.0	0.0	±1.1
183.0	183.0	0.0	±1.1
184.0	184.0	0.0	±1.1
185.0	185.0	0.0	±1.1
186.0	186.0	0.0	±1.1
187.0	187.0	0.0	±1.1
188.0	188.0	0.0	±1.1
189.0	189.0	0.0	±1.1
190.0	190.0	0.0	±1.1
191.0	191.0	0.0	±1.1
192.0	192.0	0.0	±1.1
193.0	193.0	0.0	±1.1
194.0	194.0	0.0	±1.1
195.0	195.0	0.0	±1.1
196.0	196.0	0.0	±1.1
197.0	197.0	0.0	±1.1
198.0	198.0	0.0	±1.1
199.0	199.0	0.0	±1.1
200.0	200.0	0.0	±1.1

QR-1512-04-01-02064

T. Reth...

151-45171 Subachon Rd., Bangna Suburb, Bangkok 10710 THAILAND  
Tel: 0-2431-8322 Fax: 0-2431-1679 E-mail: sithiporn@thiporn.com http://www.thiporn.com



Cert. No. : ACL22040  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-02 Microphone UC-52 - Preamplifier NH-24  
Serial No. : 0959182 / 0406 / 58175  
ID No. : BKK 15997

Condition As Found : OK

Customer : MINT LABORATORY GROUP (THAILAND) CO., LTD.  
101 HEALTHY AKAH BPHATHANAKAN ROAD,  
KHUANG SU PHAT THANAKAN, KHUANG SUAN PANG,  
BANGKOK, THAILAND

Location :  
Ambient Temperature : 23.0 ± 0.3 °C  
Pressure : 101.3 ± 0.1 kPa  
Relative Humidity : 50.0 ± 2.0 %  
Received Date : 05 JANUARY 2022  
Calibration Date : 12-14 JANUARY 2022  
Date of Issue : 17 JANUARY 2022

Calibrated by : Naphadol Panchana

Approved by : T. Reth...  
( Tharadol Panchana )

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, more not be produced other than in full, except with the prior written approval of the head of Calibration Laboratory

QR-1512-04-01-02064

**Calibration Method :**  
This equipment is calibrated by based on IEC-61672-1:2003 Standard for sound level meter (SLM).  
The SLM had tests as Acoustic and Electrical signal tests of frequency weighting with Absolute character and Reference Standard Instruments.  
For tests results of each items were made by observation of each instrument display and also with SLM display.

**Condition of this result of calibration :**

1. Reference Standard Instruments.

Instrument	Model	Serial No.	Cert. No.	Due Date
Reference Generator	33210A	MSV28017076	17-0412-21	10-Feb-22
Reference Generator	33511B	MSV2802742	17-0412-21	10-Feb-22
Digital Multimeter	34461A	MSV3220904	17-1019-053264	10-Feb-22
Digital Multimeter	33461A	MSV3220976	17-1019-053264	08-Feb-22
Digital Multimeter	34461A	MSV3224273	17-1019-053264	15-Sep-22
Programmable Attenuator	MA1-1079	62101114	1904077740	06-Mar-22
Condenser Microphone	4100	2677006	SA1006-21	05-Feb-22
Measuring Amplifier	NA-428M	34560495	SA1003-21	16-Feb-22
2. This result of calibration was found accurate as shown on due and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
  1. National Institute of Metrology (Thailand).
  2. Thailand Institute of Scientific and Technological Research (TISTR).

QR-1512104102004

+ PZ

**4. Electrical signal tests of frequency weightings**

Weighting network response with reference to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	-0.5
125	0.0	0.0	0.0	-0.5
250	0.0	0.0	-0.1	-0.5
500	0.0	0.0	-0.1	-0.5
1000	0.0	0.0	0.0	-0.5
2000	0.0	0.0	0.0	-0.5
4000	0.0	0.0	0.0	-0.5
8000	0.0	0.0	0.0	-0.5

**5. Frequency and time weightings at 1 kHz**

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	-
Eq	94.0	0.0	-0.2

**6. Long-term stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	-0.2

QR-1512104102004

+ PZ

**Summary of Measurement Result :**

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute accuracy	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings	✓	-	0.1	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.1	0.7
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity including the level range control	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.2
12. High level stability	✓	-	0.1	0.1

QR-1512104102004

+ PZ

**7. Level linearity on the reference level range**

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
120.0	120.0	0.0	-0.1
122.0	122.0	0.0	-0.1
124.0	124.0	0.0	-0.1
126.0	126.0	0.0	-0.1
128.0	128.0	0.0	-0.1
130.0	130.0	0.0	-0.1
132.0	132.0	0.0	-0.1
134.0	134.0	0.0	-0.1
136.0	136.0	0.0	-0.1
138.0	138.0	0.0	-0.1
140.0	140.0	0.0	-0.1
142.0	142.0	0.0	-0.1
144.0	144.0	0.0	-0.1
146.0	146.0	0.0	-0.1
148.0	148.0	0.0	-0.1
150.0	150.0	0.0	-0.1
152.0	152.0	0.0	-0.1
154.0	154.0	0.0	-0.1
156.0	156.0	0.0	-0.1
158.0	158.0	0.0	-0.1
160.0	160.0	0.0	-0.1
162.0	162.0	0.0	-0.1
164.0	164.0	0.0	-0.1
166.0	166.0	0.0	-0.1
168.0	168.0	0.0	-0.1
170.0	170.0	0.0	-0.1
172.0	172.0	0.0	-0.1
174.0	174.0	0.0	-0.1
176.0	176.0	0.0	-0.1
178.0	178.0	0.0	-0.1
180.0	180.0	0.0	-0.1
182.0	182.0	0.0	-0.1
184.0	184.0	0.0	-0.1
186.0	186.0	0.0	-0.1
188.0	188.0	0.0	-0.1
190.0	190.0	0.0	-0.1
192.0	192.0	0.0	-0.1
194.0	194.0	0.0	-0.1
196.0	196.0	0.0	-0.1
198.0	198.0	0.0	-0.1
200.0	200.0	0.0	-0.1

QR-1512104102004

+ PZ

**Result of calibration :**

**1. Absolute variability**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
93.9 (93.9)	93.9	0.0	-0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
16.6

2.2 The measurement of the sound level meter was performed by external signal input device.

Frequencies Weighting	Measured value (dB)
A-weight	15.6
C-weight	25.2
Flat	25.7

**3. Acoustical signal tests of frequency weightings**

Mean free field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	-0.1	0.1	0.1	-0.5
1600	0.0	0.0	0.0	-0.5
3000	0.0	0.0	0.0	-0.5

QR-1512104102004

+ PZ

**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Area	94.0	94.0	0.0	-0.1

**9. Time burst response**

Long Weighing	Time burst duration, 10 ms	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	100.0	107.9	0.1	1.5, -5.0
	2	8	117.0	117.0	0.0	1.0, -2.5
Slow	2.0	800	134.0	134.0	0.0	-0.1
	2	8	100.0	100.0	0.0	1.5, -5.0
H.I.	2.0	800	127.6	127.6	0.0	-0.1
	0.25	1	99.0	99.0	0.1	1.5, -5.0
H.I.	2.0	8	100.0	100.0	0.0	1.0, -2.5
	2.0	800	128.0	128.1	0.1	-0.1

**10. Peak C sound level**

Number of cycle or test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Imp	136.4	136.3	-0.1	-0.5

Number of cycle or test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	131.0	131.0	0.0	-
Distance half cycle	135.4	135.1	-0.3	-2.0
Separate half cycle	135.4	135.1	-0.3	-2.0

QR-1512104102004

+ PZ

Continuation of Calibration Certificate

Cert. No. : ACL12040  
Job No. : VCMAC0041  
Page : 1 of 4

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Positive one-half cycle	0.0	+1.5
Negative one-half cycle	0.0	-1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limit (dB)
A-weight	127.0	127.0	0.0	+0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$  or any value following calculation using a level of confidence of approximately 95 %

End of Calibration Certificate

QR-1512-04-04-02040

Continuation of Calibration Certificate

Cert. No. : ACL131002  
Job No. : VCMAC0042  
Page : 3 of 8

Summary of Measurement Results

Parameter	Pass	Fail	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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 kHz to 10 kHz	✓	-	0.3	1.0
For > 10 kHz to 20 kHz	✓	-	0.3	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level uncertainty on the reference level range	✓	-	0.2	0.3
8. Level uncertainty including the level range error	✓	-	0.2	0.3
9. Time base response	✓	-	0.2	0.3
10. Peak A-weight level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.2
12. High level stability	✓	-	0.1	0.1

QR-1512-04-04-02042

451-45171 Sathorn Rd., Bangkok, Bangkok 10120 THAILAND  
Tel: 02-213-4400 Fax: 02-213-1479 e-mail: sithiporn@kub.com http://www.sithiporn.com



Cert. No. : ACL131002  
Page : 1 of 8

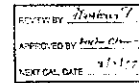
Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42; Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00597145 / 130408 / 00176  
ID No. : BKK-251001

Condition As Found : GOOD

Customer : A15 LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHAN SIKHARU PHATHAN SIKHARU ROAD,  
KIWAENG PHATHAN SIKHARU, SUKHUMVIT 21, BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature :  $23.0 \pm 0.3$  °C  
Pressure :  $1013.3 \pm 1$  hPa  
Relative Humidity :  $50.0 \pm 2.0$  %  
Received Date : 26 AUGUST 2021  
Calibration Date : 07-08 SEPTEMBER 2021  
Date of Issue : 08 SEPTEMBER 2021



Calibrated by : T. Petcha

Approved by : T. Petcha  
(Thakul Petcha)

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QR-1512-04-04-02040

Continuation of Calibration Certificate

Cert. No. : ACL131003  
Job No. : VCMAC0043  
Page : 2 of 8

Calibration Procedures : IEC 61672-3

Calibration Method :

This equipment was calibrated by using the IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had been tested in Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each instrument display and also with SLM display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY4001076	11-0012-21	10-Feb-22
Waveform Generator	33211B	MY3320242	11-0011-21	10-Feb-22
Digital Multimeter	33461A	MY3320104	11-0010-21	10-Feb-22
Digital Multimeter	33461A	109025	11-0010-21	10-Feb-22
Digital Multimeter	33461A	MY3320116	11-0010-21	10-Feb-22
Programmable Attenuator	MA11-1070	8210014	15-0010-21	05-Feb-22
Condenser Microphone	4139	2977960	15-0010-21	05-Feb-22
Measuring Amplifier	NS-426A5	3456040	AA-0013-21	16-Feb-22

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 acceptable to the international system of units maintained at :

- National Institute of Metrology (NIM)
- Thailand Institute of Scientific and Technological Research (TISTR)

QR-1512-04-04-02043

Continuation of Calibration Certificate

Cert. No. : ACL131003  
Job No. : VCMAC0043  
Page : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from standard frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
Imp	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 Limit (dB)
A-weight	94.0	94.0	0.0	±0.3

QR-1512-04-04-02043

Cert. No. : ACL21091  
Job No. : VC644C0062  
Pages : 3 of 8

7. Level Uncertainty 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
130.0	130.0	0.0	+1.1
129.0	129.0	0.0	+1.1
128.0	128.0	0.0	+1.1
119.0	119.0	0.0	+1.1
114.0	114.0	0.0	+1.1
109.0	109.0	0.0	+1.1
104.0	104.0	0.0	+1.1
99.0	99.0	0.0	+1.1
94.0	94.0	0.0	+1.1
89.0	89.0	0.0	+1.1
84.0	84.0	0.0	+1.1
79.0	79.0	0.0	+1.1
74.0	74.0	0.0	+1.1
69.0	69.0	0.0	+1.1
64.0	64.0	0.0	+1.1
59.0	59.0	0.0	+1.1
54.0	54.0	0.0	+1.1
49.0	49.0	0.0	+1.1
44.0	44.0	0.0	+1.1
39.0	39.0	0.0	+1.1
34.0	34.0	0.0	+1.1
29.0	29.0	0.0	+1.1
24.0	24.0	0.0	+1.1
19.0	19.0	0.0	+1.1
14.0	14.0	0.0	+1.1

QP-1512-04-04-02-04

T. Pichai

SITHIPORN ASSOCIATES CO.,LTD.  
CALIBRATION LABORATORY

131-451/71 Sathiporn Rd., Bangsue, Bangkok 10700 THAILAND  
Tel: 0-2435-8830 Fax: 0-2435-8839 e-mail: info@sithiporn.com www.sithiporn.com



Cert. No. : ACL21091  
Pages : 3 of 8

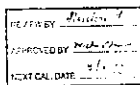
Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42; Microphone UC-52 / Pre-amplifier M1-24  
Serial No. : 1079164 / 119407 / 88177  
ID No. : RKC 15099

Condition As Found : GOOD

Customer : AIS LABORATORY GROUP (THAI) ANTHO CO., LTD.  
101 PHAI THANAKAN 40, PHAI THANAKAN ROAD,  
KHUANG PHAI THANAKAN, KHUANG LUANG,  
BANGKOK, 10250 THAI AND

Location :  
Ambient Temperature : ( 23.0 ± 1 ) °C  
Pressure : ( 101.3 ± 1 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %  
Received Date : 26 AUGUST 2021  
Calibration Date : 07-08 SEPTEMBER 2021  
Date of Issue : 08 SEPTEMBER 2021



Calibrated by : Nathaphon Pichai

Approved by : T. Pichai  
( Thatsak Pichai )

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QP-1512-04-04-02-04

Cert. No. : ACL21092  
Job No. : VC644C0062  
Pages : 3 of 8

8. Level Uncertainty 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. Time Interval response

Time Weighting	Time Interval duration, T <sub>h</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.0	+1.1	1.5 ± 5.0
	2	8	117.0	117.0	0.0	1.0 ± 2.5
Slow	250	Non	118.0	118.0	0.0	+1.0
	2	8	106.0	106.0	0.0	1.5 ± 5.0
SEL	250	1000	127.0	127.0	0.0	+1.0
	0.25	1	99.0	99.0	0.0	1.5 ± 5.0
	2	8	106.0	106.0	0.0	1.0 ± 2.5
	200	1000	128.0	128.0	0.0	+1.0

10. Peak C sound level

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	-
One	136.4	136.3	-0.1	+1.0

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	-
Positive half cycle	135.4	135.2	-0.2	+2.0
Negative half cycle	135.4	135.2	-0.2	+2.0

QP-1512-04-04-02-04

T. Pichai

Cert. No. : ACL21091  
Job No. : VC644C0062  
Pages : 3 of 8

Calibration Procedure : (P-A1-01)

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY 40017076	11-0012-21	10-Feb-22
Waveform Generator	33511B	MY 42302742	11-0011-21	10-Feb-22
Digital Multimeter	33601A	MY 4320104	11-0005-20	10-Feb-22
Digital Multimeter	8040A	1947028	11-0006-20	05-Feb-22
Digital Multimeter	33601A	MY 4320114	11-0006-20	10-Feb-22
Programmable Microphone	3651-1070	6210114	11-0007-20	08-Mar-22
Condenser Microphone	4140	2975900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42K41	34500495	AA-3003-21	10-Feb-22

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:

- National Institute of Metrology (Thailand);
- Thailand Institute of Science and Technological Research (TISTR).

Cert. No. : ACL21091  
Job No. : VC644C0062  
Pages : 3 of 8

11. Overload indication

Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive overload cycle	109.6	+1.1
Negative overload cycle	109.6	+1.1

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weighting	137.0	137.0	0.0	+1.0

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

QP-1512-04-04-02-04

T. Pichai

Cert. No. : ACL21091  
Job No. : VC644C0062  
Pages : 3 of 8

Summary of Measurement Results :

Parameter	Pass	Fail	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	✓	-	0.3	0.6
For 125 Hz	✓	-	0.3	0.6
For 1000 Hz	✓	-	0.3	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 15 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 of frequency on the reference level range	✓	-	0.2	0.3
8. Level of frequency including the level range control	✓	-	0.2	0.3
9. Time Interval response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-1512-04-04-02-04

T. Pichai

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
019191.961	019	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
19.8

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

Frequency Weighting (Hz)	Measured value (dB)
A-weight	11.5
C-weight	17.5
Flat	23.5

3. Acoustical signal tests of frequency weightings

Value free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)
125	0.0
250	0.1
500	0.1
1000	0.0
2000	0.0
4000	0.0
8000	0.0

QP-1512-04-04-02064

T. R. R.

4. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

5. Time burst response

Time Weighting	Time burst duration, Th (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	1	117.0	117.0	0.0	1.0; -2.5
	200	100	134.0	134.0	0.0	±1.0
Slow	2	1	108.0	108.0	0.0	1.5; -5.0
	200	100	127.8	127.8	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5; -5.0
SEL	2	3	108.0	108.0	0.0	1.0; -2.5
	200	100	126.0	126.0	0.0	±1.0

10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leq (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	135.0	135.0	0.0	-
One	136.4	136.0	-0.4	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	135.0	135.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

QP-1512-04-04-02064

T. R. R.

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	0.0
C-weight	0.0
A-weight	0.0
Acceptance Limits	±2.0
125	-0.1
250	0.0
500	0.0
1000	0.0
2000	0.0
4000	0.0
8000	0.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	±0.1
1 eq	94.0	0.0	±0.1

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviation Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QP-1512-04-04-02064

T. R. R.

11. Overload indication

Measured value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.6	0.1
Negative one-half cycle	89.6	0.1

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviation 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  
on any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviation 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
130.0	130.0	0.0	±1.1
129.0	129.0	0.0	±1.1
128.0	128.0	0.0	±1.1
127.0	127.0	0.0	±1.1
126.0	126.0	0.0	±1.1
125.0	125.0	0.0	±1.1
124.0	124.0	0.0	±1.1
123.0	123.0	0.0	±1.1
122.0	122.0	0.0	±1.1
121.0	121.0	0.0	±1.1
120.0	120.0	0.0	±1.1
119.0	119.0	0.0	±1.1
118.0	118.0	0.0	±1.1
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.0	0.0	±1.1
114.0	114.0	0.0	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.0	±1.1
103.0	103.0	0.0	±1.1
102.0	102.0	0.0	±1.1
101.0	101.0	0.0	±1.1
100.0	100.0	0.0	±1.1
99.0	99.0	0.0	±1.1
98.0	98.0	0.0	±1.1
97.0	97.0	0.0	±1.1
96.0	96.0	0.0	±1.1
95.0	95.0	0.0	±1.1
94.0	94.0	0.0	±1.1
93.0	93.0	0.0	±1.1
92.0	92.0	0.0	±1.1
91.0	91.0	0.0	±1.1
90.0	90.0	0.0	±1.1
89.0	89.0	0.0	±1.1
88.0	88.0	0.0	±1.1
87.0	87.0	0.0	±1.1
86.0	86.0	0.0	±1.1
85.0	85.0	0.0	±1.1
84.0	84.0	0.0	±1.1
83.0	83.0	0.0	±1.1
82.0	82.0	0.0	±1.1
81.0	81.0	0.0	±1.1
80.0	80.0	0.0	±1.1
79.0	79.0	0.0	±1.1
78.0	78.0	0.0	±1.1
77.0	77.0	0.0	±1.1
76.0	76.0	0.0	±1.1
75.0	75.0	0.0	±1.1
74.0	74.0	0.0	±1.1
73.0	73.0	0.0	±1.1
72.0	72.0	0.0	±1.1
71.0	71.0	0.0	±1.1
70.0	70.0	0.0	±1.1
69.0	69.0	0.0	±1.1
68.0	68.0	0.0	±1.1
67.0	67.0	0.0	±1.1
66.0	66.0	0.0	±1.1
65.0	65.0	0.0	±1.1
64.0	64.0	0.0	±1.1
63.0	63.0	0.0	±1.1
62.0	62.0	0.0	±1.1
61.0	61.0	0.0	±1.1
60.0	60.0	0.0	±1.1
59.0	59.0	0.0	±1.1
58.0	58.0	0.0	±1.1
57.0	57.0	0.0	±1.1
56.0	56.0	0.0	±1.1
55.0	55.0	0.0	±1.1
54.0	54.0	0.0	±1.1
53.0	53.0	0.0	±1.1
52.0	52.0	0.0	±1.1
51.0	51.0	0.0	±1.1
50.0	50.0	0.0	±1.1
49.0	49.0	0.0	±1.1
48.0	48.0	0.0	±1.1
47.0	47.0	0.0	±1.1
46.0	46.0	0.0	±1.1
45.0	45.0	0.0	±1.1
44.0	44.0	0.0	±1.1
43.0	43.0	0.0	±1.1
42.0	42.0	0.0	±1.1
41.0	41.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	39.0	0.0	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1
35.0	35.0	0.0	±1.1
34.0	34.0	0.0	±1.1
33.0	33.0	0.0	±1.1
32.0	32.0	0.0	±1.1
31.0	31.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1
24.0	24.0	0.0	±1.1
23.0	23.0	0.0	±1.1
22.0	22.0	0.0	±1.1
21.0	21.0	0.0	±1.1
20.0	20.0	0.0	±1.1
19.0	19.0	0.0	±1.1
18.0	18.0	0.0	±1.1
17.0	17.0	0.0	±1.1
16.0	16.0	0.0	±1.1
15.0	15.0	0.0	±1.1
14.0	14.0	0.0	±1.1
13.0	13.0	0.0	±1.1
12.0	12.0	0.0	±1.1
11.0	11.0	0.0	±1.1
10.0	10.0	0.0	±1.1
9.0	9.0	0.0	±1.1
8.0	8.0	0.0	±1.1
7.0	7.0	0.0	±1.1
6.0	6.0	0.0	±1.1
5.0	5.0	0.0	±1.1
4.0	4.0	0.0	±1.1
3.0	3.0	0.0	±1.1
2.0	2.0	0.0	±1.1
1.0	1.0	0.0	±1.1
0.0	0.0	0.0	±1.1

QP-1512-04-04-02064

T. R. R.

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : B&K  
Model : NL-42; Microphone UC-52; Preamplifier NF-24  
Serial No. : 0062629 / 14506 / 48044  
ID No. : BKR 150706

Condition As Found : OK

Customer : A/S LABORATORY GROUP (THAI) AND CO., LTD.  
84 PHATHANAKANAL PHATHANAKANAL ROAD,  
BANGKANG PHATHANAKANAL PHATHANAKANAL ROAD,  
BANGKANG, 10250 THAILAND.

Location :  
Ambient Temperature : 23.0 ± 3.0 °C  
Pressure : 1013.2 ± 3.0 hPa  
Relative Humidity : 50.0 ± 20.0 %  
Received Date : 08 NOVEMBER 2021  
Calibration Date : 09-10 NOVEMBER 2021  
Date of Issue : 12 NOVEMBER 2021

Calibrated by : Natchanon Pichaiwan

Approved by : T. R. R.  
Thosakul Pichaiwan

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

QP-1512-04-04-02064

T. R. R.

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T. R. R.

QP-1512-04-04-02064

Continuation of Calibration Certificate

Cert. No. : ACL21148  
Job No. : VCSAC0015  
Page : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 61072-2 (2003) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anchoic chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert.No.	Exp.Date
Waveform Generator	33210A	MY24917076	IF-0012-21	10-Feb-22
Waveform Generator	33511B	MY2242742	U-0011-21	10-Feb-22
Digital Multimeter	24463A	MY3222104	111-10P-05-0264	10-Feb-22
Digital Multimeter	33461A	MY3222076	111-10P-05-0264	08-Feb-22
Digital Multimeter	8246A	1907026	111-10P-05-0264	05-Feb-22
Programmable Metre	MY3-1070	62100114	140-077342	06-Mar-22
Condenser Microphone	4150	2675001	AA-1008-21	05-Feb-22
Measuring Amplifier	S-642CAI	34560494	AA-1003-21	16-Feb-22

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 acceptable 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).

QR-1512148-01-02644

7. P.T.L.

Continuation of Calibration Certificate

Cert. No. : ACL21148  
Job No. : VCSAC0015  
Page : 3 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with reference to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	-0.1	+2.0
125	0.0	0.0	0.0	+1.5
250	0.0	0.0	0.0	+1.5
500	0.0	0.0	-0.1	+1.5
1000	0.0	0.0	0.0	+1.0
2000	0.0	0.0	0.0	+2.0
4000	0.0	0.0	0.0	+3.0
8000	0.0	0.1	0.1	+4.0

5. Frequency and time weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	+0.1
Eq	94.0	0.0	+0.1

6. Long-term stability

Frequency Weighting	SLM Display at initial Value (dB)	SLM Display at final Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	+0.3

QR-1512148-01-02644

7. P.T.L.

Continuation of Calibration Certificate

Cert. No. : ACL21148  
Job No. : VCSAC0015  
Page : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.1	N/A
3. Acoustical signal tests of frequency weightings	✓	-	-	-
125 Hz	✓	-	0.1	0.6
1000 Hz	✓	-	0.1	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.4	0.7
For 10 Hz to 4 kHz	✓	-	0.1	0.6
For > 4 kHz to 10 kHz	✓	-	0.1	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 of range	✓	-	0.2	0.3
8. Level linearity including the level of range control	✓	-	0.2	0.3
9. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QR-1512148-01-02644

7. P.T.L.

Continuation of Calibration Certificate

Cert. No. : ACL21148  
Job No. : VCSAC0015  
Page : 4 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
127.0	127.0	0.0	+1.1
136.0	136.0	0.0	+1.1
135.0	135.0	0.0	+1.1
134.0	134.0	0.0	+1.1
133.0	133.0	0.0	+1.1
132.0	132.0	0.0	+1.1
131.0	131.0	0.0	+1.1
129.0	129.0	0.0	+1.1
124.0	124.0	0.0	+1.1
119.0	119.0	0.0	+1.1
114.0	114.0	0.0	+1.1
109.0	109.0	0.0	+1.1
104.0	104.0	0.0	+1.1
99.0	99.0	0.0	+1.1
94.0	94.0	0.0	+1.1
89.0	89.0	0.0	+1.1
84.0	84.0	0.0	+1.1
79.0	79.0	0.0	+1.1
74.0	74.0	0.0	+1.1
69.0	69.0	0.0	+1.1
64.0	64.0	0.0	+1.1
59.0	59.0	0.0	+1.1
54.0	54.0	0.0	+1.1
49.0	49.0	0.0	+1.1
44.0	44.0	0.0	+1.1
39.0	39.0	0.0	+1.1
34.0	34.0	0.1	+1.1
29.0	29.0	0.1	+1.1
24.0	24.0	0.3	+1.1
19.0	19.0	0.3	+1.1
14.0	14.0	0.5	+1.1
9.0	9.0	0.7	+1.1

QR-1512148-01-02644

7. P.T.L.

Continuation of Calibration Certificate

Cert. No. : ACL21148  
Job No. : VCSAC0015  
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.96)	93.9	0.0	+0.1

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
21.1

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

Frequency Weighting	Measured value (dB)
A-weight	16.7
C-weight	22.4
Flat	28.2

3. Acoustical signal tests of frequency weightings

Micro free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.6	0.6	+1.7
1000	0.0	0.0	0.0	+1.0
8000	-0.3	-0.3	-0.2	+5.0

QR-1512148-01-02644

7. P.T.L.

Continuation of Calibration Certificate

Cert. No. : ACL21148  
Job No. : VCSAC0015  
Page : 5 of 8

8. Level linearity including the level of range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.1	0.1	+1.1

9. Time burst response

Time Weighting	Time burst duration (s)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.9	0.1	1.5 ; +5.0
	2	3	117.0	117.0	0.0	1.0 ; +2.5
	200	900	134.0	134.0	0.0	+1.0
Slow	2	8	106.0	106.0	0.0	1.5 ; +5.0
	200	800	127.6	127.6	0.0	+1.0
SFL	0.25	1	99.0	99.9	0.1	1.5 ; +5.0
	2	8	106.0	108.0	0.1	1.0 ; +2.5
	200	800	128.0	128.0	0.0	+1.0

10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
C continuous	133.0	133.0	0.0	-
Dirac	130.4	129.9	-0.5	+1.0

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	-
Positive half cycle	135.2	135.2	-0.2	+2.0
Negative half cycle	135.2	135.2	-0.2	+2.0

QR-1512148-01-02644

7. P.T.L.

## Continuation of Calibration Certificate

Cert. No. : ACL21144  
Job No. : YC65AC0015  
Pages : 4 of 8

## 11. Overload indication

Measured value (dB)		Desired Value (dB)	Acceptance Limits
Positive one-half cycle	Negative one-half cycle		
89.4	-89.7	0.2	±1.5

## 12. High level stability

Frequency Weighting	S.M Display at initial (dB)	S.M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	127.0	127.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$   
on any value following calculation providing a level of confidence of approximately 95%

End of Calibration Certificate

QC-1512-04-01-02044

## Continuation of Calibration Certificate

Cert. No. : ACL21041  
Job No. : YC65AC0011  
Pages : 3 of 8

## Summary of Measurement Result:

Parameter	Pass	Fail	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				
120 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
4000 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. Time burst response	✓	-	0.2	0.3
10. Peak-to-peak level	✓	-	0.2	0.3
11. Deviated indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

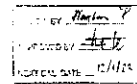
QC-1512-04-01-02044

431/431/11 S-donchom Rd., Bangphum, Bangkok 10700 THAILAND  
Tel: 0-2435-8840 Fax: 0-2435-1629 e-mail: cal@sinhthiporn.com Web: www.sithiporn.comCert. No. : YC65AC0011  
Job No. : YC65AC0011  
Pages : 3 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42 Microphone UC-02 / Preamp/DC N11-24  
Serial No. : 00825818 / 159169 / 58770  
ID No. : BKK 150105

Condition As Found : GOOD

Customer : AUST LABORATORY GROUP (THAILAND) LTD.  
104 PHA THUAN AN AN RD., PHA THUAN AN AN RD.,  
KIRAWANG PHA THUAN AN AN RD.,  
BANGKOK, 10250 THAILAND.Location :  
Ambient Temperature :  $(23.0 \pm 1.1) ^\circ\text{C}$   
Pressure :  $(101.3 \pm 0.3) \text{ hPa}$   
Relative Humidity :  $(50.0 \pm 2.0) \%$   
Received Date : 05 JANUARY 2022  
Calibration Date : 17 JANUARY 2022  
Date of Issue : 17 JANUARY 2022

Calibrated by : Natchorn Pongpattan

Approved by :

T. Rth.  
1. Natchorn Pongpattan

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

QC-1512-04-01-02044

## Continuation of Calibration Certificate

Cert. No. : ACL21041  
Job No. : YC65AC0011  
Pages : 4 of 8

## Result of calibration:

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.0 (93.56)	93.9	0.9	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
16.7

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

Frequency Weighting	Measured value (dB)
A-weight	15.9
C-weight	22.1
Flat	22.7

## 3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	±1.5
1000	0.0	0.0	0.0	±1.0
5000	-1.3	-1.0	-1.0	±5.0

QC-1512-04-01-02044

## Continuation of Calibration Certificate

Cert. No. : ACL21041  
Job No. : YC65AC0011  
Pages : 2 of 8

Calibration Procedure : C-PAC-04

## Calibration Method:

This equipment was calibrated by using an IEC 61672-3 (2012) Standard for sound level meter (SLM).  
The SLM has been an Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.  
Test results of each item were made by observation of each instruments display and also with SLM display.

## Condition of this result of calibration:

## 1. Reference Standard Instruments

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33202A	MY49017076	11-0012-21	10-Feb-22
Waveform Generator	33311B	MY4326742	11-0011-21	10-Feb-22
Digital Multimeter	33461A	MY5320014	11-0010-21	10-Feb-22
Digital Multimeter	33461A	MY53250076	11-0010-21	10-Feb-22
Digital Multimeter	33461A	MY5060273	11-0010-21	15-Sep-22
Programmable Microphone	MY41-1070	6210014	15-0017-21	08-Feb-22
Condenser Microphone	4180	297060	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-425A	3450005	AA-0003-21	16-Feb-22

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:

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

QC-1512-04-01-02044

## Continuation of Calibration Certificate

Cert. No. : ACL21041  
Job No. : YC65AC0011  
Pages : 5 of 8

## 4. Electrical signal tests of frequency weightings

Weighting network response with reference to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±2.0
125	0.0	0.0	-0.1	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

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

## 5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
1/4	94.0	0.0	±0.1

## 6. Long-term stability

Frequency Weighting	S.M Display at initial (dB)	S.M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QC-1512-04-01-02044

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
130.0	130.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
128.0	128.0	0.0	± 1.1
127.0	127.0	0.0	± 1.1
126.0	126.0	0.0	± 1.1
125.0	125.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
123.0	123.0	0.0	± 1.1
122.0	122.0	0.0	± 1.1
121.0	121.0	0.0	± 1.1
120.0	120.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
118.0	118.0	0.0	± 1.1
117.0	117.0	0.0	± 1.1
116.0	116.0	0.0	± 1.1
115.0	115.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
113.0	113.0	0.0	± 1.1
112.0	112.0	0.0	± 1.1
111.0	111.0	0.0	± 1.1
110.0	110.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
108.0	108.0	0.0	± 1.1
107.0	107.0	0.0	± 1.1
106.0	106.0	0.0	± 1.1
105.0	105.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
103.0	103.0	0.0	± 1.1
102.0	102.0	0.0	± 1.1
101.0	101.0	0.0	± 1.1
100.0	100.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
98.0	98.0	0.0	± 1.1
97.0	97.0	0.0	± 1.1
96.0	96.0	0.0	± 1.1
95.0	95.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
93.0	93.0	0.0	± 1.1
92.0	92.0	0.0	± 1.1
91.0	91.0	0.0	± 1.1
90.0	90.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
88.0	88.0	0.0	± 1.1
87.0	87.0	0.0	± 1.1
86.0	86.0	0.0	± 1.1
85.0	85.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
83.0	83.0	0.0	± 1.1
82.0	82.0	0.0	± 1.1
81.0	81.0	0.0	± 1.1
80.0	80.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
78.0	78.0	0.0	± 1.1
77.0	77.0	0.0	± 1.1
76.0	76.0	0.0	± 1.1
75.0	75.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
73.0	73.0	0.0	± 1.1
72.0	72.0	0.0	± 1.1
71.0	71.0	0.0	± 1.1
70.0	70.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
68.0	68.0	0.0	± 1.1
67.0	67.0	0.0	± 1.1
66.0	66.0	0.0	± 1.1
65.0	65.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
63.0	63.0	0.0	± 1.1
62.0	62.0	0.0	± 1.1
61.0	61.0	0.0	± 1.1
60.0	60.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
58.0	58.0	0.0	± 1.1
57.0	57.0	0.0	± 1.1
56.0	56.0	0.0	± 1.1
55.0	55.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
53.0	53.0	0.0	± 1.1
52.0	52.0	0.0	± 1.1
51.0	51.0	0.0	± 1.1
50.0	50.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
48.0	48.0	0.0	± 1.1
47.0	47.0	0.0	± 1.1
46.0	46.0	0.0	± 1.1
45.0	45.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
43.0	43.0	0.0	± 1.1
42.0	42.0	0.0	± 1.1
41.0	41.0	0.0	± 1.1
40.0	40.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
38.0	38.0	0.0	± 1.1
37.0	37.0	0.0	± 1.1
36.0	36.0	0.0	± 1.1
35.0	35.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
33.0	33.0	0.0	± 1.1
32.0	32.0	0.0	± 1.1
31.0	31.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

QR-15120400420044

T. Pich.



Calibration Certificate

Equipment: MORNELL METER  
Manufacturer: RION  
Model: N1-42 Microphone UC-52 / Pre-amplifier N1-42  
Serial No.: 0656408 / 175177 / 85722  
ID No.: BKK 150926

Condition As Found: (X)

Customer: AGN LABORATORY GROUP (THAI) ANCHUT, LTD.  
881 PHATHANSAKARN 40, PHATHANSAKARN ROAD,  
KHUANG PHATHANSAKARN, KHUANG PHATHANSAKARN,  
BANGKOK, 10250 THAILAND.

Location: -  
Ambient Temperature: 1 23.0 ± 3.1 °C  
Pressure: 1 101.8 ± 3.3 kPa  
Relative Humidity: 1 50.0 ± 20.0 %

Received Date: 06 SEPTEMBER 2022  
Calibration Date: 07-09 SEPTEMBER 2022  
Date of Issue: 14 SEPTEMBER 2022

Calibrated by: Nattakorn Petchum

Approved by: T. Pich.  
(Thonakorn Petchum)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than as full, except with the prior written approval of the head of Calibration Laboratory.

QR-15120400420044

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. Time burst response

Time Weighting	Time burst duration, 1/s	1 cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	109.0	107.9	-1.1	1.5, -3.0
	2	8	117.0	117.0	0.0	1.0, -2.5
	200	800	134.0	134.0	0.0	-4.0
Slow	2	8	108.0	108.0	0.0	1.5, -4.0
	200	800	127.0	127.0	0.0	-4.0
	0.25	1	99.0	98.9	-0.1	1.5, -9.0
NLL	2	8	108.0	108.0	0.0	1.0, -2.5
	200	800	126.0	126.0	0.0	-4.0

10. Peak C weighted level

Number of cycle m test signal	Anticipated Value (dB)	Measured Value, LeqdB (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	115.0	115.0	0.0	-
1 sec	116.4	116.4	0.0	± 1.1

Number of cycle m test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	± 2.0
Negative half cycle	135.4	135.2	-0.2	± 2.0

QR-15120400420044

T. Pich.

Calibration Procedure: CP-AC-40

Calibration Method:

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM). The SLM had been to Acoustical and Electrical signal tests of frequency weighting with Acoustic Chamber and Reference Standard for meters.

For test results of each item were made by observation of each instrument display and also with SLMs display.

Condition of this result of calibration:

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY1401070	FF-0507-22	04-Feb-23
Waveform Generator	33311D	MY12102742	13-0628-22	04-Feb-23
Digital Multimeter	33401A	MY12101604	111-101, 04-0255	09-Feb-23
Digital Multimeter	33401A	MY12102074	111-101, 03-0255	09-Feb-23
Digital Multimeter	33401A	MY10024273	111-101, 03-0255	09-Feb-23
Programmable Attenuator	MA1-1070	62100114	FF-0509-22	07-Feb-23
Condenser Microphone	4150	2477900	AA-1013-22	24-Feb-23
Measuring Amplifier	N1-42CAI	31560095	AA-1009-22	23-Feb-23

2. This result of calibration is as 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 units maintained at:

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

QR-15120400420044

T. Pich.

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	-	-
Negative one-half cycle	-	-
Auto	94.0	± 1.1

12. High level stability

Frequency Weighting	S/N Display at final (dB)	S/N Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	± 0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2 or any value following calculation providing a level of confidence of approximately 95 %.

End of Calibration Certificate

QR-15120400420044

T. Pich.

Summary of Measurement Result:

Parameter	Pass	Fail	Uncertainty (dB)	Maximum permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	K.A.
2. Self-generated noise	✓	-	0.2	K.A.
3. Acoustical signal types of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
100 Hz	✓	-	0.3	0.7
4. Electrical signal types of frequency weightings				
100 Hz to 4 kHz	✓	-	0.3	0.6
100 Hz to 10 kHz	✓	-	0.3	0.7
100 Hz 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. Time burst response	✓	-	0.2	0.3
10. Peak C-weighted level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.3
12. High level stability	✓	-	0.3	0.3

QR-15120400420044

T. Pich.



## Continuation of Calibration Certificate

Cert. No. : ACL22190  
Job No. : VC05AC0081  
Page : 4 of 8

## Result of calibration:

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.9 (93.9)	93.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
142

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

Frequency Weighting	Measured value (dB)
A-weight	12.4
C-weight	18.4
Flat	24.2

## A. Acoustical signal tests of frequency weightings

Meas. free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)
125	-0.2
500	0.0
1000	0.0
2000	-0.1
4000	-0.1
8000	-0.1

QP-1512-04-04-02944

T. R. R.

## Continuation of Calibration Certificate

Cert. No. : ACL22190  
Job No. : VC05AC0081  
Page : 5 of 8

## K. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

## L. Time based response

Time Weighting	Time base duration, Th (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5;-5.0
	2	8	112.0	112.0	0.0	1.0;-2.5
	200	300	134.0	134.1	0.1	±0.0
Slow	2	4	108.0	108.0	0.0	1.5;-5.0
	200	300	122.0	122.0	0.0	±0.0
	0.25	1	99.0	99.9	-0.1	1.5;-5.0
SIL	2	8	108.0	108.0	0.0	1.0;-2.5
	200	300	128.0	128.0	0.0	±0.0

## 10. Peak C-weight

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.0	136.3	0.3	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QP-1512-04-04-02944

T. R. R.

## Continuation of Calibration Certificate

Cert. No. : ACL22190  
Job No. : VC05AC0081  
Page : 5 of 8

## 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±2.0
8000	0.0	0.1	0.1	±2.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

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

## 5.2 Time weightings at 1 kHz

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

## 6. Long-term stability

Frequency Weighting	S.M Display at initial (dB)	S.M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	0.0	0.0	0.0	±0.3

QP-1512-04-04-02944

T. R. R.

## Continuation of Calibration Certificate

Cert. No. : ACL22190  
Job No. : VC05AC0081  
Page : 6 of 8

## 11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	
88.7	89.5	-0.2
		±1.5

## 12. High level stability

Frequency Weighting	S.M Display at initial (dB)	S.M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2  
or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

## Continuation of Calibration Certificate

Cert. No. : ACL22190  
Job No. : VC05AC0081  
Page : 6 of 8

## 5. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	-0.3	±1.1
24.0	24.0	-0.1	±1.1
19.0	19.0	-0.1	±1.1
14.0	14.0	-0.1	±1.1
9.0	9.0	-0.1	±1.1
4.0	4.0	-0.1	±1.1

QP-1512-04-04-02944

T. R. R.

251-45173 Sathorn Rd., Bangkok, Bangkok 10120 THAILAND  
Tel: 0-2419-8030 Fax: 0-2419-1679 e-mail: cal@centerphs.com http://www.sithiporn.comCert. No. : ACL22190  
Page : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42 Microphone UC-52 / Pre-amplifier N01-24  
Serial No. : 04072653 / 171547 / 73329  
ID No. : BCK 154936

Condition As Found : (C00)

Customer : AT S.1 SURATONG GROUP (THAILAND) CO., LTD.  
104 PHAI THAN AKAN 40, PHAI THAN AKAN ROAD,  
SUW. 20 PHAI THAN AKAN, KHI, PHAI THAN AKAN,  
BANGKOK, 10250 THAILAND.Location :  
Ambient Temperature : 1 23.0 ± 1.1 °C  
Pressure : 1 101.3 ± 1.1 kPa  
Relative Humidity : 1 50.0 ± 20.0 %  
Received Date : 03 JANUARY 2022  
Calibration Date : 12-14 JANUARY 2022  
Date of Issue : 17 JANUARY 2022Inspector :  
Checked :  
Calibration Date :  
R.H. 25

Calibrated by : Nithakorn Pongporns

Approved by : T. R. R.  
Thanakorn PongpornsThis 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.

QP-1512-04-04-02944

T. R. R.

QP-1512-04-04-02944

Continuation of Calibration Certificate

Cert. No. : AC122843  
Job No. : VC65AC0041  
Pages : 3 of 8

Calibration Procedure : QP-AC-01

Calibration Method :

This equipment was calibrated by based on JEI-541-72-3-2013 Standard for sound level meter (SLM).  
The SLM has tests to Acoustic and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each instrument 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	NY 44017076	13-0912-22	10-Feb-22
Waveform Generator	33511B	NY 52812742	11-0911-21	10-Feb-22
Digital Multimeter	34451A	NY 53229102	11-10F-09-0264	10-Feb-22
Digital Multimeter	34451A	NY 53229676	11-10F-09-0264	10-Feb-22
Digital Multimeter	34451A	NY 60024271	11-10F-09-0264	10-Feb-22
Programmable Attenuator	NAI-1070	62109114	10-067734E	08-Mar-22
Condenser Microphone	4190	2917900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42CM	3456495	AA-3003-21	16-Feb-22

2. This result of calibration was found as write 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 (NIM),

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

QR-1512-01404-0044

T. P. P.

Continuation of Calibration Certificate

Cert. No. : AC122843  
Job No. : VC65AC0041  
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with reference to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

QR-1512-01404-0044

T. P. P.

Continuation of Calibration Certificate

Cert. No. : AC122843  
Job No. : VC65AC0041  
Pages : 3 of 8

Summary of Measurement Results

Parameter	Pass	Fail	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	✓	-	0.3	0.6
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	✓	-	0.3	0.6
For 100 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 19 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	✓	-	0.2	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.1	0.3
6. Long-term stability	✓	-	0.2	0.3
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. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Thermal indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.3	0.1

QR-1512-01404-0044

T. P. P.

Continuation of Calibration Certificate

Cert. No. : AC122843  
Job No. : VC65AC0041  
Pages : 6 of 8

7. Level linearity on the reference level range

Assigned 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
128.0	128.0	0.0	±1.1
127.0	127.0	0.0	±1.1
126.0	126.0	0.0	±1.1
125.0	125.0	0.0	±1.1
124.0	124.0	0.0	±1.1
123.0	123.0	0.0	±1.1
122.0	122.0	0.0	±1.1
121.0	121.0	0.0	±1.1
120.0	120.0	0.0	±1.1
119.0	119.0	0.0	±1.1
118.0	118.0	0.0	±1.1
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.0	0.0	±1.1
114.0	114.0	0.0	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.0	±1.1
103.0	103.0	0.0	±1.1
102.0	102.0	0.0	±1.1
101.0	101.0	0.0	±1.1
100.0	100.0	0.0	±1.1
99.0	99.0	0.0	±1.1
98.0	98.0	0.0	±1.1
97.0	97.0	0.0	±1.1
96.0	96.0	0.0	±1.1
95.0	95.0	0.0	±1.1
94.0	94.0	0.0	±1.1
93.0	93.0	0.0	±1.1
92.0	92.0	0.0	±1.1
91.0	91.0	0.0	±1.1
90.0	90.0	0.0	±1.1
89.0	89.0	0.0	±1.1
88.0	88.0	0.0	±1.1
87.0	87.0	0.0	±1.1
86.0	86.0	0.0	±1.1
85.0	85.0	0.0	±1.1
84.0	84.0	0.0	±1.1
83.0	83.0	0.0	±1.1
82.0	82.0	0.0	±1.1
81.0	81.0	0.0	±1.1
80.0	80.0	0.0	±1.1
79.0	79.0	0.0	±1.1
78.0	78.0	0.0	±1.1
77.0	77.0	0.0	±1.1
76.0	76.0	0.0	±1.1
75.0	75.0	0.0	±1.1
74.0	74.0	0.0	±1.1
73.0	73.0	0.0	±1.1
72.0	72.0	0.0	±1.1
71.0	71.0	0.0	±1.1
70.0	70.0	0.0	±1.1
69.0	69.0	0.0	±1.1
68.0	68.0	0.0	±1.1
67.0	67.0	0.0	±1.1
66.0	66.0	0.0	±1.1
65.0	65.0	0.0	±1.1
64.0	64.0	0.0	±1.1
63.0	63.0	0.0	±1.1
62.0	62.0	0.0	±1.1
61.0	61.0	0.0	±1.1
60.0	60.0	0.0	±1.1
59.0	59.0	0.0	±1.1
58.0	58.0	0.0	±1.1
57.0	57.0	0.0	±1.1
56.0	56.0	0.0	±1.1
55.0	55.0	0.0	±1.1
54.0	54.0	0.0	±1.1
53.0	53.0	0.0	±1.1
52.0	52.0	0.0	±1.1
51.0	51.0	0.0	±1.1
50.0	50.0	0.0	±1.1
49.0	49.0	0.0	±1.1
48.0	48.0	0.0	±1.1
47.0	47.0	0.0	±1.1
46.0	46.0	0.0	±1.1
45.0	45.0	0.0	±1.1
44.0	44.0	0.0	±1.1
43.0	43.0	0.0	±1.1
42.0	42.0	0.0	±1.1
41.0	41.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	39.0	0.0	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1
35.0	35.0	0.0	±1.1
34.0	34.0	0.0	±1.1
33.0	33.0	0.0	±1.1
32.0	32.0	0.0	±1.1
31.0	31.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1
24.0	24.0	0.0	±1.1
23.0	23.0	0.0	±1.1
22.0	22.0	0.0	±1.1
21.0	21.0	0.0	±1.1
20.0	20.0	0.0	±1.1
19.0	19.0	0.0	±1.1
18.0	18.0	0.0	±1.1
17.0	17.0	0.0	±1.1
16.0	16.0	0.0	±1.1
15.0	15.0	0.0	±1.1
14.0	14.0	0.0	±1.1
13.0	13.0	0.0	±1.1
12.0	12.0	0.0	±1.1
11.0	11.0	0.0	±1.1
10.0	10.0	0.0	±1.1
9.0	9.0	0.0	±1.1
8.0	8.0	0.0	±1.1
7.0	7.0	0.0	±1.1
6.0	6.0	0.0	±1.1
5.0	5.0	0.0	±1.1
4.0	4.0	0.0	±1.1
3.0	3.0	0.0	±1.1
2.0	2.0	0.0	±1.1
1.0	1.0	0.0	±1.1
0.0	0.0	0.0	±1.1
-1.0	-1.0	0.0	±1.1
-2.0	-2.0	0.0	±1.1
-3.0	-3.0	0.0	±1.1
-4.0	-4.0	0.0	±1.1
-5.0	-5.0	0.0	±1.1
-6.0	-6.0	0.0	±1.1
-7.0	-7.0	0.0	±1.1
-8.0	-8.0	0.0	±1.1
-9.0	-9.0	0.0	±1.1
-10.0	-10.0	0.0	±1.1
-11.0	-11.0	0.0	±1.1
-12.0	-12.0	0.0	±1.1
-13.0	-13.0	0.0	±1.1
-14.0	-14.0	0.0	±1.1
-15.0	-15.0	0.0	±1.1
-16.0	-16.0	0.0	±1.1
-17.0	-17.0	0.0	±1.1
-18.0	-18.0	0.0	±1.1
-19.0	-19.0	0.0	±1.1
-20.0	-20.0	0.0	±1.1
-21.0	-21.0	0.0	±1.1
-22.0	-22.0	0.0	±1.1
-23.0	-23.0	0.0	±1.1
-24.0	-24.0	0.0	±1.1
-25.0	-25.0	0.0	±1.1
-26.0	-26.0	0.0	±1.1
-27.0	-27.0	0.0	±1.1
-28.0	-28.0	0.0	±1.1
-29.0	-29.0	0.0	±1.1
-30.0	-30.0	0.0	±1.1
-31.0	-31.0	0.0	±1.1
-32.0	-32.0	0.0	±1.1
-33.0	-33.0	0.0	±1.1
-34.0	-34.0	0.0	±1.1
-35.0	-35.0	0.0	±1.1
-36.0	-36.0	0.0	±1.1
-37.0	-37.0	0.0	±1.1
-38.0	-38.0	0.0	±1.1
-39.0	-39.0	0.0	±1.1
-40.0	-40.0	0.0	±1.1
-41.0	-41.0	0.0	±1.1
-42.0	-42.0	0.0	±1.1
-43.0	-43.0	0.0	±1.1
-44.0	-44.0	0.0	±1.1
-45.0	-45.0	0.0	±1.1
-46.0	-46.0	0.0	±1.1
-47.0	-47.0	0.0	±1.1
-48.0	-48.0	0.0	±1.1
-49.0	-49.0	0.0	±1.1
-50.0	-50.0	0.0	±1.1
-51.0	-51.0	0.0	±1.1
-52.0	-52.0	0.0	±1.1
-53.0	-53.0	0.0	±1.1
-54.0	-54.0	0.0	±1.1

Continuation of Calibration Certificate

Cert. No. : ACC22013  
Job No. : VCMAC0043  
Pages : 9 of 8

11. Overall indication

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

12. High level stability

Frequency	S.M Display at initial (dB)	S.M Display at final (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Weighting				
A-weight	137.6	137.6	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2 or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

QE-TS22-04-04-020043

Continuation of Calibration Certificate

Cert. No. : ACC22017  
Job No. : VCMAC0081  
Pages : 3 of 3

Result of calibration:

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.17	0.17	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1001.9	0.2	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.22	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

QE-TS22-04-04-020044

451-45171 Srinachorn Rd.,Banghuaning, Bangkok 10700 THAILAND  
Tel:0-2433-8800 Fax:0-2433-1679 e-mail:cal@csipthiporn.com http://www.csipthiporn.com



Cert. No. : ACC22027  
Pages : 1 of 3

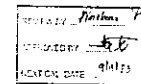
Calibration Certificate

Equipment : SOUND CALIBRATOR  
Manufacturer : RION  
Model : NC-74  
Serial No. : 3442566  
ID No. : BKK\_FS0617

Condition As Found : GOOD

Customer : AJS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KIDWANG PHATHANAKAN, KHUET SUKUMI UANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : 1 23.0 ± 3.3 °C  
Pressure : 1 101.3 ± 3.1 kPa  
Relative Humidity : 1 50.0 ± 2.0 %  
Received Date : 06 SEPTEMBER 2022  
Calibration Date : 09 SEPTEMBER 2022  
Date of Issue : 14 SEPTEMBER 2022



Calibrated by : Nithakorn Prasanna

Approved by : T. Petcha  
( Thanakul Petcha )

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.

QE-TS22-04-04-020043

451-45171 Srinachorn Rd.,Banghuaning, Bangkok 10700 THAILAND  
Tel:0-2433-8800 Fax:0-2433-1679 e-mail:cal@csipthiporn.com http://www.csipthiporn.com



Cert. No. : ACC22246  
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NR-42 Microphone UC-52 / Pre-amplifier NR-24  
Serial No. : 03597155 / 1440788 / 331046  
ID No. : BKK\_FS0909

Condition As Found : GOOD

Customer : AJS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KIDWANG PHATHANAKAN, KHUET SUKUMI UANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : 1 23.0 ± 3.3 °C  
Pressure : 1 101.3 ± 3.1 kPa  
Relative Humidity : 1 50.0 ± 2.0 %  
Received Date : 11 OCTOBER 2022  
Calibration Date : 25-26 OCTOBER 2022  
Date of Issue : 27 OCTOBER 2022



Calibrated by : Nithakorn Prasanna

Approved by : T. Petcha  
( Thanakul Petcha )

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.

QE-TS22-04-04-020044

Continuation of Calibration Certificate

Cert. No. : ACC22027  
Job No. : VCMAC0081  
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment is calibrated by based 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	33311H	NY52307742	1F-0005-22	04-Feb-23
Digital Multimeter	3340A	NY53228104	1F1-0P-04-0265	09-Feb-23
Digital Multimeter	3340A	NY53228105	1F1-0P-03-0265	09-Feb-23
Digital Multimeter	3340A	NY5024273	1F1-0P-05-0265	09-Feb-23
Programmable Attenuator	NA1-1070	62109114	1F-0009-22	07-Feb-23
Condenser Microphone	4180	2977000	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-425A1	34560495	AA-0005-22	22-Feb-23
Audio Analyzer	AY30-3360A	V74406069	1F-0010-22	07-Feb-23

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).

QE-TS22-04-04-020044

Continuation of Calibration Certificate

Cert. No. : ACL22246  
Job No. : VCMAC0090  
Pages : 2 of 3

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument display and also with SLMC display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	NY52017076	1F-0007-22	04-Feb-23
Waveform Generator	33311H	NY52307742	1F-0008-22	04-Feb-23
Digital Multimeter	3340A	NY53228104	1F1-0P-04-0265	09-Feb-23
Digital Multimeter	3340A	NY53228105	1F1-0P-03-0265	09-Feb-23
Digital Multimeter	3440A	NY5024273	1F1-0P-05-0265	09-Feb-23
Programmable Attenuator	NA1-1070	62109114	1F-0009-22	07-Feb-23
Condenser Microphone	4180	2977000	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-425A1	34560495	AA-0005-22	22-Feb-23

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).

QE-TS22-04-04-020044

## Continuation of Calibration Certificate

Cert. No. : 1 ACCL22246  
Job No. : 1 VC65AC0090  
Pages : 3 of 8

## Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum permitted uncertainty (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal levels of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
5000 Hz	✓	-	0.3	0.7
4. Electrical signal levels 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. Long-term stability	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QR-1512-01-01-029641

P.A.L.

## Continuation of Calibration Certificate

Cert. No. : 1 ACCL22246  
Job No. : 1 VC65AC0090  
Pages : 4 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
127.0	127.0	0.0	+1.1
119.0	119.0	0.0	+1.1
114.0	114.0	0.0	+1.1
109.0	109.0	0.0	+1.1
104.0	104.0	0.0	+1.1
99.0	99.0	0.0	+1.1
94.0	94.0	0.0	+1.1
89.0	89.0	0.0	+1.1
84.0	84.0	0.0	+1.1
79.0	79.0	0.0	+1.1
74.0	74.0	0.0	+1.1
69.0	69.0	0.0	+1.1
64.0	64.0	0.0	+1.1
59.0	59.0	0.0	+1.1
54.0	54.0	0.0	+1.1
49.0	49.0	0.0	+1.1
44.0	44.0	0.0	+1.1
39.0	39.0	0.0	+1.1
34.0	34.0	0.0	+1.1
29.0	29.0	0.0	+1.1
24.0	24.0	0.0	+1.1
19.0	19.0	0.0	+1.1
14.0	14.0	0.0	+1.1
9.0	9.0	0.0	+1.1

QR-1512-01-01-029641

P.A.L.

## Continuation of Calibration Certificate

Cert. No. : 1 ACCL22246  
Job No. : 1 VC65AC0090  
Pages : 4 of 8

## Result of Calibration :

## 1. Absolute sensitivity

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

## 2. Self-generated noise

## 2.1. Normal test

Measured Value (dB)
16.4

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

Frequency Weighting	Measured value (dB)
A-weight	11.6
C-weight	17.8
Flat	23.2

## 3. Acoustical signal levels of frequency weightings

## Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
5000	1.0	1.0	1.0	± 2.0

QR-1512-01-01-029641

P.A.L.

## Continuation of Calibration Certificate

Cert. No. : 1 ACCL22246  
Job No. : 1 VC65AC0090  
Pages : 4 of 8

## 8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

## 9. Time burst response

Time Weighting	Test burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	118.0	117.9	-0.1	1.5; -5.0
	2	6	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	109.0	109.0	0.0	1.5; -5.0
	200	800	127.4	127.6	0.2	±1.0
	0.25	1	90.0	90.0	-0.1	1.5; -5.0
SEL	2	8	118.0	118.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

## 10. Peak C-weight level

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	-
Pulse	136.4	135.9	-0.5	±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	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QR-1512-01-01-029641

P.A.L.

## Continuation of Calibration Certificate

Cert. No. : 1 ACCL22246  
Job No. : 1 VC65AC0090  
Pages : 5 of 8

## 4. Electrical signal levels of frequency weightings

## Weighting network response with relative to 1 kHz.

Frequency (Hz)	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	0.1	0.0	±2.0
5000	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	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	-
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.2

## 5.2. Time weighting at 1 kHz

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

## 6. Long-term stability

Frequency Weighting	STM Display at initial (dB)	STM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QR-1512-01-01-029641

P.A.L.

## Continuation of Calibration Certificate

Cert. No. : 1 ACCL22246  
Job No. : 1 VC65AC0090  
Pages : 6 of 8

## 11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive each half cycle	Negative each half cycle		
92.6	99.6	0.0	±1.5

## 12. High level stability

Frequency Weighting	STM Display at initial (dB)	STM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

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

or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

QR-1512-01-01-029641

P.A.L.

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY



451-45173 Sathorn-76, Bangkok, Bangkok 10100 THAILAND  
Tel: 02-2475-0803 Fax: 02-2475-1879 E-mail: sithiporn@eng.sithiporn.com http://www.sithiporn.com

Cert. No. : ACL22191  
Pages : 3 of 8

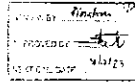
## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42 Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00597156 / 170403 / 72804  
ID No. : BKC-150994

Condition As Found : GOOD

Customer : A/S LABORATORY GROUP CO., LTD.  
104 PHATHANAKAN 45, PHATHANAKAN ROAD,  
KHUANG PHATHANAKAN, KHUANG SUAN UANG,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature : 4 23.0 ± 3.1 °C  
Pressure : 4 101.3 ± 5.1 kPa  
Relative Humidity : 4 50.0 ± 20.1 %  
Received Date : 06 SEPTEMBER 2022  
Calibration Date : 07-09 SEPTEMBER 2022  
Date of Issue : 14 SEPTEMBER 2022



Calibrated by : Natchanon Pongpan

Approved by : *T. Pich...*  
( Thanakorn Picharai )

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.

QP-1512-04-002004

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No. : ACL22191  
Job No. : YC65AC0001  
Pages : 4 of 8

### Result of calibration:

#### 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.8 (93.5)	93.9	0.0	±0.3

#### 2. Self-generated noise

##### 2.1 Normal test

Measured Value (dB)
14.3

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

Frequency Weighting	Measured value (dB)
A-weight	11.6
C-weight	18.0
Flat	22.3

#### 3. Acoustical signal levels of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.7	0.3	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-2.7	-2.7	-2.8	±5.0

QP-1512-04-002004

*T. Pich...*

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No. : ACL22191  
Job No. : YC65AC0001  
Pages : 2 of 8

Calibration Procedure : EP-AC-GI

### Calibration Method :

This equipment was calibrated by based on IEC 61672-2 (2013) Standard for sound level meter (SPL).  
The SLM had been to Acoustical and Electrical signal levels of frequency weighting with Acoustic chamber and Reference  
Standard loudspeakers.  
For test results of each item were made by observation of each instrument display and also with SLM's display.

### Condition of this result of calibration :

#### 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY48817076	13-0007-22	04-Feb-23
Waveform Generator	33511B	MY5232742	13-0008-22	04-Feb-23
Digital Multimeter	34461A	MY33220164	13-0009-22	09-Feb-23
Digital Multimeter	34461A	MY5122976	13-0010-22	09-Feb-23
Digital Multimeter	34461A	MY6002273	13-0011-22	09-Feb-23
Programmable Amplifier	NAT-1070	A2100114	13-0012-22	07-Feb-23
Condenser Microphone	4140	2977949	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34566195	AA-3025-22	22-Feb-23

2. This result of calibration was based on the date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of units maintained as :

- 3.1 National Institute of Metrology (Thailand)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR)

QP-1512-04-002004

*T. Pich...*

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No. : ACL22191  
Job No. : YC65AC0001  
Pages : 3 of 8

#### 4. Electrical signal levels of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.1	0.0	±3.0
8000	0.1	0.1	0.1	±5.0

#### 5. Frequency and time weightings at 1 kHz

##### 5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	04.0	0.0	±
C-weight	04.0	0.0	±0.2
Flat	04.0	0.0	±0.2

##### 5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	04.0	0.0	±0.1
Slow	04.0	0.0	±0.1
Long	04.0	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	04.0	04.1	0.1	±0.3

QP-1512-04-002004

*T. Pich...*

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No. : ACL22191  
Job No. : YC65AC0001  
Pages : 3 of 8

### Summary of Measurement Result:

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

QP-1512-04-002004

*T. Pich...*

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No. : ACL22191  
Job No. : YC65AC0001  
Pages : 4 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
128.0	128.0	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	0.1	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	0.0	±1.1
24.0	24.0	-0.1	±1.1
19.0	19.0	-0.1	±1.1
14.0	14.0	-0.1	±1.1
9.0	9.0	-0.1	±1.1
4.0	4.0	-0.1	±1.1

QP-1512-04-002004

*T. Pich...*

Cert. No. : ACL22192  
Job No. : VCAAC0061  
Page : 3 of 8

## 8. Level linearity including the level range control

Range	Assigned Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Aus	94.0	94.0	0.0	±1.1

## 9. Time burst response

Time Weighting	Time burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.9	-0.1	1.5 : -5.0
	2	8	112.0	116.9	-0.1	1.0 : -2.5
Slow	200	819	134.0	134.0	0.0	±1.0
	2	8	106.0	107.9	-0.1	1.5 : -5.0
SIL	200	810	127.5	127.5	-0.1	±1.0
	0.25	1	99.0	99.8	-0.2	1.5 : -5.0
	2	8	106.0	107.9	-0.1	1.0 : -2.5
	200	819	129.0	129.0	0.0	±1.0

## 10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, LeqdB (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Cut	136.4	136.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

CP-1512-04-04-02-04

T. Peth...

Cert. No. : ACL22192  
Job No. : VCAAC0061  
Page : 1 of 8

Calibration Procedure : CP-AC-01

## Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests on Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

Test results of each item were made by observation of each instrument's 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	MY44617076	11-0007-22	04-Feb-23
Waveform Generator	33511B	MY52162742	11-0008-22	04-Feb-23
Digital Multimeter	33441A	MY33220104	11-109_04-0260	09-Feb-23
Digital Multimeter	33441A	MY33220476	11-109_03-0263	09-Feb-23
Digital Multimeter	34481A	MY36924271	11-109_05-0265	09-Feb-23
Programmable Acoustics	NAT-1070	42180114	11-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KA1	34560495	AA-3005-22	22-Feb-23

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).

CP-1512-04-04-02-04

T. Peth...

Cert. No. : ACL22192  
Job No. : VCAAC0061  
Page : 8 of 8

## 11. Overload indication

Measured value (dB)	Deviation Value (dB)	Acceptance Limits
Positive one-half cycle	89.5	0.0
Negative one-half cycle	89.5	±1.5

## 12. High level stability

Frequency Weighting	SLM Display at Initial (dB)	SLM Display at final (dB)	Deviation Value (dB)	Acceptance Limits (dB)
A-weight	137.1	137.0	0.1	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k=2$   
or any value following calculation using a level of confidence of approximately 95 %

End of Calibration Certificate

CP-1512-04-04-02-04

T. Peth...

Cert. No. : ACL22192  
Job No. : VCAAC0061  
Page : 3 of 8

## Summary of Measurement Result :

Parameter	Pass	Fail	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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
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. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

CP-1512-04-04-02-04

T. Peth...

631-61171 Southorn Rd, Bangkok, Bangkok 10700 THAILAND  
Tel: 0-2455-8800 Fax: 0-2451-1679 e-mail: info@sithiporn.com http://www.sithiporn.com

Cert. No. : ACL22192

Page : 1 of 8

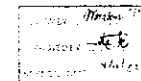
## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : KERN  
Model : SL-42 Microphone UC 52 / Pre-amplifier N1-24  
Serial No. : 00597159 / 140802 / 88172  
ID No. : DKA\_150995

Condition As Found : (C/F/R)

Customer : AUSTRIAN LABORATORY GROUP (THAI) SDSC CO., LTD.  
104 PHATHAN KASEN RD, PHATHANAKAN ROAD,  
KHUASAT PHATHANAKASEN, KHUASAT PANG,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature : 1 23.0 ± 1.1 °C  
Pressure : 1 101.3 ± 3.1 kPa  
Relative Humidity : 1 50.0 ± 20.1 %



Received Date : 06 SEPTEMBER 2022  
Calibration Date : 07 SEPTEMBER 2022  
Date of Issue : 14 SEPTEMBER 2022

Calibrated by : Thasakorn Petchum

Approved by :

T. Peth...

( Thasakorn Petchum )

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

CP-1512-04-04-02-04

Cert. No. : ACL22192  
Job No. : VCAAC0061  
Page : 4 of 8

## Result of calibration :

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.9 (93.9)	93.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal use

Measured Value (dB)
15.4

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

Frequency Weighting	Measured value (dB)
A-weight	26.9
C-weight	27.5
Flat	33.0

## 3. Acoustical signal tests of frequency weightings

Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.1	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
5000	1.4	1.5	1.5	± 5.0

CP-1512-04-04-02-04

T. Peth...

Continuation of Calibration Certificate

Cert. No. : ACL22192  
Job No. : VCSA0001  
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	±0.3
Imp	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

QC-FS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22192  
Job No. : VCSA0001  
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	-0.1	±1.1
24.0	24.0	-0.1	±1.1
19.0	19.0	-0.1	±1.1
14.0	14.0	-0.1	±1.1

QC-FS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22192  
Job No. : VCSA0001  
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Th	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	109.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	2.0; -2.5
Slow	200	800	124.0	124.1	0.1	±1.0
	2	8	128.0	128.0	0.0	1.5; -5.0
SEL	0.25	1	99.0	99.9	+0.9	1.5; -5.0
	2	8	109.0	109.0	0.0	1.0; -2.5
	200	800	126.0	126.0	0.0	±1.0

10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Level (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.7	-0.7	±1.0

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	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QC-FS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22192  
Job No. : VCSA0001  
Pages : 8 of 8

11. Overload indication

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

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k = 2  
or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

QC-FS12-04-04-02064

T. Petch.

411-45171, Sathorn Rd, Bangkok, Bangkok 10700 THAILAND  
Tel: 0-2415-8820 Fax: 0-2415-1679 e-mail: sithiporn@thai.com http://www.sithiporn.com



Cert. No. : ACL22192  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : ERM  
Model : NL-42 Microphone UC-32 / Pre-amplifier N11-24  
Serial No. : 00197183 / 120404 / 88174  
ID No. : HKK 120996

Condition As Found : GOOD

Customer : M/S. ARUNACHAL GROUP (THAI) AND CO., LTD.  
104 PHU THAI ANKASARAD, PHU THAI ANKASARAD,  
KHUANG PHU THAI ANKASARAD, KHUANG PHU THAI ANKASARAD,  
BANGKOK, 10250 THAILAND

Location :  
Ambient Temperature : 23.0 ± 3.0 °C  
Pressure : 101.5 ± 3.0 kPa  
Relative Humidity : 50.0 ± 20.0 %  
Received Date : 25 JULY 2022  
Calibration Date : 18-19 AUGUST 2022  
Date of Issue : 19 AUGUST 2022

Calibrated by : Naban Petchum

Approved by : T. Petch.  
( Thanakol Petchum )

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when not in full, except with the prior written approval of the head of Calibration Laboratory.

QC-FS12-04-04-02064

Continuation of Calibration Certificate

Cert. No. : ACL22192  
Job No. : VCSA0001  
Pages : 2 of 8

Calibration Procedure : CPAC-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had been in Acoustical and Electrical signal tests of frequency weighting with A-weight character and Reference  
Standard Instruments.  
For tests results of each item were made by observation of each instrument display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY38017076	11-0007-22	04-Feb-23
Waveform Generator	33511B	MY32102142	11-0008-22	04-Feb-23
Digital Multimeter	34461A	MY32201041	11-0010-22	09-Feb-23
Digital Multimeter	34461A	MY32201036	11-0010-22	09-Feb-23
Digital Multimeter	34461A	MY32201037	11-0010-22	09-Feb-23
Programmable Attenuator	MA1-1070	62101114	11-0009-22	07-Feb-23
Condenser Microphone	4130	29776001	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42K41	34504045	AA-1008-22	22-Feb-23

2. The 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 units maintained at :

- 3.1 National Institute of Metrology (Thailand)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR)

QC-FS12-04-04-02064

T. Petch.

Cert. No. : ACL22176  
Job No. : VCA5AC0071  
Page : 3 of 8

Summary of Measurement Results

Parameter	Pass	Fail	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
10000 Hz	✓	-	0.5	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	✓	-	0.2	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

QP-TN12-04-04-02004

T. Rth.

Cert. No. : ACL22176  
Job No. : VCA5AC0071  
Page : 4 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
24.0	24.0	0.0	± 1.1
19.0	19.0	0.0	± 1.1
14.0	14.0	0.0	± 1.1
9.0	9.0	0.0	± 1.1

QP-TN12-04-04-02004

T. Rth.

Cert. No. : ACL22176  
Job No. : VCA5AC0071  
Page : 4 of 8

Results of Calibration

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.0 (93.9)	93.9	0.0	± 0.3

2. Self-generated noise

Measured Value (dB)
15.5

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

Frequency (Hz)	Measured value (dB)
Weighting	0.2
A-weight	11.6
C-weight	17.8
Flat	25.3

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	± 1.2
1000	0.0	0.0	0.0	± 1.2
10000	0.0	0.2	0.2	± 1.0

QP-TN12-04-04-02004

T. Rth.

Cert. No. : ACL22176  
Job No. : VCA5AC0071  
Page : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	± 1.1

9. Tone burst response

Time Weighting	Tone burst duration (s)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	119.0	119.0	-0.1	1.5 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	± 1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -3.0
	200	800	127.8	127.8	0.0	± 1.0
	0.25	1	99.0	99.0	-0.1	1.5 ; -3.0
SFL	2	8	106.0	106.0	0.0	1.0 ; -2.5
	200	800	126.0	126.0	0.0	± 1.0

10. Peak C sound level

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	-
One	136.4	135.6	-0.8	± 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	-
Positive half-cycle	135.4	135.3	-0.1	± 2.0
Negative half-cycle	135.4	135.3	-0.1	± 2.0

QP-TN12-04-04-02004

T. Rth.

Cert. No. : ACL22176  
Job No. : VCA5AC0071  
Page : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	± 2.0
125	-0.1	0.0	-0.1	-
250	0.0	0.0	-0.1	± 1.5
500	0.0	0.0	-0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
2000	0.0	0.0	0.0	± 2.0
4000	-0.0	0.0	0.0	± 3.0
8000	0.0	0.1	0.1	± 3.0

5. Frequency and time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	04.0	0.0	± 0.2
C-weight	04.0	0.0	± 0.2
Flat	04.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	04.0	0.0	-
Slow	04.0	0.0	± 0.1
Imp	04.0	0.0	± 0.1

6. Long-term stability

Frequency Weighting	SI M Display at Initial (dB)	SI M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	04.0	04.0	0.0	± 0.1

QP-TN12-04-04-02004

T. Rth.

Cert. No. : ACL22176  
Job No. : VCA5AC0071  
Page : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
59.6	80.6	0.0	±1.5

12. High level stability

Frequency Weighting	SI M Display at Initial (dB)	SI M 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 follows by calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

QP-TN12-04-04-02004

T. Rth.



# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-4517 Sathorn Rd., Bangkok, Bangkok 10120 THAILAND  
Tel: 2433-8840 Fax: 2433-8879 e-mail: cal@hph.com http://www.hph.com



Cert. No.: ACL22250  
Page: 1 of 8

## Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RION  
Model: SR-42 Microphone UC-52 + Pre-amplifier NH-24  
Serial No.: 008515 / 15775 / 10641  
ID No.: BKA-FS015

Condition As Found: GOOD

Customer: AT S LABORATORY GROUP (THAILAND) CO., LTD.  
204 PHATHANAKAN 40 PHATHANAKAN ROAD,  
KHUANG PHATHANAKAN, KHUANG LUANG,  
BANGKOK, 10250 THAILAND.

Location: -  
Ambient Temperature: ( 23.0 ± 3 ) °C  
Pressure: ( 101.3 ± 3 ) kPa  
Relative Humidity: ( 50.0 ± 2.0 ) %

Received Date: 01 NOVEMBER 2022  
Calibration Date: 02-03 NOVEMBER 2022  
Date of Issue: 04 NOVEMBER 2022

Calibrated by: Nubakorn Pichanun

Approved by: *T. Pichanun*  
( Thanakul Pichanun )

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

QP-FS12-04-01-02064

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Calibration Procedure: CP-AC-01

## Calibration Method:

This equipment was calibrated by based on IEC 61672-2 (2013) Standard for sound level meter (SLM).  
The SLM had tests on Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference  
Standard Instruments.

For tests results of each item were made by observation of each instrument display and also with SLM's display.

## Condition of this result of calibration:

### 1. Reference Standard Instruments:

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	11-0007-22	04-Feb-23
Waveform Generator	33511B	MY5282742	11-0008-22	04-Feb-23
Digital Multimeter	17441A	MY52527004	FTL-RP-04-0265	09-Feb-23
Digital Multimeter	33441A	MY53227476	FTL-RP-05-0265	09-Feb-23
Digital Multimeter	33461A	MY60027271	FTL-RP-05-0265	09-Feb-23
Programmable Attenuator	MAT-107u	62100114	EP-0009-22	07-Feb-23
Condenser Microphone	4190	2977500	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KA	34360415	AA-3002-22	22-Feb-23

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.: ACL22250  
Job No.: VC66AC0004  
Page: 2 of 8

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No.: ACL22250  
Job No.: VC66AC0004  
Page: 3 of 8

## Summary of Measurement Results

Parameter	Pass	Fail	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
5000 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				
6. Long-term stability	✓	-	0.2	0.2
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. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-FS12-04-01-02064

*T. Pichanun*

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No.: ACL22250  
Job No.: VC66AC0004  
Page: 4 of 8

## Result of calibration:

### 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.8 (5.0)	93.9	0.0	±0.3

### 2. Self-generated noise

#### 2.1 Normal test

Measured Value (dB)
17.2

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

Frequency Weighting	Measured value (dB)
A-weight	9.0
C-weight	16.6
Z-weight	22.6

### 3. Acoustical signal tests of frequency weightings

Micro free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.8	0.8	±1.5
1000	0.0	0.0	0.0	±1.0
5000	-3.1	-3.2	-3.2	±3.0

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No.: ACL22250  
Job No.: VC66AC0004  
Page: 5 of 8

### 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±2.0
4000	0.0	0.1	0.0	±3.0
8000	0.1	0.1	0.1	±5.0

### 5. Frequency and time weightings at 1 kHz

#### 5.1 Frequency weightings at 1 kHz

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

#### 5.2 Time weighting at 1 kHz

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

### 6. Long-term stability

Frequency Weighting	SLM display at initial (dB)	SLM display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.1	0.1	±0.3

QP-FS12-04-01-02064

*T. Pichanun*

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No.: ACL22250  
Job No.: VC66AC0004  
Page: 7 of 8

### 8. Level linearity including the level range control

Range	Artificial Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

### 9. Time burst response

Time Weighting	Time burst duration, Th (μs)	Cycle	Anticipated	Measured	Deviated	Acceptance
			Value (dB)	Value (dB)	Value (dB)	Limits (dB)
Fast	0.25	1	105.6	107.6	-0.1	1.5 ± 5.0
	2	8	117.0	116.9	-0.1	1.0 ± 2.5
Slow	200	800	134.0	134.0	0.0	±2.0
	2	8	106.0	107.9	-0.1	1.5 ± 5.0
SEL	200	800	127.6	127.5	-0.1	±1.0
	0.25	1	99.0	99.8	-0.2	1.5 ± 5.0
	2	8	108.0	107.9	-0.1	1.0 ± 2.5
	200	800	128.0	128.0	0.0	±1.0

### 10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Peak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Burst	136.4	136.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

QP-FS12-04-01-02064

*T. Pichanun*

QP-FS12-04-01-02064

*T. Pichanun*

## Continuation of Calibration Certificate

Cert. No. : ACL22228  
Job No. : VCS65AC0004  
Pages : 8 of 8

## 11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.3

## 12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
	(dB)	(dB)		
A-weight	131.0	131.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$  or any value following a decision, providing a level of confidence of approximately 95 %

End of Calibration Certificate

QR-1512-01-01-02964

## Continuation of Calibration Certificate

Cert. No. : ACL22197  
Job No. : VCS65AC0003  
Pages : 3 of 8

## Summary of Measurement Results

Parameter	Pass	Fail	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	✓	-	0.2	0.6
For > 4 kHz to 10 kHz	✓	-	0.2	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	✓	-	0.3	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. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QR-1512-01-01-02964

411-451/1 Sathorn Rd, Jungsom, Bangkok Bangkok 10700 THAILAND  
Tel: 02-2531-6630 Fax: 02-2531-1679 e-mail: sathorn@sithiporn.com http://www.sithiporn.comCert. No. : ACL22197  
Job No. : VCS65AC0003  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : SL-42; Microphone UC-52 / Preamp/Ext SNI-24  
Serial No.: 00597163 / 180406 / B3176  
ID No.: BCK-150906

Condition As Found : LKRD

Customer : ACSI LABORATORY GROUP CO., LTD.  
166 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KHWAENG PHATHANAKAN, KHUET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature :  $23.0 \pm 3.3$  °C  
Pressure :  $(101.3 \pm 1.1)$  kPa  
Relative Humidity :  $50.0 \pm 20.1$  %

Received Date : 15 SEPTEMBER 2022  
Calibration Date : 19-21 SEPTEMBER 2022  
Date of Issue : 27 SEPTEMBER 2022

Calibrated by : Nattakorn Pichasarn

Approved by : T. Pichasarn  
(Thanaol Pichasarn)

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.

QR-1512-01-01-02964

## Continuation of Calibration Certificate

Cert. No. : ACL22197  
Job No. : VCS65AC0003  
Pages : 1 of 8

## Result of calibration:

## 1. Absolute sensitivity

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

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A-weight	12.9
C-weight	16.2
Total	15.7

## 3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.1	0.2	0.2	±2.0

QR-1512-01-01-02964

## Continuation of Calibration Certificate

Cert. No. : ACL22197  
Job No. : VCS65AC0003  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

## Calibration Method:

This equipment was calibrated by based on IEC 61672-3 (B1) Standard for sound level meters (SLM).

The SLM had been in Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument's display and also with SLM's display.

## Conditions of this result of calibration:

## 1. Reference Standard Instruments:

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY4-015976	11-0007-22	04-Feb-23
Waveform Generator	33311H	MY52302742	11-0008-22	04-Feb-23
Digital Multimeter	3390A	MY52320104	11-110P-04-0285	09-Feb-23
Digital Multimeter	3390A	MY52320078	11-110P-03-0285	09-Feb-23
Digital Multimeter	3440A	MY6002273	11-110P-05-0285	09-Feb-23
Programmable Attenuator	MYST-1070	62100114	17-0009-22	07-Feb-23
Condenser Microphone	4180	2972995	AA-1013-22	24-Feb-23
Measuring Amplifier	NV-42KA	54560495	AA-3003-22	22-Feb-23

2. This result of calibration was found accurate as shown on date and place of calibration for this calibration item only.

3. This certificate is traceable to the international system of unit maintained at:

- National Institute of Metrology (Thailand).
- Harvard Institute of Scientific and Technological Research (HISTRI).

QR-1512-01-01-02964

## Continuation of Calibration Certificate

Cert. No. : ACL22197  
Job No. : VCS65AC0003  
Pages : 3 of 8

## 4. Electrical signal tests of frequency weightings

Weighting network response with reference to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

## 5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	64.0	0.0	±0.2
C-weight	64.0	0.0	±0.2
Flat	64.0	0.0	±0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	64.0	0.0	-
Slow	64.0	0.0	±0.1
Imp	64.0	0.0	±0.1

## 6. Long-term stability

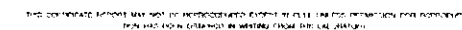
Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	64.0	64.0	0.0	±0.3

QR-1512-01-01-02964









Result of Calibration: **✓ With Adjustment**    **✓ With Adjustment**  
 Calibration Range: **20 - 60 °C**  
 Function:

Table 1: This equipment was calibrated with wet bulb probe Model: H93051 2 S.N. 15093263.  
 Dimensions: Diameter 14 mm, Length 120 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	23.050	22.1	0.9	0.009
35	24.550	23.4	0.0	0.009
40	26.050	25.1	0.0	0.009
45	27.550	26.1	0.0	0.009
50	29.050	27.1	0.0	0.009

Table 2: This equipment was calibrated with thermistor probe Model: TP3207 2 S.N. 15090014.  
 Dimensions: Diameter 14 mm, Length 120 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
20	20.050	20.2	0.1	0.009
25	21.550	21.9	0.1	0.009
30	23.050	23.0	0.0	0.009
35	24.550	24.6	0.1	0.009
40	26.050	26.1	0.1	0.009

Table 3: This equipment was calibrated with Glass Thermistor probe Model: TP3276 2 S.N. 150922734.  
 Dimensions: Diameter 14 mm, Length 120 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
15	20.050	20.0	0.0	0.009
20	21.550	21.5	0.0	0.009
25	23.050	23.0	0.0	0.009
30	24.550	24.5	0.0	0.009
35	26.050	26.0	0.0	0.009

UUC: Unit Under Calibration  
 The reported uncertainty is based on the standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

★ End of Certificate ★



## CERTIFICATE OF CALIBRATION

Certificate No. 21CH452  
 Page 2 of 2

Equipment Name: Hot Wire Thermometer  
 Manufacturer: GEM  
 Model: H93051  
 Serial No.: 15093263  
 ID No.: P-15394

Customer:  
 Name: A.S. Laboratory (Thailand) Co., Ltd.  
 Address: 104 Petchkasem Rd., Petchkasem Rd.,  
 Wathana, Bangkok, Bangkok 10600 Thailand  
 Tel: (66) 02-860812413 Fax: (66) 02-8608060

Reference Used During Calibration:  
 1. Standard Temperature Probe Model: STS-100A-01  
 Serial No.: 627002-01, Date: 23 May 2021  
 2. IEC 60751 Temperature Probe Model: 10T-1000-A-1  
 Serial No.: A13407-0021, Date: 04 Jun 2022

Calibration Procedure:  
 The temperature calibration was performed by the comparison method with standard digital temperature calibrator and standard temperature probe. The comparison method was used to calibrate the probe.

Calibration Condition:  
 Temperature: 23.0 ± 0.1 °C  
 Pressure: 101.3 kPa

Uncertainty:  
 The measurement uncertainty is based on the comparison method with standard digital temperature calibrator and standard temperature probe. The comparison method was used to calibrate the probe.

Certified by:  
 (Signature)  
 (Signature)

Approved by:  
 (Signature)  
 (Signature)

This certificate is valid only for the equipment and the conditions of use specified on the certificate. It is not valid for other equipment or conditions of use.

Result of Calibration: **✓ With Adjustment**    **✓ With Adjustment**  
 Calibration Range: **20 - 60 °C**  
 Function:

Table 1: This equipment was calibrated with wet bulb probe Model: H93051 2 S.N. 15093263.  
 Dimensions: Diameter 14 mm, Length 120 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	23.050	22.1	0.9	0.009
35	24.550	23.4	0.0	0.009
40	26.050	25.1	0.0	0.009
45	27.550	26.1	0.0	0.009
50	29.050	27.1	0.0	0.009

Table 2: This equipment was calibrated with thermistor probe Model: TP3207 2 S.N. 15090014.  
 Dimensions: Diameter 14 mm, Length 120 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
20	20.050	20.2	0.1	0.009
25	21.550	21.9	0.1	0.009
30	23.050	23.0	0.0	0.009
35	24.550	24.6	0.1	0.009
40	26.050	26.1	0.1	0.009

Table 3: This equipment was calibrated with Glass Thermistor probe Model: TP3276 2 S.N. 150922734.  
 Dimensions: Diameter 14 mm, Length 120 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
15	20.050	20.0	0.0	0.009
20	21.550	21.5	0.0	0.009
25	23.050	23.0	0.0	0.009
30	24.550	24.5	0.0	0.009
35	26.050	26.0	0.0	0.009

UUC: Unit Under Calibration  
 The reported uncertainty is based on the standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

★ End of Certificate ★



## Certificate of Calibration

Equipment: pH Meter  
 Manufacturer: Metro Toledo  
 Model: SevenCompact 3232  
 Serial No.: 852094428  
 ID No.: 800\_840072  
 Condition At Receipt: Used Item  
 Received Date: 24 March 2021  
 Calibration Date: 26 March 2021  
 Reference: 2103-1000000-1  
 Submitted by: A.S. Laboratory (Thailand) Co., Ltd.  
 104 Petchkasem Rd., Petchkasem Rd.,  
 Wathana, Bangkok, Bangkok 10600 Thailand  
 Ambient Temperature: (25 ± 2.5) °C  
 Relative Humidity: (50 ± 15) %  
 Calibration Procedure:  
 - pH Meter method  
 - CP-GB by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)  
 - CP-GB by comparison with standard thermometer

Calibrated by: Watana Lempagorn

Approved by: (Signature)  
Approved Signatory

(Signature)  
 (Signature)  
 (Signature)

Issue Date: 31 March 2021

The uncertainty is for a confidence level of approximately 95%.

This certificate is valid only for the equipment and the conditions of use specified on the certificate. It is not valid for other equipment or conditions of use.

Member of the National Association of Metrological Institutions and Engineers (NAMI) and the International Association of Metrological Institutions (IAMI).

Condition of this calibration result:

1. Reference Standard Instrument:

Instrument: pH Meter  
 Serial No.: 852094428  
 ID No.: 800\_840072  
 Date: 24 Nov 2021  
 Date: 15 Oct 2021

2. Certified Reference Material:  
 The measurement results are traceable to SI through CPA chem Ltd, AND-ASD National Accreditation Board, Accredited No. AR-1635

Buffer Solution: pH 4.008  
 pH 6.865  
 pH 10.012  
 Manufacturer: CPA chem  
 Lot No.: 705004  
 72295  
 72287  
 Exp. Date: 05 Sep 2022  
 19 Dec 2021  
 19 Dec 2021

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

Calibration Result:

Function: mV Measurement

Performing standard curve by Fisher at pH (4.7, 10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading	Uncertainty of Measurement	Coverage factor
pH Meter	4.000	177.48	177.4	0.008	2.00
	7.000	0.00	-0.1	0.008	2.00
	10.000	-177.48	-177.5	0.008	2.00

Calibration Result:

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	Uncertainty of pH measurement	Coverage factor
pH Electrode	4.008	4.010	150.3	0.0048	2.00
	6.865	6.869	-32.5	0.0077	2.00
	10.012	10.011	-193.7	0.013	2.00

Function: Temperature Measurement

(\*) With adjustment

This equipment was calibrated with Temperature Probe:

Model: WLab Expert Pro-40M

Serial No.: 8205001

Dimension of probe:

Length: 120 mm

Diameter: 12 mm

Immersion Depth: 120 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.003	25.2	0.197	0.20	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%.

★ End of Certificate ★

**PENTA CALIBRATION**  
PENTA CALIBRATION CO., LTD.  
89/124 The Corner 33, Village Panchasarakha Road  
Chomphu Prachin Buri 10250  
Tel: +66 80 208 8773  
www.pentacal.com

**Certificate of Calibration**  
Represent in Certificate of Calibration: PTC0722291

Certificate No.: PTC0722291 Page: 1 of 2  
Equipment: Digital Balance  
Manufacturer: Sartorius  
Serial No.: 2607012  
Model: MS2054-01N-01  
Type of Balance: Single pan  
Customer: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phrakhanlan 45, Phrakhanlan Rd.,  
Klongkum Phrakhanlan, Klongkum District, Bangkok 10250  
Environment Condition: Temperature: 23.5 °C ± 0.1 °C  
Humidity: 45 ± 5 %RH  
Air velocity: 0.1 m/s  
Calibration Place: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phrakhanlan 45, Phrakhanlan Rd.,  
Klongkum Phrakhanlan, Klongkum District, Bangkok 10250

The Method used: In-house method PTC 0722291, based on EN 847-1  
Traceability: The calibration is traceable to the SI Unit through the Calibration Service Co. Ltd.  
Date Received: February 20, 2022  
Calibration Date: February 20, 2022  
Issued Date: March 01, 2022  
Calibration By: Mr. Panchasarakha

Approved By: [Signature]  
Account By: [Signature]  
Reviewed By: [Signature]

Next Calibration Date: [Signature]

**PENTA CALIBRATION**  
PENTA CALIBRATION CO., LTD.  
89/124 The Corner 33, Village Panchasarakha Road  
Chomphu Prachin Buri 10250  
Tel: +66 80 208 8773  
www.pentacal.com

**Certificate of Calibration**  
Represent in Certificate of Calibration: PTC0722291

Certificate No.: PTC0722291 Page: 2 of 2

Measurement Results:  
Without Adjustment  
Function Calibration: Not Adjustment  
Economic Error: Weight is 1.0121 g, 1.0121 g, 1.0121 g

Repeatability Test: Weight is 1.0121 g, 1.0121 g, 1.0121 g  
Determination of the standard deviation of weighing balance: 0.0001 g

End of Certificate

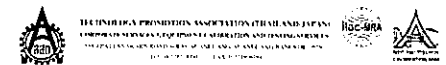
**SCG Metrological Center**  
SCI ECO Services Company Limited  
332 Moo 3, T. Bangpa-A, Klongkum District, Bangkok 10250  
Tel: +66 2 622 3399 Fax: +66 2 622 3100  
Bangkok Tel: +66 2 622 3399 Fax: +66 2 622 3100  
Website: www.scgmetro.com E-Mail: metrology@scg.co.th

**Certificate of Calibration**  
Certificate No.: T220139 Page: 1 of 1

Equipment: Liquid Bath (Water)  
Manufacturer: MEMMERT  
Model: WNB29  
Serial No.: 1.611.0135  
Customer Code: BKN\_EN0148  
ID No.: T645544  
Customer: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phrakhanlan 45, Phrakhanlan Rd., Klongkum Phrakhanlan,  
Klongkum District, Bangkok 10250  
Customer Location: ORGANIC PREPARATION LAB  
Date of Receipt: 26 January 2022  
Calibrated By: Wacharaporn Sangsri (Technician)  
Approved By: [Signature]  
Date of Issue: 8 FEB 2022

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 Center which has assessed the measurement capability of the laboratory and its capability to recognize national standards and to the units of measurement related in the corresponding national standard laboratory. This certificate may not be reproduced other than in full agreement with the prior written approval of the Metrological Center.



**Certificate No. T220139**  
Page 2 of 3

**Calibration Report**

Equipment: Liquid Bath (Water)  
Date of Calibration: 31 January 2022  
Environment: Temperature: 23.5 ± 0.1 °C  
Relative Humidity: 45 ± 5 %RH

Condition of this result of calibration:  
1. The equipment is calibrated by using temperature measurement devices and is not used for other use.  
2. The equipment is used for temperature measurement. The calibration is done in accordance with the SI Unit (based on ASTM E 113-99) (Repeatability 2021).  
3. All data show below were found in place and the initial data were consistent. The temperature scale used was based on ITS-90.  
4. The certificate is traceable to National Standard of Thailand (TIS) and is traceable to the SI Unit (based on ASTM E 113-99) (Repeatability 2021).  
5. Condition of calibration was good.  
6. Equipment is in good condition.  
7. Temperature: 23.5 ± 0.1 °C  
8. Humidity: 45 ± 5 %RH

Approved By: [Signature]

**Certificate No. T220139**  
Page 3 of 3

**Calibration Report**

Side View: [Diagram]  
Top View: [Diagram]

Working space dimension: 100 ± 5 mm  
Working standard are located at: 2.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 mm

Measured Results:

Calibration Point	Reading (°C)	Stability (°C)	Calibration (°C)	Uncertainty (°C)	Remarks
23.5	23.5	0.01	23.5	0.01	
24.0	24.0	0.01	24.0	0.01	
25.0	25.0	0.01	25.0	0.01	
26.0	26.0	0.01	26.0	0.01	
27.0	27.0	0.01	27.0	0.01	
28.0	28.0	0.01	28.0	0.01	
29.0	29.0	0.01	29.0	0.01	
30.0	30.0	0.01	30.0	0.01	

The quoted uncertainty includes "repeatability".  
The calibration result apply only the above values and items.  
The result of not found accuracy in above no date and place of test item.  
The reported expanded uncertainty is based on a normal distribution multiplied by a coverage factor k which for a distribution provides a level of confidence of approximately 95%.

Approved By: [Signature]

**Certificate of Calibration**  
Certificate No.: T220139 Page: 1 of 3

Equipment: HMI Air Oven  
Manufacturer: Memmert  
Model: LR 100  
Serial No.: 03111574  
ID No.: BKN\_EN0097  
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phrakhanlan 45, Phrakhanlan Rd.,  
Klongkum Phrakhanlan, Klongkum District, Bangkok 10250 Thailand  
Location: Oven Room  
Received Order: 1 December 2021  
Calibration Date: 1 December 2021  
Ambient Temperature: 23.5 ± 0.1 °C  
Relative Humidity: 50 ± 3 %  
Calibrated by: HMI Thungyaiyachon  
Approved by: [Signature]  
Issue Date: 7 December 2021

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





Equipment: Hot Air Oven  
Condition As-Received: Used Item  
Reference: 2112-00020G-1  
Page: 2 of 3

Cert. No.: 21TM2189  
Page: 2 of 3

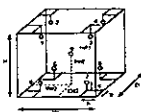
Procedure Used:  
Calibration was conducted using calibration procedure CP-0102 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration:  
1. Reference standard instrument:  
Instrument Model Serial No. Cert. No. Due Date  
1) Data Acquisition 84970A M74400450 2113A61 06 Mar 2022

2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This certificate is traceable to the International System of Unit.

Result of Calibration: (°C) Without Adjustment  
Function of UUC: Temperature Source  
Fresh air setting: On



Probe Installation Details: Dimension of Chamber:  
a = 50 cm b = 50 cm c = 50 cm  
D = 0.40 m W = 0.56 m H = 0.45 m  
Capacity = 0.11 m<sup>3</sup>

Environment during calibration	Temperature (°C)	Stability (°C)	Fluctuation (°C)
Temp. (°C)	25	25	25
REL Humid. (%)	51	53	53
AG Supply (Vol)	221	222	222

Position	1	2	3	4	5	6	7	8	9 (Ref.)
1	15-14RTD-01	15-14TC-01	15-14RTD-02	15-14TC-02	15-14RTD-03	15-14TC-03	15-14RTD-04	15-14TC-04	15-14TC-05
2	15-14RTD-05	15-14TC-05	15-14RTD-06	15-14TC-06	15-14RTD-07	15-14TC-07	15-14RTD-08	15-14TC-08	15-14TC-09
3	15-14RTD-09	15-14TC-09	15-14RTD-10	15-14TC-10	15-14RTD-11	15-14TC-11	15-14RTD-12	15-14TC-12	15-14TC-13

1085518



Equipment: Hot Air Oven  
Condition As-Received: Used Item  
Reference: 2112-00020G-1  
Page: 3 of 3

Cert. No.: 21TM2189  
Page: 3 of 3

Procedure Used:  
Calibration was conducted using calibration procedure CP-0102 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 Model Serial No. Cert. No. Due Date  
1) Data Acquisition 84970A M74400450 2113A61 06 Mar 2022

2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This certificate is traceable to the International System of Unit.

Result of Calibration: (°C) Without Adjustment  
Function of UUC: Temperature Source  
Fresh air setting: On

Calibration Point (°C)	UUC <sup>1</sup> (°C)	UUC <sup>2</sup> (°C)	Temperature stability (°C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (°C)	Coverage Factor
104.0	104.0	104.0	0.09	0.52	0.59	0.45	2
121.0	121.0	121.0	0.11	0.75	1.2	1.1	2
175.0	175.0	175.0	0.13	0.90	1.8	1.1	2
180.0	180.0	180.0	0.13	0.93	1.8	1.1	2

Calibration Point: Measured Temperature (°C)

Position	1	2	3	4	5	6	7	8	9 (Ref.)
104.0	104.263	104.229	104.262	104.222	104.390	104.394	104.284	103.994	103.909
121.0	120.836	120.519	120.661	120.524	121.162	120.856	120.703	120.126	120.728
175.0	175.021	174.803	174.848	174.852	175.820	175.321	175.411	174.482	175.223
180.0	179.192	179.374	179.575	179.578	180.643	180.681	180.174	179.217	180.014

Average<sup>2</sup>: 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<sup>1</sup>: 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 %.

1085517



Cert. No.: 21CH1835  
Page: 2 of 2

Condition of this calibration result:  
1. Reference Standard Instrument:  
Instrument Model Serial No. ID No. Cert. No. Due Date  
1) Document Process Calibrator 8420049 130RC118 21E26M2 25 Aug 2022

This certificate is traceable to the International System of Unit maintained at:  
- Traceable to National Institute of Metrology (Thailand), NIMT

2. Certified Reference Materials:  
The measurement results are traceable to SI through CPA Chem Ltd., ANASASQ National Accreditation Board, Accredited No. AN-1035

Buffer Solution	Manufacturer	Lot No.	Exp. Date
pH 4.008	CPA chem	781016	02 Aug 2023
pH 6.862	CPA chem	781017	02 Aug 2022
pH 10.015	CPA chem	781018	02 Aug 2022

Unit Under Calibration	Nominal Value	Standard Voltage Input (mV)	Actual Reading (mV)	Uncertainty of Measurement (mV)	Coverage Factor
pH Meter	pH				
SN: B524047025	4.00	177.48	177	0.58	2.00
	7.00	0.00	0	0.58	2.00
	10.00	-177.48	-177	0.58	2.00

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading	Uncertainty of pH measurement (pH)	Coverage Factor
pH Electrode					
SN: 0292355	4.008	4.01	173	0.078	2.00
	6.862	6.86	-9	0.099	2.00
	10.015	10.02	-177	0.011	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 %.

1085834



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN  
COMMITTEE OF METRIC AND PHYSICAL SCIENCE AND TECHNOLOGY  
100-0001, 1-1-1, Kojima, Setagaya-ku, Tokyo 158-8501, Japan

Cert. No.: 21TM223  
Page: 1 of 2

## Certificate of Calibration

Equipment: pH Meter with Sensor  
Manufacturer: Mettler-Toledo  
Model: SEVENGO  
Serial No.: B524047508  
ID No.: BIKC\_L00024

Submitted by: AJS Laboratory Group (Thailand) Co., Ltd.  
104 Phachanank 40, Phachanank Rd., Khwaeng Phachanank, Khet Suan Lum, Bangkok 10250 Thailand

Location: TPA On Site Calibration Laboratory

Received Date: 24 November 2021  
Calibrated Date: 30 November 2021  
Ambient Temperature: (28 ± 1) °C  
Relative Humidity: (50 ± 30) %  
AC Line Voltage: (220 ± 22) V

Calibrated by: Kanchit Promsom  
Approved by: [Signature]  
Approved Signatory: [Signature]  
Issue Date: 2 December 2021

The Uncertainty are for a confidence probability of approximately 95 %



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN  
COMMITTEE OF METRIC AND PHYSICAL SCIENCE AND TECHNOLOGY  
100-0001, 1-1-1, Kojima, Setagaya-ku, Tokyo 158-8501, Japan

Cert. No.: 21CH1835  
Page: 1 of 2

## Certificate of Calibration

Equipment: pH Meter  
Manufacturer: Mettler-Toledo  
Model: SEVENGO  
Serial No.: B524047508  
ID No.: BIKC\_L00024

Condition As-Received: Used Item  
Received Date: 24 November 2021  
Calibration Date: 25 November 2021  
Reference: 2111-00040SC-1  
Submitted by: AJS Laboratory Group (Thailand) Co., Ltd.  
104 Phachanank 40, Phachanank Rd., Khwaeng Phachanank, Khet Suan Lum, Bangkok 10250 Thailand

Ambient Temperature: (25 ± 2.5) °C  
Relative Humidity: (50 ± 10) %  
Calibration Procedure: In-house method:  
- CP-015 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)

Calibrated by: Woranuch Lenggrasud  
Approved by: [Signature]  
Approved Signatory: [Signature]  
Issue Date: 1 December 2021

The Uncertainty are for a confidence probability of approximately 95 %

1085370



Equipment: pH Meter with Sensor  
Condition As-Received: Used Item  
Reference: 2111-00040SC-2  
Page: 2 of 2

Cert. No.: 21TM223  
Page: 2 of 2

Procedure Used:  
Calibration was conducted using in-house calibration procedure CP-0101 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) 140 Temperature Bath.  
The temperature scale used was based on ITS-90.

Condition of this result of calibration:  
1. Reference standard instrument:  
Instrument Model Serial No. Cert. No. Due Date  
1) Digital Thermometer 1622A A00004 201333 21 Dec 2021

2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This certificate is traceable to the International System of Unit.

Result of Calibration: (°C) Without Adjustment  
Function: Temperature measurement

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC <sup>1</sup> Reading (°C)	Error (°C)	Uncertainty (°C)	Coverage Factor
22.0	120	22.064	25.2	0.196	0.16	2.00
22.0	120	25.002	25.2	0.198	0.16	2.00
30.0	120	30.054	30.2	0.296	0.18	2.00
25.0	120	35.001	35.3	0.299	0.18	2.00
40.0	120	40.002	40.3	0.299	0.18	2.00
45.0	120	45.002	45.3	0.298	0.16	2.00
50.0	120	50.003	50.3	0.297	0.16	2.00

UUC<sup>1</sup>: 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 %.

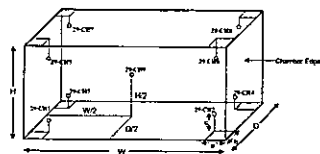
1084520



Certificate No. T212123

Page 3 of 3

### Calibration Report




Internal Dimensions of Chamber: W (Width) = 70 cm, L (Length) = 100 cm, D (Depth) = 55 cm.  
 Size of Internal Standard sensor number 29-CH10: a = 5 cm, b = 5 cm, and c = 5 cm.  
 Size of Internal Standard sensor number 29-CH11: W = 70 cm, L = 100 cm, and D = 55 cm.

Average Standard Reading at each position (°C)									
Calibration Point	29-CH1	29-CH2	29-CH3	29-CH4	29-CH5	29-CH6	29-CH7	29-CH8	29-CH9
20	20.04	20.08	20.14	19.94	19.88	20.04	20.12	19.92	20.07
25	24.99	25.06	25.18	24.98	24.74	25.12	25.16	24.80	25.00

Chamber (Manufacturer)		Temperature Distribution			
Setting (°C)	Reading (°C)		Stability (°C)	Uniformity (°C)	Uncertainty (°C)
	Min	Max			
20.0	-	-	0.05	1.01	0.35
25.0	-	-	0.07	0.96	0.18


\* The quoted uncertainty is a "k=2" uncertainty.  
 The calibration is valid only for the above calibrated item.  
 The result of test is a final accuracy 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 distribution, possibly a level of confidence of approximately 95%.

Approved By:   
 (Signature) (Date)

Certificate No. T220630

Page 1 of 5

### Certificate of Calibration

Equipment : HOT BLOCK  
 Manufacturer : Environmental Express  
 Model : R3000-240  
 Serial No. : 2017COW116  
 Customer Code : BKK-EN0222  
 ID No. : T6769A4  
 Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
 104 Phatthanasak Rd., Phatthanasak Rd., Khwaeng Phatthanasak,  
 Khet Suan Luang, Bangkok 10550  
 Customer Location : Wet Chemistry Lab2  
 Date of Receipt : 21 March 2022  
 Calibrated By : Watcharapong Sangtong (Technician)  
 Approved By :  / Sajjar Nakasri (Site Calibration Manager)  
 Date of Issue : 23.03.2022

The uncertainty is for a confidence probability of approximately 85%.

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 capability is recognized national standards and by 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.

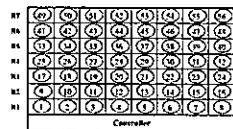
13/01/2022 09:00:00

13/01/2022 09:00:00

Certificate No. T220630

Page 5 of 5

### Calibration Report



Cal	1	2	3	4	5	6	7	8	9	10	11
20.0	20.01	20.02	20.03	20.04	20.05	20.06	20.07	20.08	20.09	20.10	20.11
25.0	25.01	25.02	25.03	25.04	25.05	25.06	25.07	25.08	25.09	25.10	25.11

Approved By: 

13/01/2022 09:00:00

Certificate No. T220630

Page 4 of 5

### Calibration Report

Measurement Results											
Calibration Point		Average Standard Reading at each position (°C)									
20	Min	19.92	19.93	19.94	19.95	19.96	19.97	19.98	19.99	20.00	20.01
	Max	20.02	20.03	20.04	20.05	20.06	20.07	20.08	20.09	20.10	20.11
	Average	19.97	19.98	19.99	20.00	20.01	20.02	20.03	20.04	20.05	20.06
	Uncertainty	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
25	Min	24.92	24.93	24.94	24.95	24.96	24.97	24.98	24.99	25.00	25.01
	Max	25.02	25.03	25.04	25.05	25.06	25.07	25.08	25.09	25.10	25.11
	Average	24.97	24.98	24.99	25.00	25.01	25.02	25.03	25.04	25.05	25.06
	Uncertainty	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Approved By: 

13/01/2022 09:00:00

Certificate No. T220630

Page 2 of 5

### Calibration Report

Equipment : HOT BLOCK  
 Date of Calibration : 21 March 2022  
 Environment : Temperature : 21.0-21.3 °C  
 Humidity : 22.1-22.3 %  
 Relative Humidity : 25-25 %RH

Condition of this result of calibration:  
 1. This equipment was calibrated by using nine standard thermocouples type T into its chamber. The reference specified thermocouples type T were for ambient temperature measurement. The calibration was done in accordance with ISO 9001.  
 All data shown below were final values and the serial data from customer request. The temperature scale used was based on ITS-90.  
 2. Reference Standard Instrument:  
 Instrument Model Certificate No. Due Date  
 TC T1901 T1901 28 February 2022  
 TC T1902 T1902 28 February 2022  
 TC T1903 T1903 28 February 2022  
 TC T1904 T1904 28 February 2022  
 TC T1905 T1905 28 February 2022  
 TC T1906 T1906 28 February 2022  
 TC T1907 T1907 28 February 2022  
 TC T1908 T1908 28 February 2022  
 TC T1909 T1909 28 February 2022  
 3. This certificate is traceable to National Institute of Standards & Technology (NIST) through Metrological Center (SCG) (T1901-T1909) CALIBRATION (T1901-T1909).  
 4. Condition of calibrated item: good  
 Equipment Description:  
 Item Location: ☐ Home ☐ Office ☐ Lab ☐ Field  
 Fresh Air Filter: ☐ Yes ☐ No ☐ Not Available  
 5. Adjustment:  
☐ Without adjustment ☐ After adjustment

Approved By: 

13/01/2022 09:00:00


Certificate No. T220630

Page 5 of 5

### Calibration Report

Measurement Results			
Calibration Point		Average Standard Reading at each position (°C)	
20	Min	19.92	19.93
	Max	20.02	20.03
	Average	19.97	19.98
	Uncertainty	0.01	0.01
25	Min	24.92	24.93
	Max	25.02	25.03
	Average	24.97	24.98
	Uncertainty	0.01	0.01

\* The quoted uncertainty is a "k=2" uncertainty.  
 The calibration is valid only for the above calibrated item.  
 The result of test is a final accuracy 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 distribution, possibly a level of confidence of approximately 95%.

Approved By: 

13/01/2022 09:00:00

# ภาคผนวก จ

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สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน



๖๖๖  
(นายสิทธิ์ ชื่นพันธ์) \

អំពី ទំព័រ 59 រាប់

ลำดับที่	สารพิษ	วิธีการตรวจ
1	Alcobar	High-Performance Liquid Chromatographic Method <sup>18</sup>
2	Alcobar Sulfone	High-Performance Liquid Chromatographic Method <sup>18</sup>
3	Alcobar Sulfonide	High-Performance Liquid Chromatographic Method <sup>18</sup>
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>19</sup>
5	Arsenic	1) Distillation, Inductively Coupled Plasma Method <sup>21</sup> 2) Distillation, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>20</sup>
6	Barium	1) Distillation, Inductively Coupled Plasma Method <sup>21</sup> 2) Distillation, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>20</sup>
7	$\alpha$ -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>19</sup>
8	$\beta$ -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>19</sup>
9	$\delta$ -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>19</sup>
10	$\gamma$ -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>19</sup>
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>22</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>23</sup>
12	Carbaryl	High-Performance Liquid Chromatographic Method <sup>18</sup>
13	Carfendathion	High-Performance Liquid Chromatographic Method <sup>18</sup>
14	Cadmium	1) Distillation, Inductively Coupled Plasma Method <sup>21</sup> 2) Distillation, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>20</sup>
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method <sup>24</sup> 2) Closed Reflux, Titrimetric Method <sup>25</sup>
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>19</sup>
17	Chromium	1) Distillation, Inductively Coupled Plasma Method <sup>21</sup> 2) Distillation, Inductively Coupled Plasma/ Spectrometric Method <sup>26</sup>
18	Color	APHA Whited-Orbitate Spectrophotometric Method <sup>27</sup>

(นางสาวอุบลรัตน์ นิลประทีป)

19 Copper...

क्र.सं.	अवस्थिति	प्रकार
19	Copper	1) Digestion, Inductively Coupled Plasma Method <sup>10</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>11</sup>
20	Cyanide	Distillation, Colorimetric Method <sup>12</sup>
21	2,4'-OD	Liquid-Liquid Extraction, Gas Chromatographic Method
22	4,4'-OD	Liquid-Liquid Extraction, Gas Chromatographic Method
23	2,4'-OD	Liquid-Liquid Extraction, Gas Chromatographic Method
24	4,4'-OD	Liquid-Liquid Extraction, Gas Chromatographic Method
25	2,4'-OD	Liquid-Liquid Extraction, Gas Chromatographic Method
26	4,4'-OD	Liquid-Liquid Extraction, Gas Chromatographic Method
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method
32	Enthal Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method
33	Formaldehyde	Distillation, Colorimetric Method <sup>13</sup>
34	Free Chlorine	1) DPD Ferrous Thiocyanate Method <sup>14</sup> 2) Iodometric Method <sup>15</sup>
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method
36	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method
37	Hexachlor Chromium	Filtration, Colorimetric Method <sup>16</sup>
38	Hydroxycarbazoles	High-Performance Liquid Chromatographic Method <sup>17</sup>
39	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>10</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>11</sup>
40	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>10</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>11</sup>
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>18</sup> 2) Digestion, Inductively Coupled Plasma/Mass spectrometric Method <sup>19</sup>
42	Methionin	High-Performance Liquid Chromatographic Method <sup>16</sup>
43	Methoxychlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method

(นางสาว) 44 Methomyl  
 (นางสาว) นิตยา (นิตยา)  
 (นางสาว) นิตยา นิตยา (นิตยา)

44 Melhontvá

ลำดับที่	สารพิษ	วิธีการตรวจ
44	Methanol	High-Performance Liquid Chromatographic Method <sup>44</sup>
45	Nickel	2) Digestion, Inductively Coupled Plasma Method <sup>45</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>45</sup>
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method <sup>46</sup> 2) Soxhlet Extraction Method <sup>46</sup>
47	Quarrel	High-Performance Liquid Chromatographic Method <sup>47</sup>
48	Proposul	High-Performance Liquid Chromatographic Method <sup>48</sup>
49	pH	Electrometric Method <sup>49</sup>
50	Phenols	1) Distillation, Colorimetric Extraction Method <sup>50</sup> 2) Distillation, Direct Photometric Method <sup>50</sup>
51	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>51</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>51</sup>
52	Sulfide	Isoelectric Method <sup>52</sup>
53	Temperature	Laboratory and Field Methods <sup>53</sup>
54	Total Dissolved Solids	Dried at 180 °C <sup>54</sup>
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method <sup>55</sup>
56	Total Suspended Solids	Dried at 103-105 °C <sup>56</sup>
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>57</sup>
58	Toxicant Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>58</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>58</sup>
59	Zinc	2) Digestion, Inductively Coupled Plasma Method <sup>59</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>59</sup>

หน้าปกพิมพ์สี 126 หน้า

ลำดับที่	สารพิษ	วิธีการ
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(8)</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(8)</sup>

3 Aldin

### 3 Aldrin

สารเคมี	การวิเคราะห์	อุปกรณ์
3 Aldin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
4 Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
5 Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>2</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>4</sup>	
6 Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>2</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>4</sup>	
7 Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
8 Barium	1) Digestion, Inductively Coupled Plasma Method <sup>2</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>4</sup>	
9 Benz[a]anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
10 Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
11 Benzofluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
12 Benzofluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
13 Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
14 Benzofluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
15 Benzofluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	
16 Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>2</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>4</sup>	
17 Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>	

18 Bis(2-ethylhexyl)phthalate

(ហេតុការណ៍ ឆ្នាំ ២០០៧)

สารเคมี	สารพิษหลัก	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
20	Bromodform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
		Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
22	Butyl Benzyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>4</sup>
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>4</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>4</sup>

34 CHRONICLES (II)

(អាងវិទ្យាសាស្ត្រ វិទ្យាសាស្ត្រ)

ลำดับที่	สารเคมี	วิธีการตรวจ
34	Chromium (II)	1) Digestion, Inductively Coupled Plasma Method/ Colorimetric Method/Calculation <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method/Colorimetric Method/ Calculation <sup>14</sup>
35	Chromium (VI)	Colorimetric Method <sup>14</sup>
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
37	Cyanide	Distillation, Colorimetric Method <sup>14</sup>
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
43	Din-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>

51 cis-1,2-Dichloroethylene...

(หน่วยรายงาน: มิลลิกรัม/ลิตร)  
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(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)

ลำดับที่	สารเคมี	วิธีการตรวจ
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
57	Delalin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
63	Di-n-Octyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>

68 Fluorene...

(หน่วยรายงาน: มิลลิกรัม/ลิตร)  
(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)  
(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)

ลำดับที่	สารเคมี	วิธีการตรวจ
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
74	o-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
75	p-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>
83	Mercury	1) Cold Vapor Atomic Absorption Spectrometric Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>

84 Methanol...

(หน่วยรายงาน: มิลลิกรัม/ลิตร)  
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(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)

ลำดับที่	สารเคมี	วิธีการตรวจ
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
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 <sup>14</sup>

97 Pentachlorophenol...

(หน่วยรายงาน: มิลลิกรัม/ลิตร)  
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ลำดับที่	สารเคมี	วิธีการตรวจ
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
98	pH	Electrometric Method <sup>14</sup>
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
100	Phenol	1) Distillation, Direct Photometric Method <sup>14</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
102	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>
103	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
109	TPH C <sub>12</sub> -C <sub>14</sub>	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
110	TPH C <sub>16</sub> -C <sub>18</sub>	Solvent Extraction, Gas Chromatographic Method <sup>14</sup>
111	TPH C <sub>18</sub> -C <sub>21</sub>	Solvent Extraction, Gas Chromatographic Method <sup>14</sup>
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>

114 1,1,2-Trichloroethane...

(หน่วยรายงาน: มิลลิกรัม/ลิตร)  
(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)  
(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)

ลำดับที่	สารเคมี	วิธีการตรวจ
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
118	1,3,5-Triethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>
120	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
121	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>14</sup>
126	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>14</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>14</sup>


หมายเหตุ: หน่วยรายงาน: มิลลิกรัม/ลิตร

ลำดับที่	สารเคมี	วิธีการตรวจ
1	Antimony	Inductively Coupled Plasma Method <sup>14</sup>
2	Arsenic	Inductively Coupled Plasma Method <sup>14</sup>


3 Carbon Monoxide...

(หน่วยรายงาน: มิลลิกรัม/ลิตร)  
(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)  
(ค่ามาตรฐาน: มิลลิกรัม/ลิตร)

ลำดับที่	สารเคมี	วิธีการตรวจ
3	Carbon Monoxide	1) Sampling Bag Non-Dispersive Infrared Method <sup>21</sup> 2) Non-Dispersive Infrared Method <sup>21</sup> 3) Instrumental Analyzer Method <sup>21</sup>
4	Chlorine	1) Absorption Sampling, Ion Chromatographic Method <sup>21</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>21</sup> Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>21</sup>
5	Copper	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Isokinetic/Titrimetric Analysis Approved) <sup>21</sup>
6	Dioxins	1) Absorption Sampling, Ion Chromatographic Method <sup>21</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>21</sup> Absorption Sampling, Iodometric Method <sup>21</sup> Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>21</sup>
7	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method <sup>21</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>21</sup> Absorption Sampling, Iodometric Method <sup>21</sup> Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>21</sup>
8	Hydrogen Sulfide	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>21</sup> 2) Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>21</sup>
9	Lead	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>21</sup>
10	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>21</sup> 2) Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>21</sup>
11	Opacity	Ringelmann's Method <sup>21</sup>
12	Oxides of Nitrogen	1) Absorption Sampling, Phenol-disulfonic Acid Method <sup>21</sup> 2) Chemiluminescence Method <sup>21</sup> 3) Instrumental Analyzer Method <sup>21</sup>
13	Sulfur Dioxide	1) Absorption Sampling, Barium-Thioin Titrimetric Method <sup>21</sup> 2) UV Fluorescence Method <sup>21</sup> 3) Instrumental Analyzer Method <sup>21</sup>
14	Sulfuric Acid	Isokinetic Sampling, Barium-Thioin Titrimetric Method <sup>21</sup>
15	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>21</sup>
16	Xylene	Absorption Sampling, Gas Chromatographic Method <sup>21</sup>


  
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ลำดับที่	สารเคมี	วิธีการตรวจ
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>

  
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
6 Cadmium...

ลำดับที่	สารเคมี	วิธีการตรวจ
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
7	Chloride	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
9	Chromium (6)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
10	Chromium (3)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>

  
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
11 Cobalt...

ลำดับที่	สารเคมี	วิธีการตรวจ
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
14	DDO	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
15	DDC	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>

  
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
23 Soxhlet...

ลำดับที่	สารเคมี	วิธีการตรวจ
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
21	Urdane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>21</sup>

  
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2) Waste Extraction...

ลำดับที่	สารเคมี	วิธีการตรวจ
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>21</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>21</sup>
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>21</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>21</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>21</sup>

  
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2) Polychlorinated...



ลำดับที่	สารเคมี	วิธีวิเคราะห์
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',3,4-Tetrachlorobiphenyl - 2,2',3,4'-Tetrachlorobiphenyl - 2,2',3,4,5-Pentachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',3,4,5,6-Hexachlorobiphenyl - 2,2',3,4,5,6'-Hexachlorobiphenyl - 2,2',3,4,5,6,7-Heptachlorobiphenyl - 2,2',3,4,5,6,7'-Heptachlorobiphenyl - 2,2',3,4,5,6,7,8-Octachlorobiphenyl - 2,2',3,4,5,6,7,8'-Octachlorobiphenyl - 2,2',3,4,5,6,7,8,9-Nonachlorobiphenyl	1) Waste Extraction, Separatory Funnel, Liquid-Liquid Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>2,3,4</sup>

29 Pentachlorophenol...  
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ลำดับที่	สารเคมี	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel, Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>2,3,4</sup>
29	pH	Electrometric Method <sup>1,2,3,4</sup>
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
33	Toxaphene	1) Waste Extraction, Separatory Funnel, Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>2,3,4</sup>
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup>

4) Digestion...  
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ลำดับที่	สารเคมี	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup> 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>

รูป จำนวน 125 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Acephenylene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
3	Acidin	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
4	Anthrane	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>

9 Benzoanthracene...  
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ลำดับที่	สารเคมี	วิธีวิเคราะห์
9	Benzoanthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
11	Benzo[b]fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
12	Benzo[b]fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
13	Benzoic acid	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
14	Benzo[a]pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
15	Benzo[a]pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
20	Bromoforn	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>

26 Carbon tetrachloride...  
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ลำดับที่	สารเคมี	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
30	Chlorobromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,2,3,4</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method, Alkaline Digestion, Colorimetric Method, Calculation Method <sup>1,2,3,4</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method, Alkaline Digestion, Colorimetric Method, Calculation Method <sup>1,2,3,4</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>1,2,3,4</sup>
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
37	Cyanide	Extraction, Distillation, Colorimetric Method <sup>1,2,3,4</sup>
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
39	DDO	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>

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ลำดับที่	สารเคมี	วิธีวิเคราะห์
40	DDE	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
41	DDT	1) Soxhlet Extraction, Gas Chromatographic Method <sup>1,2,3,4</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
42	Dibenz[a,h]anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
44	1,2-Dichlorodurene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
47	1,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
54	1,2,4-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>1,2,3,4</sup>

57 Dieldrin...  
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