

ภาคผนวก ง

เอกสารการสอบเทียบเครื่องมือตรวจวิเคราะห์



right solutions.
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	n-Hexane	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Ambient	n-Hexane	GC-FID	BKK_EN0133	26-Jul-23	26-Jan-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0414	10-Feb-23	10-Aug-24	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0413	10-Feb-23	10-Aug-24	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0531	19-Jan-23	19-Jul-24	18
Workplace	n-Hexane	Field Rotameter	RYG_FS0199	4-Jan-24	4-Apr-24	3
Workplace	n-Hexane	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	n-Hexane	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Total Dust	Field Rotameter	RYG_FS0197	4-Jan-24	4-Apr-24	3
Workplace	Total Dust	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Total Dust	Digital Balance	RYG_EN0004	22-Feb-24	22-Feb-25	12
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	26-Jan-24	25-Jan-25	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0024	25-Jan-24	24-Jan-25	12
Noise	Leq 12 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0438	19-Oct-23	19-Oct-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0439	19-Oct-23	19-Oct-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0615	5-Jan-24	4-Jan-25	12
Noise	Leq 12 hrs	Sound Calibrator	RYG_FS0496	26-Jan-24	25-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0300	1-Sep-23	1-Sep-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0304	1-Sep-23	1-Sep-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0381	19-Oct-23	19-Oct-24	12
Noise	Octave Band	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Octave Band	Sound Level Meter	RYG_FS0438	19-Oct-23	19-Oct-24	12
Noise	Octave Band	Sound Level Meter	RYG_FS0439	19-Oct-23	19-Oct-24	12
Noise	Octave Band	Sound Level Meter	RYG_FS0615	5-Jan-24	4-Jan-25	12
Noise	Octave Band	Sound Calibrator	RYG_FS0496	26-Jan-24	25-Jan-25	12
Noise	Octave Band	Sound Level Meter	RYG_FS0300	1-Sep-23	1-Sep-24	12
Noise	Octave Band	Sound Level Meter	RYG_FS0304	1-Sep-23	1-Sep-24	12
Noise	Octave Band	Sound Level Meter	RYG_FS0381	19-Oct-23	19-Oct-24	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0212	18-Aug-23	18-Aug-24	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0440	29-Jan-24	28-Jan-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0217	8-Jan-24	7-Jan-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0219	14-Feb-23	14-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0221	11-Jan-24	10-Jan-25	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0223	12-Jan-24	11-Jan-25	12
Rayong Lab	pH at 25 °C	pH meter	RYG_EN0183	19-Jan-24	19-Jan-25	12
Rayong Lab	Color (at Original pH)	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Color (at pH 7.0)	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	24-Jul-23	24-Jan-25	18
Rayong Lab	BOD	Incubator	RYG_EN0154	29-May-23	29-Nov-24	18
Rayong Lab	BOD	Burette	RYG_EN0162	30-Oct-23	30-Oct-24	12
Rayong Lab	COD	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Total Dissolved Solids 180°C	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Dissolved Solids 180°C	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0213	21-Mar-24	21-Mar-25	12
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	21-Mar-24	21-Sep-25	18
Rayong Lab	Temperature	pH meter	RYG_FS0607	6-Dec-23	6-Dec-24	12
Rayong Lab	Chloride	pH ISE Meter	RYG_EN0152	14-Dec-23	14-Dec-24	12
Water Lab	n-Hexane	Gas Chromatography (MSD)	BKK_EN0059	13-Dec-23	13-Jun-25	18

Calibration Certificate

Certificate No. 551422
Product 200-6100 Outcomes 610 Medium Flow
Serial No. 200545
Cal. Date 18-Aug-2023

Sold To:

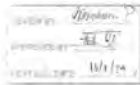
All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave., Littleton, CO 80120, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Austin Schwartz	Lab. Pressure Lab. Temperature	620.1 mmHg 23.5 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation
412.29 cm	418.62 cm	-6.33%	1.00%
599.43 cm	599.21 cm	0.04%	1.00%
249.27 cm	249.88 cm	-0.24%	1.00%

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	220367	29-Mar-2023	29-Mar-2024



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(303) 967-6020 mesa@mesalabs.com Twitter: @MLAB on the NVLAP

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As Shipped Calibration Data

Certificate No.	551422	Lab. Pressure Lab. Temperature	516.8 mmHg 24.2 °C
Technician	Xian Ly		
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation
416.81 cm	418.62 cm	-0.55%	1.00%
599.87 cm	599.21 cm	0.02%	1.00%
248.84 cm	249.88 cm	-0.41%	1.00%

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	220367	29-Mar-2023	29-Mar-2024

Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%. Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen as standard laboratory air. Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By: *Xian Ly* Accepted By: *Norma Aragon*
Xian Ly Production Technician II Norma Aragon QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibration process has a Total Uncertainty Factor (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against specified tolerance only.

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Calibration Certificate

Certificate No. 541047
Product 200-6100 Outcomes 510 Low Flow
Serial No. 130029
Cal. Date 25-Sep-2023

Sold To:

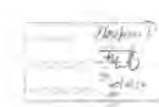
All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave., Littleton, CO 80120, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Austin Schwartz	Lab. Pressure Lab. Temperature	610.1 mmHg 24 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation
9.0 cm	9.61 cm	-6.67%	1.00%
9.6 cm	9.75 cm	-1.56%	1.00%
9.2 cm	9.82 cm	-6.31%	1.00%

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	101743	25-Jan-2023	25-Jan-2024



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As Shipped Calibration Data

Certificate No Technician	591687 Austin Schwartz	Lab. Pressure Lab. Temperature	629.2 mmHg 23.6 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation
449.73 cm	451.46 cm	-3.84%	1.00%
140.89 cm	142.22 cm	-0.94%	1.00%
19.81 cm	20.38 cm	-2.80%	1.00%

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	101743	25-Jan-2023	25-Jan-2024

Calibration Notes:

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%. Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen as standard laboratory air. Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By: *Austin Schwartz* Accepted By: *David Thomas*
Austin Schwartz Calibration Technician II David Thomas Quality Engineer

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibration process has a Total Uncertainty Factor (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against specified tolerance only.

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Calibration Certificate

Certificate No. 501986
Product 200-6100 Outcomes 510 Medium Flow
Serial No. 131114
Cal. Date 20-Sep-2023

Sold To:

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As Received Calibration Data

Technician	Xian Ly	Lab. Pressure Lab. Temperature	615.8 mmHg 23.6 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation
5 cm	4.88 cm	0.21%	1.00%
9 cm	8.97 cm	0.11%	1.00%
9 cm	250.32 cm	-108.9%	1.00%

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117891	16-Aug-2022	16-Aug-2024



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As Shipped Calibration Data

Certificate No.	501986	Lab. Pressure	616.2 mmHg
Technician	Xian Ly	Lab. Temperature	26.1 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation
4.88 cm	4.88 cm	0.00%	1.00%
8.97 cm	8.97 cm	-0.01%	1.00%
348.84 cm	250.32 cm	-28.24%	1.00%

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117891	06-Oct-2022	06-Oct-2024

Calibration Notes:

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%. Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen as standard laboratory air. Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By: *Xian Ly* Accepted By: *Norma Aragon*
Xian Ly Production Technician II Norma Aragon QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibration process has a Total Uncertainty Factor (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against specified tolerance only.

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Certificate of System Qualification

QC-00

System ID: QC-7
 Organization Name: AL3 Laboratory Group (Thermo) Co., Ltd.
 Organization Location: 134 Phatthanaburi Rd., Prachinburi (R.), Ban Lueang, Bangkok 10250

Date: July 26, 2023 10:55:30 AM
 SOP Name: Agilent Recommended
 SOP Revision: QC-02.02
 Overall Qualification Status: Pass

REVIEW BY: *[Signature]*
 APPROVED BY: *[Signature]*
 NEXT CAL DATE: 12-31-23

1.4.0 System Configuration / SOP
 System Configuration: Sample Test Method
 Overall QC System Verification - QC Test Status: Pass

System Inspection and Setup: Setup and Calibration

Name: T800
 Setup Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status: Pass

Test Pressure Decay

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Pressure: 25.0 psi
 Pressure Change: -0.2 psi
 Agilent Recommended: +/- 0.2 psi

Date: July 26, 2023 10:55:30 AM
 System ID: QC-7

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Overall Test Pressure Decay Test Status

Pass

Test Pressure Accuracy

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Pressure: 25.0 psi
 Pressure Change: -0.1 psi
 Agilent Recommended: +/- 0.2 psi

Overall Test Pressure Accuracy Test Status: Pass

Test Pressure Decay

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Pressure: 25.0 psi
 Pressure Change: -0.1 psi
 Agilent Recommended: +/- 0.2 psi

Overall Test Pressure Decay Test Status: Pass

Test Pressure Accuracy

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass

Date: July 26, 2023 10:55:30 AM
 System ID: QC-7

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Setup Status: Pass
 Test Pressure: 25.0 psi
 Accuracy: +/- 0.2 psi
 Agilent Recommended: +/- 0.2 psi

Overall Test Pressure Accuracy Test Status: Pass

Detector Flow Accuracy

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Flow Type: 25.0 mL/min
 Accuracy: +/- 0.2 mL/min
 Agilent Recommended: +/- 0.2 mL/min

Limit is percentage of setup or 0.5 mL/min, whichever is larger.

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Flow Type: 25.0 mL/min
 Accuracy: +/- 0.2 mL/min
 Agilent Recommended: +/- 0.2 mL/min

Limit is percentage of setup or 0.5 mL/min, whichever is larger.

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Flow Type: 25.0 mL/min
 Accuracy: +/- 0.2 mL/min
 Agilent Recommended: +/- 0.2 mL/min

Date: July 26, 2023 10:55:30 AM
 System ID: QC-7

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Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Flow Type: 25.0 mL/min
 Accuracy: +/- 0.2 mL/min
 Agilent Recommended: +/- 0.2 mL/min

Limit is percentage of setup or 0.5 mL/min, whichever is larger.

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Flow Type: 25.0 mL/min
 Accuracy: +/- 0.2 mL/min
 Agilent Recommended: +/- 0.2 mL/min

Limit is percentage of setup or 0.5 mL/min, whichever is larger.

Name: T800
 From: 25.0
 To: 25.0
 Setup Status: Pass
 Flow Type: 25.0 mL/min
 Accuracy: +/- 0.2 mL/min
 Agilent Recommended: +/- 0.2 mL/min

Overall Detector Flow Accuracy Test Status: Pass

GC Oven Temperature Accuracy

Name: T800

Date: July 26, 2023 10:55:30 AM
 System ID: QC-7

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Setup Status: Pass
 Zone: Oven
 Temperature: 120.0
 Accuracy: +/- 0.2
 Agilent Recommended: +/- 0.2

Name: T800
 From: 120.0
 To: 120.0
 Setup Status: Pass
 Temperature: 120.0
 Accuracy: +/- 0.2
 Agilent Recommended: +/- 0.2

Overall GC Oven Temperature Accuracy Test Status: Pass

GC Oven Temperature Stability

Name: T800
 Setup Status: Pass
 Temperature: 120.0
 Accuracy: +/- 0.2
 Agilent Recommended: +/- 0.2

Overall GC Oven Temperature Stability Test Status: Pass

Sampling Run

Name: T800
 From: 120.0
 To: 120.0
 Setup Status: Pass

Date: July 26, 2023 10:55:30 AM
 System ID: QC-7

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Setup Status: Pass
 Injection Volume on Column: 1.0
 Overall Sampling Run Status: Completed

Heads and Darts

Name: T800
 From: 120.0
 To: 120.0
 Setup Status: Pass
 Temperature: 120.0
 Accuracy: +/- 0.2
 Agilent Recommended: +/- 0.2

Overall Heads and Darts Test Status: Pass

Injection Precision

Name: T800
 From: 120.0
 To: 120.0
 Setup Status: Pass
 Temperature: 120.0
 Accuracy: +/- 0.2
 Agilent Recommended: +/- 0.2

Overall Injection Precision Test Status: Pass

Signal to Noise

Date: July 26, 2023 10:55:30 AM
 System ID: QC-7

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MEASUREMENT RESULTS

The work described under this certificate is performed using equipment and procedures that are traceable to the International System of Units (SI). The measurement results are expressed in SI units. The measurement results are expressed in SI units. The measurement results are expressed in SI units.

Item	Value	Uncertainty	Unit
1.1	10.000	0.001	mm
1.2	10.000	0.001	mm
1.3	10.000	0.001	mm
1.4	10.000	0.001	mm
1.5	10.000	0.001	mm
1.6	10.000	0.001	mm
1.7	10.000	0.001	mm
1.8	10.000	0.001	mm
1.9	10.000	0.001	mm
1.10	10.000	0.001	mm

Remarks:

Calibration results are valid for the period of validity of the certificate and the conditions of use specified in the certificate.

Validity of results:

Validity of results: 12 months.

End of Certificate

MEASUREMENT RESULTS

The work described under this certificate is performed using equipment and procedures that are traceable to the International System of Units (SI). The measurement results are expressed in SI units. The measurement results are expressed in SI units.

Item	Value	Uncertainty	Unit
1.1	10.000	0.001	mm
1.2	10.000	0.001	mm
1.3	10.000	0.001	mm
1.4	10.000	0.001	mm
1.5	10.000	0.001	mm
1.6	10.000	0.001	mm
1.7	10.000	0.001	mm
1.8	10.000	0.001	mm
1.9	10.000	0.001	mm
1.10	10.000	0.001	mm

Remarks:

Calibration results are valid for the period of validity of the certificate and the conditions of use specified in the certificate.

Validity of results:

Validity of results: 12 months.

Validity of results: 12 months.

End of Certificate



62/14 15,6/7/30-36, Soi Pathanasam 7/71, Pathanasam Rd.
Wattana, Bangkok, Bangkok 10500 Thailand
Tel: (66) 02-6480812/13 Fax: (66) 02-6480810 www.jnac.co.th



Certificate No. 13-006-06
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Result of Calibration: () Without Adjustment () With Adjustment
Calibration Range: 20-40 °C

Procedure:

This equipment was calibrated with temperature sensor Model: SAMP01-01C 10212001.

Calibration: Diameter 12 mm, Length 60 mm

Item	Value	Uncertainty	Unit
1.1	10.000	0.001	mm
1.2	10.000	0.001	mm
1.3	10.000	0.001	mm
1.4	10.000	0.001	mm
1.5	10.000	0.001	mm
1.6	10.000	0.001	mm
1.7	10.000	0.001	mm
1.8	10.000	0.001	mm
1.9	10.000	0.001	mm
1.10	10.000	0.001	mm

JNAC Ltd. (In Thai Language)

The equipment was calibrated with temperature sensor Model: SAMP01-01C 10212001.

End of Certificate

End of Certificate



62/14 15,6/7/30-36, Soi Pathanasam 7/71, Pathanasam Rd.
Wattana, Bangkok, Bangkok 10500 Thailand
Tel: (66) 02-6480812/13 Fax: (66) 02-6480810 www.jnac.co.th

Announced calibration laboratory
JNAC 1000-001
No. 100-1000
Certificate No. 13-006-06

By Standard measurement laboratory
JNAC 1000-001

CERTIFICATE OF CALIBRATION

MEASUREMENT RESULTS

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ROTA METER CALIBRATION RESULT JANUARY 2024

Rotameter ID	Calibration Date	Regression Result	Coefficient (R ²)
BKX_F50505	10 Jan 24	$Y = 1.0361x + 2.3723$	0.9998
BKX_F50507	10 Jan 24	$Y = 1.0760x + 15.05$	0.9997
BKX_F50502	10 Jan 24	$Y = 1.0073x + 12.555$	1.0000
BKX_F50504	10 Jan 24	$Y = 1.0045x + 4.8752$	1.0000
BKX_F51004	04 Jan 24	$Y = 0.9875x + 13.47$	0.9993
BKX_F51005	04 Jan 24	$Y = 1.0187x + 1.25$	0.9999
BKX_F51006	04 Jan 24	$Y = 1.1589x + 3.6905$	0.9981
BKX_F51007	10 Jan 24	$Y = 1.1347x + 1.6007$	0.9989
BKX_F51008	10 Jan 24	$Y = 1.1271x + 4.3827$	0.9996
BKX_F51017	04 Jan 24	$Y = 1.0632x + 0.0701$	0.9998
BKX_F51018	04 Jan 24	$Y = 1.0115x + 1.2657$	0.9996
BKX_F51019	04 Jan 24	$Y = 1.0019x + 8.4457$	1.0000
BKX_F51020	10 Jan 24	$Y = 0.9618x + 1.9426$	0.9996
BKX_F51027	10 Jan 24	$Y = 1.0065x + 4.3785$	1.0000
BKX_F51028	10 Jan 24	$Y = 1.0184x + 37.308$	0.9997
BKX_F51029	10 Jan 24	$Y = 0.9800x + 2.7925$	0.9977
BKX_F51030	10 Jan 24	$Y = 0.9845x + 1.3296$	1.0000
BKX_F51031	10 Jan 24	$Y = 1.0151x + 27.236$	0.9997
BKX_F51033	04 Jan 24	$Y = 1.0047x + 8.2297$	0.9997
BKX_F51042	04 Jan 24	$Y = 1.0036x + 3.6652$	1.0000
BKX_F51041	04 Jan 24	$Y = 1.0077x + 0.0496$	0.9995
BKX_F51043	04 Jan 24	$Y = 1.0071x + 11.273$	0.9995
BKX_F51043	04 Jan 24	$Y = 1.0033x + 8.5605$	1.0000
BKX_F51044	04 Jan 24	$Y = 1.0738x + 1.2327$	0.9987
PKW_F50027	10 Jan 24	$Y = 1.1096x + 0.3585$	1.0000
PKW_F50026	10 Jan 24	$Y = 1.0341x + 2.52$	1.0000
PKW_F50029	10 Jan 24	$Y = 1.0017x + 8.9124$	1.0000
RYQ_F50067	04 Jan 24	$Y = 1.0045x + 10.275$	1.0000
RYQ_F50068	04 Jan 24	$Y = 1.0024x + 10.1$	1.0000
RYQ_F50070	04 Jan 24	$Y = 1.0043x + 0.3654$	0.9999
RYQ_F50054	04 Jan 24	$Y = 1.0025x + 0.1566$	0.9999
RYQ_F50055	04 Jan 24	$Y = 0.9923x + 8.9967$	0.9992
RYQ_F50059	04 Jan 24	$Y = 1.0068x + 2.8429$	1.0000
RYQ_F50057	04 Jan 24	$Y = 1.0472x + 1.3223$	0.9999
RYQ_F50056	04 Jan 24	$Y = 0.9975x + 20.263$	0.9996
RYQ_F50059	04 Jan 24	$Y = 1.0028x + 10.275$	1.0000
SGK_F50135	17 Jan 24	$Y = 1.0145x + 2.8273$	1.0000
SGK_F50136	17 Jan 24	$Y = 1.0113x + 1.15$	0.9999
SGK_F50138	04 Jan 24	$Y = 1.0032x + 1.0034$	0.9999

Page 1 of 2

ALS Customer Sheet



ROTA METER CALIBRATION RESULT JANUARY 2024

Rotameter ID	Calibration Date	Regression Result	Coefficient (R ²)
SGK_F50139	04 Jan 24	$Y = 1.0047x + 1.8957$	0.9998
SGK_F50140	04 Jan 24	$Y = 1.0001x + 14.149$	1.0000
SGK_F50141	04 Jan 24	$Y = 1.1111x + 1.1337$	0.9984
SGK_F50142	04 Jan 24	$Y = 1.0179x + 0.3653$	0.9999
SGK_F50143	04 Jan 24	$Y = 1.0541x + 2.2352$	1.0000

Review By:

Mr. Wawan Chohan
Bumi Felt Services Manager

Approved By:

Mr. Suryadi Jember
Assistant General Manager

Page 2 of 2

ALS Laboratory Sheet

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Agilent Chemical Compliance Services

Certificate of System Qualification
GC-003

System ID: CH1141500
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 54 Soi 40 Phatthanaburi Rd. Phatthanaburi Sub. Living Unit 2nd Floor, Bangkok 10200

Date: April 27, 2023 13:30 PM
IOP Name: AgilentGC003
IOP Revision: GC-02-02
Output Qualification Status: Pass

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Liquor: Sample Type

Overall GC-003 System Qualification - GC Test Status

Pass

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Name: TMS

Sample Status: Pass

Overall System Qualification and Data Safety and Operation Test Status

Pass

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Name: TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Date: April 27, 2023 13:30 PM

System ID: CH1141500

Page 1 of 3

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Agilent Chemical Compliance Services

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Inlet Pressure: 25.0 psi

Accuracy: 0.2 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Supply

Name:

TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Date: April 27, 2023 13:30 PM

System ID: CH1141500

Page 1 of 3

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Agilent Chemical Compliance Services

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Inlet Pressure: 25.0 psi

Accuracy: 0.2 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Date: April 27, 2023 13:30 PM

System ID: CH1141500

Page 1 of 3

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Agilent Chemical Compliance Services

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Inlet Pressure: 25.0 psi

Accuracy: 0.2 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Accuracy

Name:

TMS

Flow: 5.0

Sample Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.1 psi

Agilent Recommendation: 0.2 psi

Limit is percentage of target or 0.5 minutes, whichever is larger

Date: April 27, 2023 13:30 PM

System ID: CH1141500

Page 1 of 3

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Background Material:

Zone:

Temperature: °C

Accuracy: °C

Agilent Recommended: °C % compliant °C °C

Sample Status:

Zone:

Temperature: °C

Accuracy: °C

Agilent Recommended: °C % compliant °C °C

Overall QC Oven Temperature Accuracy Test Status:

QC Oven Temperature Stability

Name:

Sample Status:

Temperature: °C

Stability: °C

Agilent Recommended: °C

Overall QC Oven Temperature Stability Test Status:

Exhausting Run:

Test Combination:

Name:

Date: April 27, 2023 8:28 AM

System ID: DVI1401080

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Agilent Emerald® Compliance Reviewer

Tested Contributor: SSL ☐ / Firm ☐ FD ☐

Injection Type:

Name:

Pass:

Accepted Status:

Signal to Noise:

Agilent Recommended:

Overall Signal to Noise Test Status:

Pass:

Scouting Run

Tested Contributor: SSL ☐ / Ball ☐ FD ☐

Injection Type:

Name:

Accepted Status:

Injection Volume or Column:

Overall Scouting Run Status:

Completed:

Notes and Data

Tested Contributor: SSL ☐ / Ball ☐ FD ☐

Name:

Pass:

Accepted Status:

Base Signal:

ASTV Noise:

SNR:

SNR:

SNR:

Agilent Recommended:

Status:

Pass:

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Diversified Name and Shift Test Status

Name:

Injection Parameters

Inject Component(s)	Inject	SQL	Inject	FD
Name:	7823A			

Setpoint Status:

Point			
1.0	OK		

Injection Volume or Column:

Area FID	1.26	%	Retention Time (min)	0.00	%
Agilent Name(s)	1.00			1.00	

Diversified Injection Parameter Test Status

Name:

Signal to Name

Inject Component(s)	Inject	SQL	Inject	FD
Name:	7890			

Setpoint Status:

Point			
2024358			
200000			

Signal to Name:

Agilent Name(s)			
-----------------	--	--	--

Diversified Signal to Name Test Status

Name:

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Instrument Details					
Purpose:					
This section describes the software system configuration.					
Details:					
System					
System ID	CV11481036				
Manufacturer	Agilent Technologies				
Name	T030				
Plan Date/Pref	Version Data				
Temperature/Gas Input	Manual Data or Global Data Logging				
Isolated Components					
Injection Technology	Injection: Fused				
Sample Identifier	Sample: 7				
Cell	Flow				
Detector	FID				
LTV Included?	No				
Isolated Components					
Injection Technology	Injection: Fused				
Sample Identifier	Sample: 3				
Cell	Flow				
Detector	FID				
LTV Included?	No				
Sample 1					
Manufacturer	Agilent Technologies				
Type	T030				
Name	T030A				
Model Number	G4314A				
Serial Number	CV15305030				
Firmware Revision	A.11.01				
Valve Driver	Not Installed				

Jaglan Creekline Development Limited	
Sample 2	
Manufacturer	Agilent Technologies
Type	Vaporizer / Oven
Model	7890A
Model Number	03413A
Serial Number	CN1800108
Formware Revision	A.10.09
Usage	Sample Injection
Location	Plant
Sample Volume (uL)	10
Sample 3	
Manufacturer	Agilent Technologies
Type	Vaporizer / Oven
Model	7890A
Model Number	03413A
Serial Number	CN18040103
Formware Revision	A.10.09
Usage	Sample Injection
Location	Plant
Sample Volume (uL)	10
Reference 1	
Manufacturer	Agilent Technologies
Model	7890
Model Number	03442A
Serial Number	CN11481080
Formware Revision	Version 4.27
Other Type	Standard

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Base-flow characteristics			Significant hydrological events	
Name: CAEPF (2002-03-01)			Project Start: 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659,	
Date	Transmittance (%)	Activity	Type of Transmittance	Station information
2001-01-01 00:00:00 to 2001-01-01 00:00:00	Auto	Auto	Hydrograph Transmittance Transmittance (%) 	

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SARTORIUS (Thailand) Co., Ltd.
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 Tel: +66 2 624 8100 • e-Mail: service.thailand@sartorius.com



ISO 9001:2015
 ISO 13485:2015
 ISO 14001:2015
 ISO 45001:2018
 ISO 27001:2017
 ISO 22301:2017
 ISO 22716:2017
 ISO 22717:2017
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 ISO 22953:2017
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Sartorius (Thailand) Co., Ltd.
 301 Nong Chok Road, Nong Chok, Bangkok, Thailand 10110
 Tel: +662 624 5141 Fax: +662 624 6617 e-mail: ap@pharm.hancom.net.th

SARTORIUS

Certificate of Calibration

Model Number: MSE125R-100-OU
 Description: Semi-automatic Balance
 Serial Number: 002102893
 ID No: RVC_EA0004
 Manufacturer: Sartorius

Certificate No: ZSC02114
 Issued Date: Friday, March 10, 2006
 Reference No: 254832

Page No: 3 of 3

Calibration Results: Without Adjustment

Repeatability

This repeatability is a result of a weighing method that is designed to deliver weight without having to perform manual adjustment. The results shown are the average of 10 consecutive readings. The repeatability is expressed as standard deviation (SD) and standard error (SE).

Nominal Value	(Line Load)	100.0000 g
Standard Deviation		0.00001 g
Standard Error		0.000003 g
Temperature	23.00 °C	23.00 °C
Repeatability		0.00001 g
Standard Deviation		0.00001 g
Standard Error		0.000003 g
Temperature	23.00 °C	23.00 °C
Repeatability		0.00001 g
Standard Deviation		0.00001 g
Standard Error		0.000003 g

Evenness (Off-center loading error)

This off-center loading error is a result of the difference between the center of the load and the center of the weighing pan. The results shown are the average of 10 consecutive readings. The evenness is expressed as standard deviation (SD) and standard error (SE).

Nominal Value	100.00 g	g
Standard Deviation	0.0001 g	g
Standard Error	0.00003 g	g
Temperature	23.00 °C	23.00 °C
Evenness		0.0001 g
Standard Deviation		0.0001 g
Standard Error		0.00003 g
Temperature	23.00 °C	23.00 °C
Evenness		0.0001 g
Standard Deviation		0.0001 g
Standard Error		0.00003 g

Linearity

This linearity is a result of a weighing method that is designed to deliver weight without having to perform manual adjustment. The results shown are the average of 10 consecutive readings. The linearity is expressed as standard deviation (SD) and standard error (SE).

Temperature	23.00 °C	g
Linearity	0.0001 g	0.0001 g
Standard Deviation		0.0001 g
Standard Error		0.00003 g
Temperature	23.00 °C	23.00 °C
Linearity		0.0001 g
Standard Deviation		0.0001 g
Standard Error		0.00003 g
Temperature	23.00 °C	23.00 °C
Linearity		0.0001 g
Standard Deviation		0.0001 g
Standard Error		0.00003 g

End of Page

[illegible][illegible]

Certificate of Calibration

REVIEW BY: *[Signature]*
APPROVED BY: *[Signature]*

Model Number: M95133P-100-01
Description: Sartorius Scale
Serial Number: 023118003
ID No.: RYG 750004
Manufacturer: Sartorius

Certificate No.: 21800000000000000000
Issued Date: 2024-01-25
Reference No.: 221818
Page No.: 3 of 3

Calibration Results: Without Adjustment

Repeatability

The repeatability is the ability of a weighing instrument to display the same result when the same mass is weighed under identical conditions. The repeatability is expressed as a percentage of the nominal value.

Nominal Value (Low Load)	100.00
5	200.00
Tolerance	100.00
0.000015	100.00
	100.00
Nominal Value (High Load)	100.00
100	100.00
Tolerance	100.00
0.000015	100.00
	100.00
Standard Deviation	0.00

Summary of Measurement Results :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	±0.4
2. Self-generated noise	0.2	±0.4
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. Characteristic signal level 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	0.3
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-level level	0.2	0.23
11. Overload indication	0.2	0.23
12. High level stability	0.1	0.3

T. P. P.

4. Electrical signal level of frequency weightings

Weighting network response with reference to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting responses (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±0.9
125	0.0	0.0	0.0	±0.7
250	0.0	0.0	0.0	±0.5
500	0.0	0.0	0.0	±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	0.1	0.1	±0.5

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	±0.1
Slow	94.0	94.0	0.0	±0.1
Long	94.0	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	±0.2

T. P. P.

8. 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	±0.1

9. Time burst response

Time	Time burst duration, T _b	Cycle	Anticipated Value: (dB)	Measured Value: (dB)	Deviation (dB)	Acceptance Limits (dB)
Weighting	(ms)					
Fast	0.25	1	108.0	107.9	-0.1	±0.5
	2	8	117.0	117.0	0.0	±0.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	±0.5
	200	800	127.0	127.0	0.0	±0.5
	625	1	99.0	99.0	0.0	±0.5
SLI	2	8	108.0	108.0	0.0	±0.5
	200	800	128.0	128.0	0.0	±0.5

10. Peak C-level level

Number of cycle in one signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±0.5
One	136.4	135.7	-0.7	±0.5

Number of cycle in one signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±0.5
Positive half cycle	133.4	133.2	-0.2	±0.5
Negative half cycle	133.4	133.2	-0.2	±0.5

T. P. P.

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
-13.9 (93.96)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal use

Measured Value (dB)
16.2

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

Frequency Weighting	Measured value (dB)
A-weight	16.2
C-weight	20.0
Flat	25.6

3. Acoustical signal level of frequency weightings

Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	±0.3
1000	0.1	0.1	0.1	±0.3
8000	0.3	0.3	0.3	±0.3

T. P. P.

5. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±0.1
116.0	116.0	0.0	±0.1
115.0	115.0	0.0	±0.1
114.0	114.0	0.0	±0.1
113.0	113.0	0.0	±0.1
112.0	112.0	0.0	±0.1
111.0	111.0	0.0	±0.1
110.0	110.0	0.0	±0.1
109.0	109.0	0.0	±0.1
108.0	108.0	0.0	±0.1
107.0	107.0	0.0	±0.1
106.0	106.0	0.0	±0.1
105.0	105.0	0.0	±0.1
104.0	104.0	0.0	±0.1
103.0	103.0	0.0	±0.1
102.0	102.0	0.0	±0.1
101.0	101.0	0.0	±0.1
100.0	100.0	0.0	±0.1
99.0	99.0	0.0	±0.1
98.0	98.0	0.0	±0.1
97.0	97.0	0.0	±0.1
96.0	96.0	0.0	±0.1
95.0	95.0	0.0	±0.1
94.0	94.0	0.0	±0.1
93.0	93.0	0.0	±0.1
92.0	92.0	0.0	±0.1
91.0	91.0	0.0	±0.1
90.0	90.0	0.0	±0.1
89.0	89.0	0.0	±0.1
88.0	88.0	0.0	±0.1
87.0	87.0	0.0	±0.1
86.0	86.0	0.0	±0.1
85.0	85.0	0.0	±0.1
84.0	84.0	0.0	±0.1
83.0	83.0	0.0	±0.1
82.0	82.0	0.0	±0.1
81.0	81.0	0.0	±0.1
80.0	80.0	0.0	±0.1
79.0	79.0	0.0	±0.1
78.0	78.0	0.0	±0.1
77.0	77.0	0.0	±0.1
76.0	76.0	0.0	±0.1
75.0	75.0	0.0	±0.1
74.0	74.0	0.0	±0.1
73.0	73.0	0.0	±0.1
72.0	72.0	0.0	±0.1
71.0	71.0	0.0	±0.1
70.0	70.0	0.0	±0.1
69.0	69.0	0.0	±0.1
68.0	68.0	0.0	±0.1
67.0	67.0	0.0	±0.1
66.0	66.0	0.0	±0.1
65.0	65.0	0.0	±0.1
64.0	64.0	0.0	±0.1
63.0	63.0	0.0	±0.1
62.0	62.0	0.0	±0.1
61.0	61.0	0.0	±0.1
60.0	60.0	0.0	±0.1
59.0	59.0	0.0	±0.1
58.0	58.0	0.0	±0.1
57.0	57.0	0.0	±0.1
56.0	56.0	0.0	±0.1
55.0	55.0	0.0	±0.1
54.0	54.0	0.0	±0.1
53.0	53.0	0.0	±0.1
52.0	52.0	0.0	±0.1
51.0	51.0	0.0	±0.1
50.0	50.0	0.0	±0.1
49.0	49.0	0.0	±0.1
48.0	48.0	0.0	±0.1
47.0	47.0	0.0	±0.1
46.0	46.0	0.0	±0.1
45.0	45.0	0.0	±0.1
44.0	44.0	0.0	±0.1
43.0	43.0	0.0	±0.1
42.0	42.0	0.0	±0.1
41.0	41.0	0.0	±0.1
40.0	40.0	0.0	±0.1
39.0	39.0	0.0	±0.1
38.0	38.0	0.0	±0.1
37.0	37.0	0.0	±0.1
36.0	36.0	0.0	±0.1
35.0	35.0	0.0	±0.1
34.0	34.0	0.0	±0.1
33.0	33.0	0.0	±0.1
32.0	32.0	0.0	±0.1
31.0	31.0	0.0	±0.1
30.0	30.0	0.0	±0.1
29.0	29.0	0.0	±0.1
28.0	28.0	0.0	±0.1
27.0	27.0	0.0	±0.1
26.0	26.0	0.0	±0.1
25.0	25.0	0.0	±0.1

T. P. P.

11. Overload indication

Measured value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.3	±0.5
Negative one-half cycle	89.3	±0.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviation Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

The overall uncertainty is based on a standard uncertainty multiplied by a coverage factor of 2, which is approximately equal to 95% confidence level.

End of Calibration Certificate

T. P. P.

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-5E
Serial No. : 3479123
ID No. : RYO_P8015

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40 PHATTANAKAN ROAD,
KHAENG PHATTANAKAN KHUET SUAN LUANG,
BANGKOK, 10250 THAILAND

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

Received Date : 07 SEPTEMBER 2023
Calibration Date : 20 SEPTEMBER 2023
Date of Issue : 20 SEPTEMBER 2023

Calibrated by : *Thasakorn Pongpattana*

Approved by : *T. Pongpattana*
(Thasakorn Pongpattana)

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 : 1512400000000000

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviation value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	94.1	0.10	0.14	0.40

2. Frequency

Specified frequency (Hz)	Measured value (Hz)	Deviation value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1001.5	0.1	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
1.30	0.10	2.0

ISO/IEC 17025 standard is based on a standard uncertainty multiplied by coverage factor $k=2$
or may follow following calculation providing a level of confidence of approximately 95 %.

End of Calibration Certificate

QR : 1512400000000000

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 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	33218A	MY4017675	17-0009-23	07-FEB-24
Waveform Generator	33218B	MY3232742	17-0010-23	07-FEB-24
Digital Multimeter	34461A	MY32320194	17-0010-23	07-FEB-24
Digital Multimeter	34461A	MY32320078	17-0010-23	07-FEB-24
Digital Multimeter	34461A	MY32320075	17-0010-23	07-FEB-24
Programmable Amplifier	MAT-1070	42100114	17-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-425X1	3460495	AA-3001-23	14-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

QR : 1512400000000000

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-3 (2013) 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	33218B	MY3232742	17-0010-23	07-FEB-24
Digital Multimeter	34461A	MY32320194	17-0010-23	07-FEB-24
Digital Multimeter	34461A	MY32320078	17-0010-23	07-FEB-24
Digital Multimeter	34461A	MY32320075	17-0010-23	07-FEB-24
Programmable Amplifier	MAT-1070	42100114	17-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-425X1	3460495	AA-3001-23	14-FEB-24
Audio Analyzer	AVR-3366A	17440409	17-0011-23	14-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- National Institute of Metrology (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

QR : 1512400000000000

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : 10-42 Microphone UC-52 / Pre-amplifier 101-24
Serial No. : 06597402 / 179117/172524
ID No. : RYO_P8015

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40 PHATTANAKAN ROAD,
KHAENG PHATTANAKAN KHUET SUAN LUANG,
BANGKOK, 10250 THAILAND

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

Received Date : 17 OCTOBER 2023
Calibration Date : 19-20 OCTOBER 2023
Date of Issue : 24 OCTOBER 2023

Calibrated by : *Thasakorn Pongpattana*

Approved by : *T. Pongpattana*
(Thasakorn Pongpattana)

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 : 1512400000000000

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
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	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time 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 sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.2
12. High level stability	✓	-	0.1	0.1

Note : Pass/Fail evaluation for each parameter will be considered together from the acceptance limit and the Maximum-permitted uncertainty of measurement.

QR : 1512400000000000

Cert. No. : ACL24012
Page : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RDEH
Model : SL-42A / Microphone UC-02 / Preamp/SLR-NI-04
Serial No. : 10621900, 106437 / 24418
J.D No. : RTG/25012

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 48 PHATTHANAKAN ROAD,
KJW 4260 PHATTHANAKAN, KJW 4260 LUANG,
BANGKOK, 10255 THAILAND.

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

Received Date : 14 DECEMBER 2023
Calibration Date : 05-08 JANUARY 2024
Date of Issue : 08 JANUARY 2024

Calibrated by : Natchanon Pongpang

Approved by : *T. Petch*
(Thaichai Petch)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, they are for reproduction
after data is full, except with the prior written approval of the head of Calibration Laboratory

Cert. No. : ACL24012
Job No. : VC67AC0044
Page : 2 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.8
1000 Hz	0.3	0.8
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.7
For 4 kHz to 10 kHz	0.3	0.6
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	0.1	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	0.3	0.2

Cert. No. : ACL24012
Job No. : VC67AC0044
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4. Electrical signal tests of frequency weightings

Weighting current response with reference 1 kHz

Frequency (Hz)	Filt	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	± 2.0
125	0.0	0.0	0.0	± 1.7
250	0.0	0.0	0.0	± 1.7
500	0.0	0.1	0.0	± 1.7
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	Accepted Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits
A-weight	94.0	94.0	0.0	± 0.2
C-weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Accepted Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits
Fast	99.0	99.0	0.0	± 0.1
Slow	99.0	99.0	0.0	± 0.1
Line	99.0	99.0	0.0	± 0.1

6. Long-term stability

Frequency Weighting	SUM Display at initial (dB)	SUM Display at final (dB)	Deviation Value (dB)	Acceptance Limits
A-weight	94.0	94.0	0.0	± 0.2

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Calibration Procedures : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC 61672-3 (2013) Standard for sound level meter (SLM).
The SLM has been in Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference
Standard Instruments.

For each result of each item were noted 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	6VY0017076	17-0009-23	07 FEB 24
Waveform Generator	33110D	MY5202742	17-0010-23	07 FEB 24
Digital Multimeter	3384A	MY5225108	17-0010-23	13 FEB 24
Digital Multimeter	3384A	MY5122076	17-0010-23	13 FEB 24
Digital Multimeter	3446A	MY6024271	17-0010-23	13 FEB 24
Programmable Attenuator	MA7-107B	6020114	17-0011-23	08 FEB 24
Compressor Attenuator	4100	2977940	AA-1001-23	14 FEB 24
Measuring Amplifier	SA-432-A	3450495	AA-0801-23	14 FEB 24

2. This result of calibration was found accurate as shown on due and place of calibration for this calibration only.

3. This certificate is available to the international system of units mentioned as :

3.1 National Institute of Standards (Thailand).

3.2 Thailand Institute of Science and Technology (TISTR).

Cert. No. : ACL24012
Job No. : VC67AC0044
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Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation Value (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	12.8
C-weight	19.2
Flat	24.5

3. Acoustical signal tests of frequency weightings

Make flat-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.7
1000	0.0	0.0	0.0	± 1.0
8000	1.0	1.1	1.1	± 2.0

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7. Level linearity on the reference level range

Accepted Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
140.0	139.0	0.0	± 1.1
137.0	136.0	0.0	± 1.1
134.0	133.0	0.0	± 1.1
131.0	130.0	0.0	± 1.1
128.0	127.0	0.0	± 1.1
125.0	124.0	0.0	± 1.1
122.0	121.0	0.0	± 1.1
119.0	118.0	0.0	± 1.1
116.0	115.0	0.0	± 1.1
113.0	112.0	0.0	± 1.1
110.0	109.0	0.0	± 1.1
107.0	106.0	0.0	± 1.1
104.0	103.0	0.0	± 1.1
101.0	100.0	0.0	± 1.1
98.0	97.0	0.0	± 1.1
95.0	94.0	0.0	± 1.1
92.0	91.0	0.0	± 1.1
89.0	88.0	0.0	± 1.1
86.0	85.0	0.0	± 1.1
83.0	82.0	0.0	± 1.1
80.0	79.0	0.0	± 1.1
77.0	76.0	0.0	± 1.1
74.0	73.0	0.0	± 1.1
71.0	70.0	0.0	± 1.1
68.0	67.0	0.0	± 1.1
65.0	64.0	0.0	± 1.1
62.0	61.0	0.0	± 1.1
59.0	58.0	0.0	± 1.1
56.0	55.0	0.0	± 1.1
53.0	52.0	0.0	± 1.1
50.0	49.0	0.0	± 1.1
47.0	46.0	0.0	± 1.1
44.0	43.0	0.0	± 1.1
41.0	40.0	0.0	± 1.1
38.0	37.0	0.0	± 1.1
35.0	34.0	0.0	± 1.1
32.0	31.0	0.0	± 1.1
29.0	28.0	0.0	± 1.1
26.0	25.0	0.0	± 1.1
23.0	22.0	0.0	± 1.1
20.0	19.0	0.0	± 1.1

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Job No. : VCSAC0044
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Cert. No. : ACU34812
Job No. : VCSAC0044
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8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limit (dB)
Auto	95.0	94.0	0.0	±1.7

9. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limit (dB)
Fast	0.25	1	108.0	107.8	-0.1	1.5 / -0.0
	2	5	117.0	117.0	0.0	1.0 / -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 / -0.0
	200	800	127.8	127.8	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 / -0.0
SEL	2	8	108.0	108.0	0.0	1.0 / -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limit (dB)
Continuous	133.0	133.0	0.0	±0.0
One	134.4	134.3	-0.1	±0.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limit (dB)
Continuous	133.0	133.0	0.0	±0.0
Positive half cycle	135.4	135.2	-0.2	±0.0
Negative half cycle	135.4	135.2	-0.2	±0.0

11. Overload indication

Measured value (dB)	Deviation Value (dB)	Acceptance Limit (dB)
Positive mid-half cycle	-0.2	±1.5
Negative over-half cycle	-0.2	±1.5

12. High level stability

Frequency Weighting	SLM Display in initial (dB)	SLM Display in final (dB)	Deviation Value (dB)	Acceptance Limit (dB)
A-weight	132.0	132.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
→ any value following calculations providing a level of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

211-211-7 Sathiporn Rd, Bangkapi, Bangkok 10710 THAILAND
Tel: 0-2433-0800 Fax: 0-2433-1679 e-mail: cal@cal.sithiporn.com http://www.sithiporn.com



Cert. No. : MCL23262
Page : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RISO
Model : NL-42 Microphone UC-52 / Piezoelectric M1-21
Serial No. : 8057240 / 170396 / 12990
ID No. : RYO / 190309

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAI) CO., LTD.
104 PHATHANAKAN RD. PHATHANAKAN ROAD,
KHO-AUNG PHATHANAKAN, KJEE SUANLUANG,
BANGKOK 10250 THAILAND

Location :
Ambient Temperature : 23.0 ± 3.1 °C
Pressure : 1.013 ± 0.1 kPa
Relative Humidity : 50.0 ± 20.1 %
Received Date : 23 AUGUST 2023
Calibration Date : 01 SEPTEMBER 2023
Date of Issue : 04 SEPTEMBER 2023

Calibrated by : Narasimha Perichem

Approved by : T. Petcha
(Thaisak Perichem)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard; they are not restricted unless they are fully comply with the present written approval of the Issued Calibration Laboratory.

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SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : MCL23262
Job No. : VCSAC0044
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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 test of frequency weighting				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal test of frequency weighting				
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 weighting 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. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.3
12. High level stability	✓	-	0.3	0.3

Note: Pass/Fail evaluation for each parameter.
N/A is considered together from the acceptance limit and the Maximum permitted uncertainty of measurement.

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SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : MCL23262
Job No. : VCSAC0044
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Calibration Procedure : CP-MCH

Calibration Method:

This equipment was calibrated by based on IEC 61672-1:2003 standard for sound level meter (SLM).
The 1/3 Octave levels to Acoustical and Electrical signal test of frequency weighting with A-weight, C-weight and Reference Standard Instruments.
For test results of each item were made by observation of each measurement 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	MY48017076	17-0609-21	07/09/24
Waveform Generator	33210B	MY5320242	17-0609-21	07/09/24
Digital Multimeter	3380A	MY5320204	17-0609-21	17/09/24
Digital Multimeter	3380A	MY5320206	17-0609-21	17/09/24
Digital Multimeter	3446A	MY4805473	17-0609-21	17/09/24
Programmable Oscillator	MA1-100	6710014	17-0609-21	17/09/24
Condenser Microphone	4180	2979900	17-0609-21	17/09/24
Measuring Amplifier	NA-42K-M	3450405	17-0609-21	17/09/24

2. This result of calibration was limited to the scope 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 Standards (Thailand).
- Thailand Institute of Scientific and Technological Research (TISTR).

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SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : MCL23262
Job No. : VCSAC0044
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Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limit (dB)
92.8 (93.0)	93.8	0.0	±0.3

2. Self-generated noise

2.1 Reference test

Measured Value (dB)
16.1

2.2 The microphone at the sound level meter was replaced by electrical signal noise device.

Frequency Weighting	Measured value (dB)
A-weight	12.0
C-weight	19.2
Flat	24.0

3. Acoustical signal test of frequency weighting

Mean free-field acoustic response in a field of 0.4 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limit
125	0.2	0.2	0.2	±1.5
1000	-0.1	-0.1	-0.1	±1.0
1000	0.3	0.3	0.3	±0.0

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4. Theoretical digital limit of frequency weighting

Weighting curves only response with relative to 1 MHz

Frequency (Hz)	Filter	Weighting	Δ-weighting	Acceptance Limits
63	0.0	-0.1	0.0	-0.8
125	0.0	0.0	0.0	-0.5
250	0.0	0.0	0.0	-0.3
500	0.0	0.1	0.0	-0.1
1000	0.0	0.0	0.0	0.0
2000	0.0	0.1	0.0	+0.1
4000	0.0	0.0	0.0	+0.3
8000	0.0	0.1	0.1	+0.8

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weighting	94.0	94.0	-0.1	-0.2
C-weighting	94.0	94.0	-0.1	-0.2
Flat	94.0	94.0	-0.1	-0.2

5.2 Time weighting at 1 kHz

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

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8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weighting	94.0	94.0	0.0	-0.1

9. Time interval response

Time Weighting	Time interval duration, T _s (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	-0.5, +0.4
	2	8	117.0	117.0	0.0	-1.0, +0.5
	200	300	134.0	134.1	0.1	-0.5, +1.0
Slow	2	8	108.0	108.0	0.0	-0.5, +0.4
	200	300	127.8	127.6	-0.2	-0.7, +0.0
	0.25	1	99.0	98.9	-0.1	-0.5, +0.0
SLI	2	8	108.0	108.0	0.0	-1.0, +0.5
	200	300	128.0	128.0	0.0	-0.5, +1.0

10. Peak C sound level

Number of cycle to test signal	Anticipated Value (dB)	Measured Value, Leq(dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-0.5, +0.5
One	133.4	133.7	-0.7	-1.0, +0.6

Number of cycle to test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-0.5, +0.5
Positive half cycle	133.4	133.2	-0.2	-0.5, +0.6
Negative half cycle	133.4	133.2	-0.2	-0.5, +0.6

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Cert. No. : ACL22382
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Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : KEM
Model : 62-42 Microphone (U3A) / Preamp/SLI 50-54
Serial No. : 00472152 / 40840 / 3086
ID No. : KVO 180004

Condition As Found : 0000

Customer : SITHIPORN ASSOCIATES CO.,LTD.
104 PHATHANAKAN 46 PHATHANAKAN ROAD,
KUPANG PHATHANAKAN KIRT LUANG (LUANG)
BANGKOK 10250 THAILAND

Location :
Ambient Temperature : (23.6 ± 0.1) °C
Pressure : (101.3 ± 0.1) kPa
Relative Humidity : (60.0 ± 2.0) %

Received Date : 23 AUGUST 2021
Calibration Due : 31 SEPTEMBER 2021
Date of Issue : 30 SEPTEMBER 2021

Calibrated by :

Validation (Inspector)

Approved by :

T. Petch

(Technical Director)

This certificate is issued in accordance with the requirements of ISO/IEC 17025, issued, may not be reproduced
other than in full, except with the prior written approval of the head of Calibration Laboratory

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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	-0.1
136.0	136.0	0.0	-0.1
135.0	135.0	0.0	-0.1
134.0	134.0	0.0	-0.1
133.0	133.0	0.0	-0.1
132.0	132.0	0.0	-0.1
131.0	131.0	0.0	-0.1
130.0	130.0	0.0	-0.1
129.0	129.0	0.0	-0.1
128.0	128.0	0.0	-0.1
127.0	127.0	0.0	-0.1
126.0	126.0	0.0	-0.1
125.0	125.0	0.0	-0.1
124.0	124.0	0.0	-0.1
123.0	123.0	0.0	-0.1
122.0	122.0	0.0	-0.1
121.0	121.0	0.0	-0.1
120.0	120.0	0.0	-0.1
119.0	119.0	0.0	-0.1
118.0	118.0	0.0	-0.1
117.0	117.0	0.0	-0.1
116.0	116.0	0.0	-0.1
115.0	115.0	0.0	-0.1
114.0	114.0	0.0	-0.1
113.0	113.0	0.0	-0.1
112.0	112.0	0.0	-0.1
111.0	111.0	0.0	-0.1
110.0	110.0	0.0	-0.1
109.0	109.0	0.0	-0.1
108.0	108.0	0.0	-0.1
107.0	107.0	0.0	-0.1
106.0	106.0	0.0	-0.1
105.0	105.0	0.0	-0.1
104.0	104.0	0.0	-0.1
103.0	103.0	0.0	-0.1
102.0	102.0	0.0	-0.1
101.0	101.0	0.0	-0.1
100.0	100.0	0.0	-0.1
99.0	99.0	0.0	-0.1
98.0	98.0	0.0	-0.1
97.0	97.0	0.0	-0.1
96.0	96.0	0.0	-0.1
95.0	95.0	0.0	-0.1
94.0	94.0	0.0	-0.1
93.0	93.0	0.0	-0.1
92.0	92.0	0.0	-0.1
91.0	91.0	0.0	-0.1
90.0	90.0	0.0	-0.1
89.0	89.0	0.0	-0.1
88.0	88.0	0.0	-0.1
87.0	87.0	0.0	-0.1
86.0	86.0	0.0	-0.1
85.0	85.0	0.0	-0.1
84.0	84.0	0.0	-0.1
83.0	83.0	0.0	-0.1
82.0	82.0	0.0	-0.1
81.0	81.0	0.0	-0.1
80.0	80.0	0.0	-0.1
79.0	79.0	0.0	-0.1
78.0	78.0	0.0	-0.1
77.0	77.0	0.0	-0.1
76.0	76.0	0.0	-0.1
75.0	75.0	0.0	-0.1
74.0	74.0	0.0	-0.1
73.0	73.0	0.0	-0.1
72.0	72.0	0.0	-0.1
71.0	71.0	0.0	-0.1
70.0	70.0	0.0	-0.1
69.0	69.0	0.0	-0.1
68.0	68.0	0.0	-0.1
67.0	67.0	0.0	-0.1
66.0	66.0	0.0	-0.1
65.0	65.0	0.0	-0.1
64.0	64.0	0.0	-0.1
63.0	63.0	0.0	-0.1
62.0	62.0	0.0	-0.1
61.0	61.0	0.0	-0.1
60.0	60.0	0.0	-0.1
59.0	59.0	0.0	-0.1
58.0	58.0	0.0	-0.1
57.0	57.0	0.0	-0.1
56.0	56.0	0.0	-0.1
55.0	55.0	0.0	-0.1
54.0	54.0	0.0	-0.1
53.0	53.0	0.0	-0.1
52.0	52.0	0.0	-0.1
51.0	51.0	0.0	-0.1
50.0	50.0	0.0	-0.1
49.0	49.0	0.0	-0.1
48.0	48.0	0.0	-0.1
47.0	47.0	0.0	-0.1
46.0	46.0	0.0	-0.1
45.0	45.0	0.0	-0.1
44.0	44.0	0.0	-0.1
43.0	43.0	0.0	-0.1
42.0	42.0	0.0	-0.1
41.0	41.0	0.0	-0.1
40.0	40.0	0.0	-0.1
39.0	39.0	0.0	-0.1
38.0	38.0	0.0	-0.1
37.0	37.0	0.0	-0.1
36.0	36.0	0.0	-0.1
35.0	35.0	0.0	-0.1
34.0	34.0	0.0	-0.1
33.0	33.0	0.0	-0.1
32.0	32.0	0.0	-0.1
31.0	31.0	0.0	-0.1
30.0	30.0	0.0	-0.1
29.0	29.0	0.0	-0.1
28.0	28.0	0.0	-0.1
27.0	27.0	0.0	-0.1
26.0	26.0	0.0	-0.1
25.0	25.0	0.0	-0.1

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11. Overload indication

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
107.0	107.0	-0.1	-0.1

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weighting	137.1	137.0	-0.1	-0.2

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

End of Calibration Certificate

QF-VIS-004-000001

T. Petch

Calibration Procedure : CLP-AC-01

Calibration Method :

This equipment was calibrated by using an ETC-40725-0 (2013) Standard, by using sound source (SLM).
The SLM had been to Accredited and Electrical digital limit of frequency weighting with Audiotape chamber (SLI) 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
Reference Standard	51210A	MY 0807070	13-0000-11	07/12/24
Reference Standard	13011R	MY 0200702	13-0000-11	07/12/24
Digital Multimeter	33-61A	MY 0300104	13-0000-11	07/12/24
Digital Multimeter	6101A	MY 0300104	13-0000-11	07/12/24
Digital Multimeter	5000A	MY 0300104	13-0000-11	07/12/24
Programmable Attenuator	MA3-1670	6210014	13-0000-11	07/12/24
Condenser Microphone	4100	2977000	AA-0000-01	14/12/24
Measuring Amplifier	NA-020A1	1404000	08-0000-01	14/12/24

2. This result of calibration was based on the data and place of calibration in the calibration test only.

3. This certificate is issued in accordance with the requirements of ISO/IEC 17025, issued, may not be reproduced
other than in full, except with the prior written approval of the head of Calibration Laboratory

1.1 National Institute of Standards and Technology (NIST)
1.2 Thailand Institute of Scientific and Technological Research (TISTR)

QF-VIS-004-000001

T. Petch

Cert. No. : ACL23281
Job No. : YC66AC0094
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. Nominal 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				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For 4 kHz to 20 kHz	✓	-	0.3	0.7
5. Frequency and time weightings at 1 kHz	✓	-	0.2	1.0
A-weight	✓	-	0.1	0.1
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 extend	✓	-	0.2	0.3
9. Time 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

Note: Pass/Fail evaluation for each parameter will be considered together from the acceptance limit and the Maximum permitted uncertainty of measurement.

QP-P12-004-02000

F. Petch

Cert. No. : ACL23281
Job No. : YC66AC0094
Page : 5 of 8

8. Electrical signal level of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±0.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±2.0
4000	0.0	0.1	0.1	±3.0
8000	0.1	0.1	0.1	±5.0

9. Frequency and time weightings at 1 kHz

9.1 Frequency weightings at 1 kHz

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

9.2 Time weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	±0.1
Slow	94.0	94.0	0.0	±0.1
Log	94.0	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	94.1	0.1	±0.1

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F. Petch

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Job No. : YC66AC0094
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11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
95.5	95.6	0.1	±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	±0.1

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

End of Calibration Certificate

QP-P12-004-02000

F. Petch

Cert. No. : ACL23281
Job No. : YC66AC0094
Page : 4 of 8

Result of calibration:

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
92.9 (92.9)	92.9	0.0	±0.2

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
10.0

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

Frequency	Measured value (dB)
Weighting	0.7
A-weight	15.0
C-weight	21.0

3. Acoustical signal level of frequency weightings

Mean four-field acoustic response at a level of 93.4 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	±1.5
1000	-0.1	-0.1	-0.1	±1.0
8000	-1.4	-1.3	-1.5	±5.0

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F. Petch

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Job No. : YC66AC0094
Page : 7 of 8

8. Level linearity including the level range extend

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	90.0	90.0	0.0	±1.1

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	106.0	107.9	+0.1	12.5/5.0
	2	8	117.0	116.9	-0.1	0.0/2.5
	200	300	124.0	124.0	0.0	0.0
Slow	2	8	108.0	107.9	-0.1	1.5/0.0
	200	300	127.0	127.6	+0.6	0.0
	0.25	1	99.0	98.8	-0.2	1.5/0.0
NFI	2	8	108.0	108.0	0.0	1.0/0.5
	200	300	126.0	126.0	0.0	0.0

10. Peak C sound level

Number of cycle in test signal	Anticipated	Measured	Deviated	Acceptance
	Value (dB)	Value (typical) (dB)	Value (dB)	Limits (dB)
Continuous	135.0	133.0	-2.0	±3.0
Short	134.4	135.5	+0.5	±3.0

Number of cycle in test signal	Anticipated	Measured	Deviated	Acceptance
	Value (dB)	Value (dB)	Value (dB)	Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

QP-P12-004-02000

F. Petch

63-45/11 Sukhumvit Rd, Bangkok, Bangkok 10110 THAILAND
Tel: 0-2615-4600 Fax: 0-2615-4879 email: sithiporn@thiporn.com http://www.thiporn.comCert. No. : ACL23281
Page : 8 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : RL-47 Analog/Auto UC-32 Programmable 301-24
Serial No. : 0807087 / 171099 / 13333
ID No. : RYO 130181

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
106 PHATHANAKAN 40, PHATHANAKAN ROAD,
KJW/NO.3 PHATHANAKAN, KJW/SEAN LUKANG
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : $(23.0 \pm 1) ^\circ\text{C}$
Pressure : $(101.3 \pm 1) \text{ hPa}$
Relative Humidity : $(50.0 \pm 20) \%$
Received Date : 11 OCTOBER 2023
Calibration Date : 19-20 OCTOBER 2023
Date of Issue : 24 OCTOBER 2023

Calibrated by : Nattakorn Pongpattana

Approval by : F. Petch
(Thasakorn Pongpattana)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, and not to represent any other than the scope with the scope written approval of the form of Calibration Laboratory.

QP-P12-004-02000

Continuation of Calibration Certificate

Cert. No. : ACL23323
Job No. : VCE7AC0011
Page : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 64972-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Acoustic Chamber and Reference Standard Instruments.
For tests results of each 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	33215A	MY49017076	ET-0009-23	07-FEB-24
Waveform Generator	33511B	MY32327242	ET-0010-23	07-FEB-24
Digital Multimeter	33461A	MY32320104	ESL-009 306204	13-FEB-24
Digital Multimeter	33461A	MY32320076	ESL-009 296204	13-FEB-24
Digital Multimeter	34461A	MY30252773	ESL-009 316204	14-FEB-24
Programmable Attenuator	34A1-1070	67100114	ET-0011-23	08-FEB-24
Condenser Microphone	A180	7977900	AA-1001-23	14-FEB-24
Microphone Amplifier	XA-125A1	34360981	AA-3002-23	14-FEB-24

2. This result of calibration was based on items as shown on date and place of calibration for this calibration item only.

3. This certificate is transferable to the international system of units measurement as :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Q7-1512-00-020001

Continuation of Calibration Certificate

Cert. No. : ACL23323
Job No. : VCE7AC0011
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference (Acoustic Chamber) (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)
13.8

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

Frequency Weighting	Measured value (dB)
A-weight	12.0
C-weight	18.2
Flat	24.0

3. Acoustical signal tests of frequency weightings

Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviations from various frequency weighting response curves (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	-0.3	0.3	0.3	+1.0
1000	0.0	0.0	0.0	+1.0
8000	0.5	0.6	0.6	+0.0

Q7-1512-00-020001

Continuation of Calibration Certificate

Cert. No. : ACL23323
Job No. : VCE7AC0011
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5. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
127.0	127.0	0.0	±1.1
136.0	136.0	0.0	±1.1
137.0	137.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	53.9	-0.1	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	38.9	-0.1	±1.1
34.0	33.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
24.0	23.9	-0.1	±1.1
19.0	18.9	-0.1	±1.1
14.0	13.9	-0.1	±1.1
9.0	8.9	-0.1	±1.1

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Continuation of Calibration Certificate

Cert. No. : ACL23323
Job No. : VCE7AC0011
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Summary of Measurement Results :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.3	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				
Flat 10 Hz to 4 kHz	✓	-	0.3	0.6
Flat 10 Hz to 10 kHz	✓	-	0.3	0.7
Flat 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	✓	-	0.3	0.3
8. Level linearity including the level range control	✓	-	0.3	0.3
9. Tone burst response	✓	-	0.3	0.3
10. Peak-C measurement	✓	-	0.3	<0.1
11. Overload indication	✓	-	0.2	0.2
12. High level stability	✓	-	0.1	0.1

Note: Pass/Fail evaluation for each parameter.

will be considered together from the frequency test and the Maximum-permitted uncertainty of measurement.

Q7-1512-00-020001

Continuation of Calibration Certificate

Cert. No. : ACL23323
Job No. : VCE7AC0011
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 curves (dB)			
	Flat	C-weight	A-weight	Диапазон Цены
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	0.0	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	0.0	0.0	±3.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

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Continuation of Calibration Certificate

Cert. No. : ACL23323
Job No. : VCE7AC0011
Page : 7 of 8

8. 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

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	F ₀ (Hz)	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Flat	0.25	1	100.0	100.0	0.0	1.3 ~ 5.0
	2	8	117.0	117.0	0.0	1.0 ~ 2.5
	200	800	134.0	134.0	0.0	±0.0
Slow	2	2	100.0	100.0	0.0	1.3 ~ 5.0
	200	800	127.0	127.0	0.0	±0.0
SCE	0.25	1	90.0	90.0	0.0	1.3 ~ 5.0
	2	8	106.0	106.0	0.0	1.0 ~ 2.5
	200	800	123.0	123.0	0.0	±0.0

10. Peak-C passed test

Number of cycles at test signal	Anticipated Value (dB)	Measured Value, 1 cycle (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.0	136.0	0.0	±3.0

Number of cycles at test signal	Anticipated Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
Positive half cycle	133.0	133.0	0.0	±3.0
Negative half cycle	133.0	133.0	0.0	±3.0

Q7-1512-00-020001

Calibration Results:
Without Adjustment

Photometric Accuracy (nm): The spectral bandwidths of 200 at 2 nm and 2000 at 2 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
415.81	419.2	0.31	0.13	
526.06	526.6	0.06	0.13	
527.50	528.3	-0.32	0.13	
749.40	748.7	-0.25	0.13	
907.50	927.4	-1.37	0.13	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
430 nm	0.000	0.000	0.000	0.0045
	0.100	0.099	0.004	0.0045
	0.150	0.148	-0.002	0.0045
	0.200	0.200	0.000	0.0045
	0.300	0.300	0.000	0.0045
445 nm	0.200	0.207	0.007	0.0045
	0.300	0.300	-0.007	0.0045
	0.400	0.400	0.003	0.0045
	0.500	0.500	0.000	0.0045
	0.600	0.600	0.000	0.0045
486 nm	0.000	0.000	0.000	0.0045
	0.200	0.200	0.000	0.0045
	0.400	0.400	-0.003	0.0045
	0.600	0.600	0.000	0.0045
	0.800	0.800	0.000	0.0045
546.3 nm	0.200	0.201	0.001	0.0045
	0.400	0.400	-0.003	0.0045
	0.600	0.600	0.000	0.0045
	0.800	0.800	0.000	0.0045
	1.000	1.000	0.000	0.0045
590 nm	0.000	0.000	0.000	0.0045
	0.200	0.200	0.000	0.0045
	0.400	0.400	-0.004	0.0045
	0.600	0.600	0.000	0.0045
	0.800	0.800	0.000	0.0045
635 nm	0.000	0.000	0.000	0.0045
	0.200	0.200	0.000	0.0045
	0.400	0.400	0.000	0.0045
	0.600	0.600	0.000	0.0045
	0.800	0.800	0.000	0.0045

[illegible]

Democracy Growth in Asia and Beyond

DOI: 10.1002/for



ใบตรวจสุขภาพเคื่องจักร

ชนิดเครื่องวัด: SPECTROPHOTOMETER รุ่น: DR6000 หมายเลขเครื่อง: 1677845

รายการ (No)		รายการ (No)		รายการ (No)		รายการ (No)	
18 Sep 2023		18 Sep 2023		18 Sep 2023		18 Sep 2023	
Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
General							
<input type="checkbox"/>	<input type="checkbox"/>	1. การบำรุงรักษา	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	2. ตรวจสอบ (Check) อุปกรณ์, การเชื่อมต่อ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	3. ตรวจสอบ (Check) อุปกรณ์ (On-Off Switch)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	4. อุปกรณ์ (Equipment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	5. อุปกรณ์ (Equipment, System Control)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Specialized							
<input type="checkbox"/>	<input type="checkbox"/>	6. อุปกรณ์ (Battery Bank) > 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	7. อุปกรณ์ (Watering Control)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	8. อุปกรณ์ (Washing Control)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	9. อุปกรณ์ (N/A < 3,000 m/s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	10. อุปกรณ์ (Voltage < 5,000 m/s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	11. อุปกรณ์ (Control Module)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
pH Meter and Conductivity Meter							
<input type="checkbox"/>	<input type="checkbox"/>	12. อุปกรณ์ (Electrode and Connection Cable)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	13. อุปกรณ์ (Electrode and KCl)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	14. อุปกรณ์ (Electrode (Salt Protection Hood))	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	15. อุปกรณ์ (Electrode (Salt))	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Turbidimeter							
<input type="checkbox"/>	<input type="checkbox"/>	16. อุปกรณ์ (Sample)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	17. อุปกรณ์ (Sample) (> 2.5 m/s 1.0)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Automatic Water							
<input type="checkbox"/>	<input type="checkbox"/>	18. อุปกรณ์ (Water)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	19. Function (Flowing and Coating)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	20. อุปกรณ์ (Watering Control)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

*100.1 mm x 95.8. 1 mm
*100.1 mm x 95.8. 1 mm

Mr. Hallapal Purgunther
Service Engineer

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Cement Portland Cement
2005 Portland Cement Portland Cement Portland Cement
2005 Portland Cement Portland Cement Portland Cement
Phone: 408.588.7200 Fax: 408.588.7200 Website: www.2005-portlandcement.com

045-Phy.291-09 28 Jun 2023



Cert.No.: Z3TWH58
Page: 2 of 2

Condition of this result at saturation

8. **Reference Standard Instruments**
This certification is traceable to the International System of Unit through the reference standards inventory of National Calibration Center Technology Promotion Association (Thailand-Japan).

Instrumento	Serial No.	ID No.	Certificate No.	Due Date
1) Bureau	-	130BU113	25CG11172	22 Mar 2020
2) Balance	1120143764	140AC004	734AR0	20 Jun 2020

- | Material | Manufacturer | Lot No. | Assay |
|------------------------------|--------------|-----------|--------|
| Sodium Thiosulfate Anhydrous | Acros | AA1727348 | 99.98% |

Result: Dissolved Oxygen Meter Adjustment, With Air 120 %
Dissolved Oxygen Probe No. 150103464

Titration Method (Azide Modification Method) (mg/L)	OD Meter Reading (mg/L)	Standard Deviation (mg/L)
6.16	6.17	6.0000

This report was created only for the instrument we tested it is intended to use for study-
 818 system efficacy. The environmental impact control and present its organization. It may economical
 819 based to use its monitoring and reform purpose is prohibited. This report may not be reproduced
 820 other or full without written approval of the Ministry.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

Sally



Ceritaste Fix: C0623044 Page 2 of 3

Collision Results
Wetted Adjustment

Phenothiazine Acceptor (AA) (mumol)	Standard absorbance	Unit Under Calibration	Conversion	Uncertainty
220 nm	0.9506	0.900	0.9000	0.0008
	0.7205	0.737	-0.0165	0.0020
267 nm	0.9506	0.900	0.9000	0.0008
	0.8674	0.887	0.0004	0.0010
313 nm	0.3005	0.005	0.0005	0.0008
	0.2804	0.280	-0.0020	0.0005
350 nm	0.8500	0.808	0.0005	0.0005
	0.9374	0.937	0.0004	0.0005
Slit type *				
Standard, half slit	LMC, Wavelength (nm)	LMC, Transmission (%)	Absorbance (A)	
	388.4	1.3	1.891	
261.60 \pm 0.11 nm	391.6	1.2	1.891	
Spectral Resolution *				
Attenuated Compton 0.05 % v/v	Peak:	Thresh	Gate	Slit
Standard Wavelength (nm)	259.80	259.8	1.30	1.05
LMC Wavelength (nm)	259.3	258.1		
Std Absorbance (A)	0.888	0.796		
Absorbance (A)	0.813	0.360		

[†] *Collopidium Mohr* + *Ner. Tili. Aspidioides* [†] in the Certificate have been included for comparison.

The End of Certificate



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 (EQUIPMENT CALIBRATION AND TESTING SERVICES)
1155 PATTANAKARN ROAD NO. 11, SHAOLUANG, SI-JONG-ANG BANGKOK 10250
TEL. 0-2717-0788 FAX. 0-2718-9440

Case No.: 25TV180
Page: 1 of 2

Certificate of Testing

Equipment:	QO Meter
Manufacturer:	YSI
Model:	500-115V
Serial No.:	51612776
ID No.:	HYG_E03032
Relevant Date:	21 July 2023
Test Date:	24 July 2023
Reference:	Z00747180C-1
Submitted by:	ALE Laboratory Orster (Thailand) Co., Ltd. Rajong Boon 818/10 Jom S, T. Mueang Kho, A. Muang Mueang 21140, Thailand
Laboratory Condition:	Temperature (25 ± 1) °C Humidity (50 ± 2) % by Compensant Thermocouple with Anti-Microbial Medium
Test Procedure:	Yeastkit - Sentinel
Tested by:	<i>Sathya</i>
Approved by:	Approved Signatory
<input type="checkbox"/> Minor Defect <input type="checkbox"/> Satisfy Myanmar <input type="checkbox"/> Wasteful Lysing/Inhal	
Issue Date:	25 July 2023

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JAPANESE CHRISTIAN ASSOCIATION THEOLOGY AND JAPAN
CHRISTIANITY IN KOREA: A HISTORY OF ASSIMILATION AND RESISTANCE
JAMES H. COOPER, JR., WASHINGTON, D.C.: UNIVERSITY MICROFILMS INTERNATIONAL, 2007.
Pp. xiv + 286. ISBN 978-0-02-033000-0.



Cert. No. 2541729
Page 1 of 18

Certificate of Calibration

Equipment:	DD Motor with Serial
Manufacturer:	Y31
Model:	5000 135V
Serial No.:	14E124796
IC No.:	0102_034032
Submitted by:	ALB Laboratory Clinic (Thailand) Co., Ltd Rayong Branch 65/101 Moo 5 T. Watsoem Kru, A. Pongkajon Rayong 21140 Thailand
Location:	TPA On Site Calibration Laboratory
Received Order:	28 July 2023
Calibration Date:	27 June 2023
Analysis Temperature:	128 ± 10 °C
Analysis Humidity:	136 ± 20 %
AC Line Voltage:	120 ± 22 V
Calibrated by:	Phasichai Kiatkiet
Approved by:	 Approved Signatory
<input type="checkbox"/> Photographic Transmitted <input type="checkbox"/> Mobile WhatsApp <input checked="" type="checkbox"/> Email (yep)	
Issue Date:	27 July 2023

The 1-metre-wide gate for convenient accessibility of approximately 80%.

（三）《1985年教育法》

Equipment: OG Meter with Sensor
Condition As-Received: Unit Item
Reference: 2302-07308C-2
Procedure Used: Calibration was conducted using reference calibration procedure CP-0101 according to temperature with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
 The temperature scale used was based on ITS-90.
Condition of this result of calibration:
 1. Reference standard instrument:
 Instrument: Digital Thermometer
 Serial No.: 2180090
 Cert. No.: 231228
 Traceability: TPA
 Expiry Date: 21 Oct 2023
 2. This certificate is valid only to the item calibrated on date and place of calibration.
 3. This certification is in accordance to the International System of Unit.
Remark: TPA: Technology Promotion Association (Thailand - Japan)
Result of Calibration: ("") Without Adjustment
Function: Temperature measurement
 This instrument was connected with temperature sensor, DIN: 122475367

Calibration Point (°C)	Depth (mm)	Standard Temperature (°C)	UUC Result (°C)	Error (°C)	Uncertainty (°C)	Coverage Factor
20.00	100	20.011	-0.011	-0.011	0.15	2.00

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

1155515

Equipment: Low Temp. Incubator
Condition As-Received: Used Item
Reference: 2305-0880C-2
Procedure Used: Calibration was conducted using calibration procedure CP-0102 according to shelf measurement in accordance with Data Acquisition which connected with Resistance Temperature Detector (RTD).
 The temperature scale used was based on ITS-90.
Condition of this result of calibration:
 1. Reference standard instrument:
 Instrument: Data Acquisition
 Model: 34973A
 Serial No.: 1257032711
 Cert. No.: 231483
 Expiry Date: 07 Jul 2023
 2. This certificate is valid only to the item calibrated on date and place of calibration.
 3. This certification is in accordance to the International System of Unit.
Result of Calibration: ("") Without Adjustment
Function of UUC: Temperature Source
Fresh air setting: Close

Environment during calibration

Temp. (°C)	Relative Humidity (%)	Pressure (hPa)
22	54	1013

Position:

Position	Ref. No.
1	16-18RTD-01
2	16-18RTD-02
3	16-18RTD-03
4	16-18RTD-04
5	16-18RTD-05
6	16-18RTD-06
7	16-18RTD-07
8	22-18RTD-08
9 (ref.)	16-18RTD-09

Probe Installation Details:

Probe	Installation Details	Dimensions of Chamber
1-4	10 mm	300 x 300 x 300 mm
5-8	10 mm	300 x 300 x 300 mm
9	10 mm	300 x 300 x 300 mm

1155130

Equipment: Burette
Capacity: 50 mL
Serial No.: RYV 820382
ID No.: RYV 820382
Manufacturer: Wülfing
Model: Germany
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.
 Rayong Branch
 614/10 Moo 5 1/2 Moo 6 Km. 4 Pongkum
 Rayong 21140, Thailand
Ambient Temperature: (20 ± 2) °C
Relative Humidity: (50 ± 10) %
Barometric Pressure: 758 mmHg
Calibration Procedure: ASTM E 947 - 01
Calibrated by: Srisuda Khomkha
Approved by: Srisuda Khomkha
Issue Date: 31 October 2023

Certificate of Calibration

The certificate is for a confidence probability of approximately 95 %.

1155054

Equipment: Low Temp. Incubator
Manufacturer: Muretec
Model: RPT20
Serial No.: V919-008
ID No.: RYV 820382
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.
 Rayong Branch
 614/10 Moo 5 1/2 Moo 6 Km. 4 Pongkum
 Rayong 21140, Thailand
Received Date: 29 May 2023
Calibration Date: 29 May 2023
Ambient Temperature: (20 ± 2) °C
Relative Humidity: (50 ± 10) %
Calibrated by: Srisuda Khomkha
Approved by: Srisuda Khomkha
Issue Date: 7 June 2023

Certificate of Calibration

The certificate is for a confidence probability of approximately 95 %.

1155487

Equipment: Low Temp. Incubator
Condition As-Received: Used Item
Reference: 2305-0880C-2
Procedure Used: Calibration was conducted using calibration procedure CP-0102 according to shelf measurement in accordance with Data Acquisition which connected with Resistance Temperature Detector (RTD).
 The temperature scale used was based on ITS-90.
Condition of this result of calibration:
 1. Reference standard instrument:
 Instrument: Data Acquisition
 Model: 34973A
 Serial No.: 1257032711
 Cert. No.: 231483
 Expiry Date: 07 Jul 2023
 2. This certificate is valid only to the item calibrated on date and place of calibration.
 3. This certification is in accordance to the International System of Unit.
Result of Calibration: ("") Without Adjustment
Function of UUC: Temperature Source
Fresh air setting: Close

Environment during calibration

Temp. (°C)	Relative Humidity (%)	Pressure (hPa)
22	54	1013

Position:

Position	Ref. No.
1	16-18RTD-01
2	16-18RTD-02
3	16-18RTD-03
4	16-18RTD-04
5	16-18RTD-05
6	16-18RTD-06
7	16-18RTD-07
8	22-18RTD-08
9 (ref.)	16-18RTD-09

Probe Installation Details:

Probe	Installation Details	Dimensions of Chamber
1-4	10 mm	300 x 300 x 300 mm
5-8	10 mm	300 x 300 x 300 mm
9	10 mm	300 x 300 x 300 mm

1155129

Equipment: Burette
Capacity: 50 mL
Serial No.: RYV 820382
ID No.: RYV 820382
Manufacturer: Wülfing
Model: Germany
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.
 Rayong Branch
 614/10 Moo 5 1/2 Moo 6 Km. 4 Pongkum
 Rayong 21140, Thailand
Ambient Temperature: (20 ± 2) °C
Relative Humidity: (50 ± 10) %
Barometric Pressure: 758 mmHg
Calibration Procedure: ASTM E 947 - 01
Calibrated by: Srisuda Khomkha
Approved by: Srisuda Khomkha
Issue Date: 31 October 2023

Certificate of Calibration

The certificate is for a confidence probability of approximately 95 %.

1155054



Equipment: HCL Air Oven
Condition As-Received: Used Item
Reference: 2403-05030C-3
Procedure Used: Calibration were 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

Cert. No.: 24TMS34
Page: 2 of 3

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: Serial No. Cert. No. Traceable Due Date

1) Data Acquisition MY7013711 23M115 TPA 11 Jul 2024

2. The certificate is valid only to the item calibrated on date and place of calibration

3. This certificate is traceable to the International System of Unit

Remark: TPA Technology Promotion Association (Thailand - Japan)

Result of Calibration: (*) Without Adjustment

Function of UUC: Temperature Source

Fresh air setting: Close

Environment during calibration

Temp. (°C) Beginning Finished

REL. Humid. (%) 55 55

AC Supply (Vrms) 224 223

Ref. Site ID No.: @ Calibration Point

Position: (180) °C (104) °C

1 18-18TC-01 18-18RTD-01

2 18-18TC-02 18-18RTD-02

3 18-18TC-03 18-18RTD-03

4 18-18TC-04 18-18RTD-04

5 18-18TC-05 18-18RTD-05

6 18-18TC-06 18-18RTD-06

7 18-18TC-07 18-18RTD-07

8 18-18TC-08 18-18RTD-08

9 (ref.) 18-18TC-09 18-18RTD-09

Prize Installation Details Dimension of Chamber:

W = 5.0 mm D = 0.40 m

H = 1.5 mm W = 0.56 m

L = 7.0 mm H = 0.48 m

Capacity = 0.11 m³

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ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๑ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

[illegible]

๗๕) นายประเสริฐ...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
20	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Formaldehyde	Distillation, Colorimetric Method ⁽⁴⁾
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ⁽⁴⁾ 2) DPD Colorimetric Method ⁽⁴⁾
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Hexavalent Chromium	Colorimetric Method ⁽⁴⁾
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
39	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

40 Manganese...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
42	Methiocarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Methods ⁽⁴⁾
54	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽⁴⁾
56	Total Phosphorous	Digestion, Colorimetric Method ⁽⁴⁾
57	Total Suspended Solids	Dried from 103-105 °C ⁽⁴⁾
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
60	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

น้ำได้ดื่ม...

น้ำได้ดื่ม จำนวน 126 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
9	Benzo(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

18 Bis(2-ethylhexyl)phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	Colorimetric Method ⁽⁴⁾

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

55 1,3-Dichloropropane...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

76 γ-HCH...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

94 N-Nitrosodiphenylamine...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾ 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₈ -C ₁₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾⁽²⁾

110 TPH (C₈-C₁₆)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C ₁₀ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22)
111	TPH (C ₁₀ -C ₃₅)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

จากัดเสีย...

จากัดเสีย (ป่องระเหย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
5	Carbon Monoxide	1) Instrumental Analyzer Method ⁽²⁾ 2) Sampling Bag Non-Dispersive Infrared Method ⁽²⁾
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ⁽²⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽²⁾
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
10	Cresol	Adsorption Sampling, Gas Chromatographic Method ⁽²⁾
11	Dioxins	Isokinetic Sampling ⁽²⁾
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ⁽²⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽²⁾
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ⁽²⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽²⁾
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽²⁾

15 Lead...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁾
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
19	Opacity	Ringelmann's Method ⁽²⁾
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽²⁾ 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ⁽²⁾ 3) Instrumental Analyzer Method ⁽²⁾
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thioin Titrimetric Method ⁽²⁾ 2) Instrumental Analyzer Method ⁽²⁾
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thioin Titrimetric Method ⁽²⁾
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ⁽²⁾ 2) Paired Train, Isokinetic Sampling, Gravimetric Method ⁽²⁾

27 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽²⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽²⁾
28	Xylene	Adsorption Sampling, Gas Chromatographic Method ⁽²⁾

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24)
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
9	Chromium (II)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.16,19) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.17,18) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.14,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.17,18)

10 Chromium (VI)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1.6.19) 2) Alkaline Digestion, Colorimetric Method ^(8.19)
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24)

2) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)

22 Mercury...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.6.20) 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.6.23) 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(2.2) 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(2.2) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(2.1)
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.24)

- 2-Chlorobiphenyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	- 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3',5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4'-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,6'-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20) Electrometric Method ^(23,24)
29	pH	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16)
30	Selenium	2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

31 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

32 Cadmium...

เติม จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
2	Acetone	1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,23) 2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(1,13)
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
9	Benzo(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,23)

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,23)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,23)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(1,12,23)
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,12,20)

23 Cadmium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,11)
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,16,19) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,17,19)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,19)

36 Chrysene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(7,28,29)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
39	DDO	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)

49 1,2-Dichloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

63 Di-n-Octyl Phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

73 n-Hexane...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
75	β -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
76	γ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁹⁾ 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽²¹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾

84 Methanol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)

96 Polychlorinated biphenyls (PCBs)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3',4',6-Pentachlorobiphenyl - 2,2',3,4,5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,6'-Nonachlorobiphenyl Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
97	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)

99 Phenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
107	Tovaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
108	TPH (C ₈ -C ₄)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
109	TPH (C ₁₀ -C ₁₄)	1) Automated Extraction, Gas Chromatographic Method ^(10,26) 2) Solvent Extraction, Gas Chromatographic Method ^(10,26) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(22,23)
110	TPH (C ₁₆ -C ₃₅)	1) Automated Extraction, Gas Chromatographic Method ^(10,26) 2) Solvent Extraction, Gas Chromatographic Method ^(10,26) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(22,23)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)

115 2,4,5-Trichlorophenol...

อนึ่ง หนังสือฉบับนี้ จะมอบให้ทางศาลปกครองรับทราบเพื่อเป็นข้อมูลในการพิจารณาพิพากษา
ในชั้นที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายพรบศ อธิ์กรรณ)
อธิบดีศาลปกครองกลาง
สำนักงานศาลปกครองกลาง

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มภาคฐานวิธีการวิเคราะห์ทางเคมีและพิษวิทยาของมลพิษ

โทร : ๐ ๒๕๖๓ ๖๓๓๓ ต่อ ๑๑๐๓-๕

โทรสาร : ๐ ๒๕๖๓ ๖๓๓๓ ต่อ ๑๑๐๓-๕

ไปรษณีย์อิเล็กทรอนิกส์ : sarabangcew@gmail.com

ที่ กก.๑๓๑๐(๓)/ ๖๔๘๐



กรมโรงงานอุตสาหกรรม
แผนกพระราชพิธี ข. แขวงทุ่งพญาไท
ศาลากลาง กทม.พญา ๑๐๔๐๑๑

๒๔ มิถุนายน ๒๕๖๔

เรื่อง ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอลแอล แลอบราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแบบฟอร์มขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอลแอล แลอบราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอลแอล แลอบราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารเคมีที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอลแอล แลอบราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ๖-๒๒๓ สถานที่ตั้งเลขที่
๒๒๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู่ อำเภอปลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

๑. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๒
๒) นางริสราวัลย์ บริรักษ์	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๓
๓) นายสุพจน์ สลามะดี	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๔

๒. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณกุล บรรจงกิจ	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๕
๒) นางพจนา สัตถ์	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๖
๓) นางสาวอนิศา กุลสุริวงศ์	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๗
๔) นายทิพย์ ทอแดง	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๘
๕) นางชลธิชา สุขเกษ	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๖๙
๖) วรวิทย์ ธรรมชัย ม่วงมา	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๐
๗) นายวรารุณ พิบา	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๑
๘) นายศักดิ์รินทร์ จรัสกาย	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๒
๙) นายสุรศักดิ์ ลาชื่น	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๓
๑๐) นางสาวเพชรพรณ์ วัฒนานนท์	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๔
๑๑) นายสมชาย งามแก้ว	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๕
๑๒) นายสุริยคำวงศ์ โชคปัดนันท์	ทะเบียนเลขที่ ๖-๒๒๓-๖-๑๔๗๖

๑๑) นายวิมล

-๒-

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์
จะต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบ
คำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือขึ้นทะเบียนห้องปฏิบัติการ
วิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวจะรับได้ทั้งกรณีกรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายจินดา เฑาะศรีนทร์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
สำนักงานศาลปกครองกลาง

๒๔ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร : ๐ ๒๕๖๓ ๖๓๓๓-๓

ไปรษณีย์อิเล็กทรอนิกส์ : sarabangcew@gmail.com

๑๓) นายวิมล ทนไชยเนาว์

๑๔) นางสาวนภาสิ มณีบุญธรรมกุล

๑๕) นางสาวอนิศา กุลสุริวงศ์

๑๖) นายณฐะสิทธิ์ วงศ์ไชย

๑๗) นายชัยบุรณ์ เลิศนันทกุลชัย

๑๘) นายสุจิตา เพ็ชรนาง

๑๙) นายกันตพล มีสัมพันธ์

๒๐) นางสาวจินดา ภิรมย์

๒๑) นายธีรวิทย์ สิกขะจินดา

๒๒) นายสุภาวดี พิธีพันธ์

๒๓) นายสุภาวดี พิธีพันธ์

๒๔) นายสุภาวดี พิธีพันธ์

๒๕) นายสุภาวดี พิธีพันธ์

๒๖) นายสุภาวดี พิธีพันธ์

๒๗) นางสาวกัญญาพร ศรีบุญเรือง

๒๘) นางสาวณฐะสิทธิ์ วงศ์ไชย

๒๙) นางสาวอนิศา กุลสุริวงศ์

๓๐) นางสาวณฐะสิทธิ์ วงศ์ไชย

๓๑) นายพิพัฒน์ ธิ์ศิริเศรษฐ์

๓๒) นายศิริวิทย์ เรืองกุล

๓๓) นายสุภาวดี พิธีพันธ์

๓๔) นายสุภาวดี พิธีพันธ์

๓๕) นางสาวสุภาวดี พิธีพันธ์

๓๖) นายสุภาวดี พิธีพันธ์

๓๗) นายสุภาวดี พิธีพันธ์

๓๘) นายสุภาวดี พิธีพันธ์

๓๙) นายสุภาวดี พิธีพันธ์

๔๐) นายสุภาวดี พิธีพันธ์

๔๑) นายสุภาวดี พิธีพันธ์

๔๒) นายสุภาวดี พิธีพันธ์

๔๓) นายสุภาวดี พิธีพันธ์

๔๔) นายสุภาวดี พิธีพันธ์

๔๕) นายสุภาวดี พิธีพันธ์

๔๖) นายสุภาวดี พิธีพันธ์

๔๗) นายสุภาวดี พิธีพันธ์

๔๘) นายสุภาวดี พิธีพันธ์

๔๙) นายสุภาวดี พิธีพันธ์

๕๐) นายสุภาวดี พิธีพันธ์

๓. ข้อควรพิจารณาคือได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๓๕ รายการ

จากภาคเลย (ปกครองระยอง) จำนวน ๘ รายการ และน้ำเสีย จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๓๘ รายการ

ตามเดิมที่ส่งมาด้วย

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอนเนส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๑๒๓

ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐ ลงวันที่ ๒๔ มิถุนายน ๒๕๖๔

ขอขยายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

เป็นเสีย จำนวน 14 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ⁽²⁾ 2) 5-Day BOD Test, Azide Modification Method ⁽²⁾
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method ⁽²⁾ 2) Closed Reflux, Colorimetric Method ⁽²⁾ 3) Closed Reflux, Titrimetric Method ⁽²⁾
3	Color	ADMI Weighted = Ordinate Spectrophotometric Method ⁽²⁾
4	Cyanide	Distillation, Colorimetric Method ⁽²⁾
5	Formaldehyde	Distillation, Colorimetric Method ⁽²⁾
6	Free Chlorine	DPD-Ferrous Titrimetric Method ⁽²⁾
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ⁽²⁾
8	pH	Electrometric Method ⁽²⁾
9	Phenols	1) Distillation, Chloroform Extraction Method ⁽²⁾ 2) Distillation, Direct Photometric Method ⁽²⁾
10	Sulfide	ZnS Precipitation, Iodometric Method ⁽²⁾
11	Temperature	Laboratory and Field Method ⁽²⁾
12	Total Dissolved Solids	Dried at 180 °C ⁽²⁾
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽²⁾
14	Total Suspended Solids	Dried at 103-105 °C ⁽²⁾

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽³⁾
3	Opacity	Ringelmann's Method ^(3,4)
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾

วิรัตน์ สิมกุล
(นางสาววิภา สิมกุล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

สำเนา

ที่ อก ๐๓๑๐/ ๖๐๕๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๒ มิ.ย. ๒๕๖๔

เรื่อง เปลี่ยนแปลงบุคลากรห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนเนส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร ห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๔ มีนาคม ๒๕๖๔

ตามที่หนังสือที่อ้างถึง บริษัท เอนเนส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๒๓ สถานที่ตั้งเลขที่ ๒๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้คู่ อำเภอลำลูกนาง จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- นางสาวเจษฎาพร ศรีบุญเรือง ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๔๗๓
- นางสาวสุวิมลพร สิงห์นา ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๔๗๔
- นางสาววันวิสา ผดุงจิตต์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๔๗๕
- นายสุภาณัฐ พิสัยพันธ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๔๗๖
- นายสิทธิชัย แก้วเกตุ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๔๗๗

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- นายณัฐพงษ์ เพ็งขำนา ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๓
- นางสาวกัญญารัตน์ วิภาติ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๔
- นางสาวจุฑารัตน์ สีทองกลาง ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๕
- นางสาวจิตติภา ประเทืองสุข ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๖
- นายธรรมเสริญ คุ้มยกสุข ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๗
- นายณัฐวุฒิ อมพรมราช ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๘
- นายจิตรกร สีวะสา ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๐๙
- นายสิทธิพรวิทย์ สุวรรณวัฒน์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๑๐
- นายสิทธิพันธ์ เสนาธิ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๑๑
- นายณัฐวัฒน์ เสนาธิ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๑๒
- นายสุรวิทย์ นราพงษ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๑๓
- นายอติศักดิ์ ตะวีญ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๑๐๑๔

ลำดับที่	สารเคมี	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium - Thorin Titrimetric Method ⁽⁶⁾
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽⁷⁾

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ⁽²⁾
2	pH	Electrometric Method ⁽²⁾
3	Phenols	Distillation, Direct Photometric Method ⁽²⁾

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วิรัตน์ สิมกุล
(นางสาววิภา สิมกุล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๖๔๕ ๔๕๖๗

อนึ่ง หนังสือฉบับนี้จะมีผลใช้บังคับเมื่อหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๔ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๔ มิถุนายน ๒๕๖๔ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทั้งผ่านเว็บไซต์กรมโรงงานอุตสาหกรรมตาม QR Code ท้ายหนังสือนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทรี อัมพพันธุ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๒๖๔๕ ๔๕๖๗ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eww@eww.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



ที่ อก ๐๓๑๐/๒๕๖๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๖๐๐

๑๐ พ.ย. ๒๕๖๕

เรื่อง เปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ ตุลาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอลำปางพะเยา จังหวัดพะเยา ขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในใบแจ้ง จำนวน ๑๓ รายการ และน้ำได้คืน ๓ รายการ ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนที่ อก ๐๓๑๐/๒๕๖๕ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๕ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทันนำไปใช้สมัครโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี ยี่หวัด)

ผู้อำนวยการศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๒๑๓๓๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eww@dw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา” อุตสาหกรรมสีเขียว



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๑๒๓
ที่ อก ๐๓๑๐/๒๕๖๕ ลงวันที่ ๑๐ พ.ย. ๒๕๖๕

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๓ รายการ
น้ำได้คืน จำนวน ๓ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method
2	Chemical Oxygen Demand	2) 5-Day BOD Test, Azide Modification Method 1) Open Reflux, Titrimetric Method 2) Closed Reflux, Colorimetric Method 3) Closed Reflux, Titrimetric Method
3	Color	ADM-Weighted-Ordinate Spectrophotometric Method
4	Cyanide	Distillation, Colorimetric Method
5	Free Chlorine	DPD Ferrous Titrimetric Method
6	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method
7	pH	Electrometric Method
8	Phenols	1) Distillation, Chloroform Extraction Method 2) Distillation, Direct Photometric Method
9	Sulfide	ZnS Precipitation, Iodometric Method
10	Temperature	Field Method
11	Total Dissolved Solids	Dried at 180 °C
12	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method
13	Total Suspended Solids	Dried at 103-105 °C

น้ำได้คืน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method
2	pH	Electrometric Method
3	Phenols	Distillation, Direct Photometric Method

เอกสารอ้างอิง

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ที่ อก ๐๓๑๐/๔๖๐๐



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๖๐๐

๑๔ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๐ มีนาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอลำปางพะเยา จังหวัดพะเยา ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

1. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย
นางสาวเพชรคุณ กวอดานนท์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
2. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๕ ราย
๑) นายณัฐพล เรืองวงศ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๒) นายชานนท์ บุญขึ้น ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๓) นายณัฐกานต์ วงศ์อินทร์อยู่ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๔) นายอานนท์ โพธิ์พระทอง ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๕) นายณัฏฐ์ ถั่วกลาง ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๖) นายศุภณัฐ สัตยพันธ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๗) นายวสันต์ ศิริพันธ์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๘) นายวิญญู นิมาลี ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๙) นายศุภณัฐ สุกกิตติพิสัย ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๑๐) นายเอกชัย กิมทอง ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๑๑) นายพงษ์เทพ สิทธิธำมะ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๑๒) นายทินกร กุมากร ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๑๓) นางสาวนันทิยา บุญจันทน์ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๑๔) นายสิทธิชัย อินทิมา ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔
๑๕) นางสาวกนกวรรณ พลคอกทะ ทะเบียนเลขที่ ๖-๑๒๓-๖-๐๐๕๔๔

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒๗ มิถุนายน ๒๕๖๗

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี ยี่หวัด)
ผู้อำนวยการศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๒๑๓๓๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eww@dw.mail.go.th

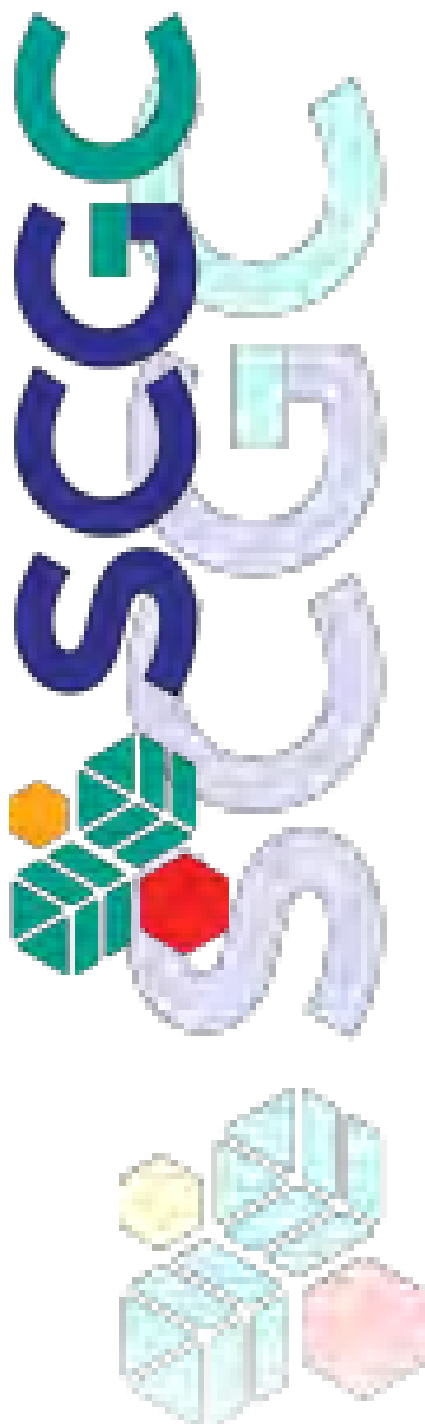


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“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา” อุตสาหกรรมสีเขียว





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