

ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



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Service Confirmation Number: 0000000000
 Service Confirmation Date: 23.06.2024

Service Confirmation Number: 0000000000
 Service Confirmation Date: 23.06.2024

Customer Contact

Agilent Laboratory Group (Thailand) Co.
 Ltd Head Office
 100 Wireless Road, 21/F, 100 Wireless Road
 Bangkok 10000 Thailand
 Tel: +662 637 8300
 Email: info.thailand@agilent.com
 Website: www.agilent.com/thailand

SERVICE REPORT

Customer Purchase Order Number:	Customer Number:
Service Request:	Service Request Date:
Service Order:	Service Confirmation:

REVIEW BY: *[Signature]*
 APPROVED BY: *[Signature]*
 REVIEW DATE: 23.06.2024

Direct Inquiry to:

Contact Name: Customer Contact Center
 Contact Email: info.thailand@agilent.com
 Contact Telephone: +662 637 8300
 Contact Fax: +662 637 4339

Location:
 Name:
 Day:
 Lab:
 Dept:

Agilent Technologies (Thailand) Limited

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Service Instruments:

Model Number	Model Description	Serial Number	System Handle	Parent Asset
17000	17000-001 (17000-001) System	17000	17000	17000
17000	17000-001 (17000-001) System	17000	17000	17000

Service Issues:

Date	Service/Part #	Description	Qty	Expenditure	Service Start	Service End
17000	17000-001	17000-001 (17000-001) System	1	Agreement	12.06.2024	23.06.2024
17000	17000-001	17000-001 (17000-001) System	1	Agreement	12.06.2024	23.06.2024

Additional Information:

Service Information:

Problem Symptom(s): VU 50-001 (VU 50-001) System	Travel Hours: 2.0
Service Provided: Complete VU 50-001 (VU 50-001) System	Customer Field Service Representative Signature: <i>[Signature]</i>
Equipment ID: VU 50-001 (VU 50-001) System	Date: 23.06.2024
Service Operations Code: Reason Code: Scheduled Service Diagnostic Code: Scheduled Service Resolution Code: Scheduled Service	Customer Signature: <i>[Signature]</i>
Customer Name: CHANGKARN PICHIT	Date: 23.06.2024



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date	10 Jul 25	Ambient Temperature (°C)	27
Calibration sheet No.	C-100725-RYG_FS0015	Relative Humidity (%)	43.7
Digital Temperature ID	RYG_FS0015	Reference Temperature ID	BKK_FS1144
Serial No.	1700001	Serial No.	20100000013
Model	XC-672-V	Model	Digicon-CC-VT-M5
Next Calibration	9 Jan 26	Next Calibration	9 Jan 26

Location	Reference Temperature °C	Digital Temperature °C	Error °C	MPE	Pass / Fail
Stack	0	-1	-1	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
	100	100	0	±3	Pass
	150	149	-1	±3	Pass
	200	198	-2	±3	Pass
	250	248	-2	±3	Pass
	300	298	-2	±3	Pass
	350	348	-2	±3	Pass
	400	398	-2	±3	Pass
Probe	450	498	-2	±3	Pass
	500	598	-1	±3	Pass
	550	648	-2	±3	Pass
	600	698	-2	±3	Pass
	650	748	-2	±3	Pass
	700	798	-2	±3	Pass
	750	848	-2	±3	Pass
	800	898	-2	±3	Pass
	850	948	-2	±3	Pass
	900	998	-2	±3	Pass
Oven	950	1048	-2	±3	Pass
	1000	1098	-1	±3	Pass
	1050	1148	-2	±3	Pass
	1100	1198	-2	±3	Pass
	1150	1248	-2	±3	Pass
	1200	1298	-2	±3	Pass
	1250	1348	-2	±3	Pass
	1300	1398	-1	±3	Pass
	1350	1448	-2	±3	Pass
	1400	1498	-2	±3	Pass
Fiber	1450	1548	-2	±3	Pass
	1500	1598	-2	±3	Pass
	1550	1648	-2	±3	Pass
	1600	1698	-2	±3	Pass
	1650	1748	-2	±3	Pass
	1700	1798	-2	±3	Pass
	1750	1848	-2	±3	Pass
	1800	1898	-2	±3	Pass
	1850	1948	-2	±3	Pass
	1900	1998	-2	±3	Pass
Exit	1950	2048	-2	±3	Pass
	2000	2098	-2	±3	Pass
	2050	2148	-2	±3	Pass
	2100	2198	-2	±3	Pass
	2150	2248	-2	±3	Pass
Meter	2200	2298	-2	±3	Pass
	2250	2348	-2	±3	Pass
	2300	2398	-2	±3	Pass
	2350	2448	-2	±3	Pass
	2400	2498	-2	±3	Pass
AUX	2450	2548	-2	±3	Pass
	2500	2598	-2	±3	Pass
	2550	2648	-2	±3	Pass
	2600	2698	-2	±3	Pass
	2650	2748	-2	±3	Pass

MPE: (Maximum permissible error of measurement) as per the requirements of the calibration certificate.

Calibrated by:

[Signature]
 (Mr. Jitakorn Siewa)

Approved by:

[Signature]
 (Mr. Natthapol Jengwarewong)
 RYG Field Service Specialist (1)

FORM NO.: F-06-027 REVISION NO.: 2 ISSUE DATE: 16/02/23

PROBE NOZZLE DIAMETER
CALIBRATION DATA SHEET

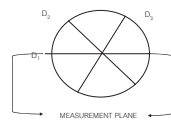
Calibration Date:		10 Jul 25		Nozzle Set ID:		RYG_FS0019	
Calibration Sheet No.:		C-060225-RYG_FS0019		Vernier Caliper ID.:		RYG_FS0030	
Nozzle ID #	Nozzle Diameter (cm.)				H - Lo	$(D_1 + D_2 + D_3) / 3$	
	D_1	D_2	D_3	ΔD		D_{avg}	
1	0.301	0.300	0.300	0.001	0.000	0.300	
2	0.465	0.468	0.465	0.003	0.466		
3	0.540	0.539	0.540	0.001	0.540		
4	0.602	0.605	0.605	0.003	0.604		
5	0.765	0.760	0.765	0.005	0.763		
6	0.929	0.928	0.930	0.002	0.929		
7	1.082	1.080	1.080	0.002	1.081		
8	1.235	1.230	1.235	0.005	1.233		
9	1.594	1.598	1.599	0.011	1.594		

Where:

D₁, D₂, D₃ = Three different nozzle diameters at 60 degrees to each other, each measured the nearest 0.025 mm.

ΔD = Maximum distance between any two diameters, must be ≥ 0.100 mm.

D_{avg} = (D₁ + D₂ + D₃) / 3



Calibrated by:

[Signature]
 (Mr. Sakit Phaisangphut)
 RYG Field Service Scientist (4)

Approved by:

[Signature]
 (Mr. Natthapol Jengwarewong)
 RYG Field Service Specialist (1)

FORM NO.: F-06-024 REVISION NO.: 0 ISSUE DATE: 24/12/23



Type S Pitot Tube Calibration

Date Calibration: 10-Jul-25
 Pitot ID: RYG_FS0320
 Pitot SN: -

Due Date: 10-Jan-26
 Inclinator ID: BKK_FS1131
 Vernier ID: RYG_FS0539

Parameter	Value	Allowable Range	Check
α1	0.5	-10° < α1 < +10°	OK
α2	1.5	-10° < α2 < +10°	OK
β1	-2.2	-5° < β1 < +5°	OK
β2	-0.6	-5° < β2 < +5°	OK
γ	-1.2	-	-
θ	1.4	-	-
Z = A tan γ	-0.018	Z ≤ 0.125"	OK
W = A tan θ	0.021	W ≤ 0.031"	OK
Dt	0.310	0.188" to 0.375"	OK
A/2Dt	1.403	1.05 ≤ A/2Dt ≤ 1.5	OK
A	0.87	2.1Dt ≤ A ≤ 3Dt	OK

Certify that pitot tube/orb meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by: *[Signature]*
 (Mr. Sakit Phaisangphut)
 RYG Field Services Scientist (4)

Approved by: *[Signature]*
 (Mr. Natthapol Jengwarewong)
 RYG Field Services Specialist (1)

FORM NO.: F-06-024 REVISION NO.: 0 ISSUE DATE: 24/12/23



Type S Pitot Tube Calibration

Date Calibration: 10-Jul-25
 Pitot ID: BKK_FS0531
 Pitot SN: -

Due Date: 10-Jan-26
 Inclinator ID: BKK_FS1131
 Vernier ID: RYG_FS0539

Parameter	Value	Allowable Range	Check
α1	6.2	-10° < α1 < +10°	OK
α2	4.2	-10° < α2 < +10°	OK
β1	4.7	-5° < β1 < +5°	OK
β2	0.9	-5° < β2 < +5°	OK
γ	1.7	-	-
θ	1.6	-	-
Z = A tan γ	0.026	Z ≤ 0.125"	OK
W = A tan θ	0.024	W ≤ 0.031"	OK
Dt	0.375	0.188" to 0.375"	OK
A/2Dt	1.160	1.05 ≤ A/2Dt ≤ 1.5	OK
A	0.87	2.1Dt ≤ A ≤ 3Dt	OK

Certify that pitot tube/orb meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by: *[Signature]*
 (Mr. Wiroon Pulpas)
 RYG Field Services Scientist (3)

Approved by: *[Signature]*
 (Mr. Natthapol Jengwarewong)
 RYG Field Services Specialist (1)

FORM NO.: F-06-024 REVISION NO.: 0 ISSUE DATE: 24/12/23



Type S Pitot Tube Calibration

Date Calibration: 10-Jul-25
 Pitot ID: RYG_FS0321
 Pitot SN: -

Due Date: 10-Jan-26
 Inclinator ID: BKK_FS1131
 Vernier ID: RYG_FS0539

Parameter	Value	Allowable Range	Check
α1	-1.4	-10° < α1 < +10°	OK
α2	-0.2	-10° < α2 < +10°	OK
β1	0.8	-5° < β1 < +5°	OK
β2	-0.4	-5° < β2 < +5°	OK
γ	0.8	-	-
θ	0.5	-	-
Z = A tan γ	0.013	Z ≤ 0.125"	OK
W = A tan θ	0.008	W ≤ 0.031"	OK
Dt	0.310	0.188" to 0.375"	OK
A/2Dt	1.484	1.05 ≤ A/2Dt ≤ 1.5	OK
A	0.92	2.1Dt ≤ A ≤ 3Dt	OK

Certify that pitot tube/orb meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by: *[Signature]*
 (Mr. Sakit Phaisangphut)
 RYG Field Services Scientist (4)

Approved by: *[Signature]*
 (Mr. Natthapol Jengwarewong)
 RYG Field Services Specialist (1)

FORM NO.: F-06-024 REVISION NO.: 0 ISSUE DATE: 24/12/23



REPORT OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : DWYER
MODEL / TYPE : DWG4-40
SERIAL NO. : DWG40BCK-F50431
DATE OF CALIBRATION : 28 August 2024

ENVIRONMENT CONDITIONS :

Temperature : (23 ± 1) °C Relative Humidity : (45 ± 10) %RH

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPP-05 according to ISO 9001-2 calibration guidelines.

The calibration was performed by direct measurement with Documented Process Calibration and Pressure Module which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Documented Process Calibration, Fluke Model 7410 5/5, 5/25/2020 with Pressure Module Model 7000F 5/5, 5/24/2020.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MP-0040-24, Due Date 30 February 2025.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of k=2, it has been evaluated according to the "Calibration of Pressure Gauges (DIN 91-4)" which provides a level of confidence approximately 95%.

Certificate No. Q2408797

Page 1 of 3

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was checked by applying a known pressure from 0 to 100 kPa in 10 kPa steps. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the mean value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE		Correction to kPa		Correction to kPa	
DUC Test point (kPa)	STD Reading (kPa)	Correction to kPa	DUC Test point (kPa)	STD Reading (kPa)	Correction to kPa
0.00	0.000	0.000	10.00	9.999	-0.001
10.00	-13.329	-13.333	20.00	-9.999	-0.001
20.00	-47.679	-47.683	30.00	-19.999	-0.001
30.00	-87.989	-87.992	40.00	-29.999	-0.001
40.00	-91.331	-91.335	50.00	-39.999	-0.001
50.00	-94.774	-94.778	60.00	-49.999	-0.001

Uncertainty of measurement : 0.003 kPa

Transmitting fluid : Air

Technical Note : Correction factor 1 kPa = 0.2953003 kPa

Note: The Scope of Accredited ANAB Certificate No. ACDNA 2014 Version 02, Page 43 of 67

This report is valid for the above stated instrument only.

Certificate No. Q2408797

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Certificate of Calibration

Equipment : SPECTROPHOTOMETER
Model : DR6000
Serial No. for ID : 1627845 (RYC-EN0037)
Manufacturer : HACH
Condition : In Condition

Certificate No. : C02020108
Issued Date : 18 March 2025
Job No. : WO-0004379
Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch) Phetchaburi
616/10 Moo 5 T.Maenam Khu.
A Phusadung, Rayong 21140, Thailand.

Environment Condition : Temperature : 24.4 °C ± 0.3 °C
Humidity : 85.0 %RH ± 3.5 %RH

Calibration Place : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
(Wet Chemistry Lab.)
616/10 Moo 5 T.Maenam Khu. A Phusadung, Rayong 21140, Thailand.

Calibration By : Mr. Pichcha Phonchai
18 March 2025
The Method used : In house method, CAL-M-04, based on ASTM E 275-08 and ASTM E 387-04

Traceability : This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Sigma Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584
The standard for Photometric Certificate No. 911494 and 111586
The standard for Stray Light Certificate No. 111585 and 111587
The standard for Spectral resolution Certificate No. 111587

(Mr. Pichcha Phonchai)
(Mr. Pichcha Phonchai)
(Mr. Pichcha Phonchai)

This certificate is issued for the purpose of measurement according to the International System of Units (SI). The uncertainty of measurement is determined by standard deviation or other statistical method.

The measurement uncertainty stated in the certificate is based on the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%.

This certificate is valid for the purpose of measurement only. It is not valid for other purposes. The results may vary in the future due to changes in the instrument or the environment.

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CAL/004/01-18-11 Mar 2024

Certificate No. C02020108 Page 2 of 3

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm)	The special bandwidth of 0.1 nm at 2 nm and UVC at 2 nm	Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
418.4 nm	418.5	418.5	418.5	0.1	0.13
538.8 nm	538.9	538.9	538.9	0.1	0.13
637.8 nm	637.9	637.9	637.9	0.1	0.13
748.8 nm	748.9	748.9	748.9	0.1	0.13
807.3 nm	807.4	807.4	807.4	0.1	0.13

Photometric Accuracy (Absorbance)	Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
0.0000	0.0000	0.0000	0.0000	0.0000	0.0045
0.2930	0.2930	0.2930	0.2930	0.0000	0.0045
0.5158	0.5158	0.5158	0.5158	0.0000	0.0045
1.0298	1.0298	1.0298	1.0298	0.0000	0.0045

AAS net	0.0000	0.000	0.0000	0.0045
	0.2897	0.289	0.0017	0.0045
	0.5073	0.508	-0.0007	0.0045
	1.0083	1.009	-0.0007	0.0045
	0.0000	0.000	0.0000	0.0045
	0.2818	0.280	0.0016	0.0045

485 nm	0.4595	0.461	0.0015	0.0045
	0.9334	0.933	0.0004 <td>0.0045</td>	0.0045
	0.0000	0.000	0.0000 <td>0.0045</td>	0.0045
	0.2401	0.240	0.0001 <td>0.0045</td>	0.0045
540-1 nm	0.4857	0.486	0.0003 <td>0.0045</td>	0.0045
	0.4668	0.466	0.0003 <td>0.0045</td>	0.0045

	0.0000	0.0000	0.0000	0.0045
540 nm	0.2484	0.2484	0.0004	0.0045
	0.5048	0.505	-0.0016	0.0045
	1.0093	1.004	-0.0008	0.0045
	0.0000	0.000	0.0000	0.0045
$\Delta \lambda$ (nm)	0.0000	0.0000	-0.0000	0.0045

835 nm	0.4971	0.4978	0.4981	0.0045
	0.4971	0.4978	0.4981	0.0045
	0.9720	0.973	0.9701	0.0045

Other features are available

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1000

635 nm	0.0000	0.0000	0.0000	0.0000	0.0045
0.2578	0.2578	0.2578	0.2578	0.0000	0.0045
0.5073	0.5073	0.5073	0.5073	0.0000	0.0045
0.9720	0.9720	0.9720	0.9720	0.0000	0.0045

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CAL/004/01-18-11 Mar 2024

Certificate No. C02020108 Page 3 of 3

Calibration Results:

Without Adjustment

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
238 nm	0.0000	0.0000	0.0000	0.0060
257 nm	0.0000	0.0000	0.0000	0.0060
275 nm	0.0000	0.0000	0.0000	0.0060
313 nm	0.0000	0.0000	0.0000	0.0060
350 nm	0.0000	0.0000	0.0000	0.0060

Stray light *	Standard cut-off	UVC: Wavelength (nm)	UVC: Transmission (%)	Absorbance (A)
260.02 ± 0.11 nm	260.0	260.0	1.7	1.770
341.44 ± 0.11 nm	341.4	341.4	1.4	1.854

Spectral Resolution *	Standard Wavelength (nm)	Peak	Trough	Ratio	SNR
260.02 ± 0.11 nm	260.0	260.0	260.0	1.38	2.96
341.44 ± 0.11 nm	341.4	341.4	341.4	1.38	2.96

Standard Absorbance (A)	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2518	0.2518	0.2518	0.2518	0.2518	0.2518
0.4895	0.4895	0.4895	0.4895	0.4895	0.4895

UVC Absorbance (A)	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2518	0.2518	0.2518	0.2518	0.2518	0.2518
0.4895	0.4895	0.4895	0.4895	0.4895	0.4895

* Correction Marked "Not Tolerable" in this Certificate have been excluded for completeness.

The End of Certificate

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CAL/004/01-18-11 Mar 2024

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

อุปกรณ์ : SPECTROPHOTOMETER รุ่น DR6000
หมายเลข : C02020108

วันที่ (ปี)	วันที่ (ปี)	วันที่ (ปี)	วันที่ (ปี)
18 Mar 2025	18 Mar 2025	18 Mar 2025	18 Mar 2025

General	Pass	Fail
1. การสอบเทียบ (Calibration)	Pass	Fail
2. การตรวจสอบ (Inspection)	Pass	Fail
3. การทำความสะอาด (Cleaning)	Pass	Fail
4. การตรวจสอบ (Inspection)	Pass	Fail
5. การตรวจสอบ (Inspection)	Pass	Fail

Spectrophotometer	Pass	Fail
6. การสอบเทียบ (Calibration)	Pass	Fail
7. การตรวจสอบ (Inspection)	Pass	Fail
8. การตรวจสอบ (Inspection)	Pass	Fail
9. การตรวจสอบ (Inspection)	Pass	Fail
10. การตรวจสอบ (Inspection)	Pass	Fail

pH Meter and Conductivity Meter	Pass	Fail
11. การสอบเทียบ (Calibration)	Pass	Fail
12. การตรวจสอบ (Inspection)	Pass	Fail
13. การตรวจสอบ (Inspection)	Pass	Fail
14. การตรวจสอบ (Inspection)	Pass	Fail
15. การตรวจสอบ (Inspection)	Pass	Fail

Turbidimeter	Pass	Fail
16. การสอบเทียบ (Calibration)	Pass	Fail
17. การตรวจสอบ (Inspection)	Pass	Fail
18. การตรวจสอบ (Inspection)	Pass	Fail
19. การตรวจสอบ (Inspection)	Pass	Fail
20. การตรวจสอบ (Inspection)	Pass	Fail

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CAL/004/01-18-11 Mar 2024

Certificate of Calibration

Certificate No. ...C-00125-RYS-09138

Equipment name : Aerosol Air Sampling Pump
Brand : Oriel
Model/Type : 1000 Plus

Reference Standard Low Flow Meter
Equipment name : Air Flow Meter
Brand : Misco
Model/Type : 1000 Plus

Reference Standard High Flow Meter
Equipment name : Air Flow Meter
Brand : Misco
Model/Type : 1000 Plus

Calibration Data

Air Sampling Pump setting (L/min)	Reference Std. Flow Reading (L/min)	Ang. (L/min)	% Error	Acceptable range (L/min)	Result (Pass/Fail)
20	19.6	19.6	0.4	19 - 21	Pass
50	49.6	49.6	0.4	48 - 52	Pass
100	99.6	99.6	0.4	98 - 102	Pass
200	199.6	199.6	0.4	198 - 202	Pass

END OF REPORT

Calibrated by : [Signature]
Approved by : [Signature]
Issue date : 08-Jul-25

Certificate of System Qualification

System ID : GC-C01141086
Organization Name : ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location : 104 Soi 40 Phrasim 20, 106 A, Phrasim 20, Bangkok 10250

Date : October 22, 2024 9:27:05 AM
EQP Name : Agilent 6890N
EQP Revision : GC-01.33
Overall Qualification Status : Pass

GC-01.33 Login Verification - GC
Login : Successful

Overall GC-01.33 Login Verification - GC Test Status : Pass

System Inspection and Basic Safety and Operation
Name : 7890
Sequenced Status : Pass

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

Initial Pressure Decay
Name : 7890
Front : 55.0

Sequenced Status : Pass
Pressure : 25.0 psi
Pressure Change : 0.0 psi
Agilent Recommended : 0.0 psi

Date : October 22, 2024 9:27:05 AM
System ID : GC-C01141086

Agilent 6890N Compliance Services

Overall Initial Pressure Decay Test Status : Pass

Initial Pressure Accuracy
Name : 7890
Front : 55.0

Sequenced Status : Pass
Pressure : 25.0 psi

Pressure Change : 0.0 psi
Agilent Recommended : 0.0 psi

Overall Initial Pressure Accuracy Test Status : Pass

Initial Pressure Decay
Name : 7890
Back : 55.0

Sequenced Status : Pass
Pressure : 25.0 psi

Pressure Change : 0.0 psi
Agilent Recommended : 0.0 psi

Date : October 22, 2024 9:27:05 AM
System ID : GC-C01141086

2023 by Agent Technology		Agent Event-Driven Configuration Module
Instrument Details		
Purpose		
The service described by the <code>AgentConfiguration</code> interface.		
Details		
System		
System ID	OC-01-CH11481000	
Manufacturer	Agent Technology	
Model	7850	
Flow Control	Manual Data or Event Data Logging	
Test Configuration	Manual Data or Event Data Logging	
Test Configuration		
Injection Technique	Injection Tower	
Sample Identifier	Sample 1	
Unit	Foot	
Detector	Foot	
STM Incident?	No	
Test Configuration		
Injection Technique	Injection Tower	
Sample Identifier	Sample 2	
Unit	Back	
Detector	Back	
STM Incident?	No	
System 1		
Manufacturer	Agent Technology	
Type	Injection Tower	
Name	7850A	
Model Number	G4515A	
Serial Number	CH2010240102	
Firmware Revision	A.11.00	
Usage	System Configuration	
Location	Floor 1	
System Voltage (V)	10	

2021 by Agilent Technologies		Agilent OneView Compliance Summary	
Sample 2			
Manufacturer	Agilent Technologies		
Type	Injection Timer		
Model	7892A		
Model Number	04813A		
Serial Number	CN18380126		
Firmware Revision	A.11.38		
Usage	Sample Injection		
Location	Basil		
Syringe Volume (µL)	10		
Sample 3			
Manufacturer	Agilent Technologies		
Type	Tub		
Model	7892A		
Model Number	04813A		
Serial Number	CN1280230		
Firmware Revision	A.11.23		
Yield Factor	Not installed		
Hardware 1			
Manufacturer	Agilent Technologies		
Model	7890		
Model Number	02040A		
Serial Number	CN11881066		
Firmware Revision	A.5.1E		
Open Type	Standard		

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Unit 1		
Manufacturer	Agilent Technologies	
Model	7890	
Type	SSIL	
Location	Front	
Carrier Gas	Helium	
Control Type	Electronic Pressure Control (EPC)	
Purged Inlet	Yes	
Unit 2		
Manufacturer	Agilent Technologies	
Model	7890	
Type	SSIL	
Location	Back	
Carrier Gas	Helium	
Control Type	Electronic Pressure Control (EPC)	
Purged Inlet	Yes	
Detector 1		
Manufacturer	Agilent Technologies	
Model	7890	
Type	FID	
Carrier	Capillary	
Control Type	Electronic Pressure Control (EPC)	
Location	Front	
Milking Gas	Nitrogen	
Detector 2		
Manufacturer	Agilent Technologies	
Model	7890	
Type	FID	
Carrier	Capillary	
Control Type	Electronic Pressure Control (EPC)	
Location	Back	
Milking Gas	Nitrogen	

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Logged On User Name:	saeedulhaq.tahir@phonelimited.com
Signature Creation Date:	October 22, 2024
Reason for Signature:	Executed protocol and published this original version of document

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Date: October 23, 2024 @ 9:05 AM
System ID: UC-6_C911401000

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[illegible]

Date: October 21, 2024 9:27:09 AM
System ID: GC4-DV11851068

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[illegible]

Date: October 22, 2024 9:27:05 AM

[illegible]

Date: October 22, 2024 @ 2:05 AM
System ID: D0-8_CNV1481088

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
2.62	Determination of semi-volatile organic compounds ² by gas chromatography method with MS detection and calculation of semi-volatile organic compounds sums from measured values	CZ_SOP_D06_03_181 (US EPA 429, US EPA 1608, US EPA 3550)	Sediments, soils, rocks
2.63	Determination of acidic herbicides, drug residues and other pollutants ³ by liquid chromatography method with MS/MS detection and calculation of acidic herbicides, drug residues and other pollutants sums from measured values	CZ_SOP_D06_03_182.A (DIN 38407-35)	Water ⁴
2.64	Determination of acidic herbicides and drug residues ⁵ by liquid chromatography method with MS/MS detection	CZ_SOP_D06_03_182.B (CSN EN 15637, US EPA 1604)	Sediments, sludges, soils, rocks
2.65	Determination of pesticides, pesticide metabolites, drug residues and other pollutants ⁶ by liquid chromatography method with MS/MS detection and calculation of pesticides, pesticide metabolites, drug residues and other pollutants sums from measured values	CZ_SOP_D06_03_183.A (US EPA 535, US EPA 1604)	Water ⁴
2.66	Determination of pesticides, pesticide metabolites, drug residues and other pollutants ⁷ by liquid chromatography method with MS/MS detection and calculation of pesticides, pesticide metabolites, drug residues and other pollutants sums from measured values	CZ_SOP_D06_03_183.B (CSN EN 15637, US EPA 1604)	Sediments, sludges, soils, rocks, building materials ⁸ , materials for building ⁹
2.67	Determination of pesticides, pesticide metabolites, drug residues and other pollutants ¹⁰ by liquid chromatography method with MS/MS detection and calculation of pesticides, pesticide metabolites, drug residues and other pollutants sums from measured values	CZ_SOP_D06_03_183.C (CSN EN 15662)	Vegetable materials ¹⁰ , animal materials ¹¹
2.68	Determination of pesticides ¹² by gas chromatography method with MS or MS/MS detection and calculation of pesticides sums from measured values	CZ_SOP_D06_03_184 (US EPA 514, US EPA 3515A, US EPA 3516)	Water ⁴
2.69	Determination of pesticides and pesticide metabolites ¹³ by derivatization and liquid chromatography method with MS/MS detection and calculation of pesticides and pesticide metabolites sums from measured values	CZ_SOP_D06_03_185.A (CSN ISO 14138)	Water ⁴
2.70	Determination of pesticides and pesticide metabolites ¹⁴ by derivatization and liquid chromatography method with MS/MS detection	CZ_SOP_D06_03_185.B (CSN EN 15638, Journal of Chromatography A, 1292 (2013) 137591, EC Decision No. 2002/673/EC)	Sediments, sludges, soils, rocks
2.71	Determination of complexing substances ¹⁵ by gas chromatography method with MS detection	CZ_SOP_D06_03_186 (CSN EN 15638)	Water ⁴
2.72	Determination of polycyclic aromatic hydrocarbons (PAHs) by liquid chromatography method with MS detection	CZ_SOP_D06_03_187 (Journal of Chromatography A, 1133 (2006) 241-247)	Emission ¹⁶ , emission ¹⁷

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
2.73	Determination of organic acids ¹⁸ by capillary electrophoresis method with UV detection	CZ_SOP_D06_03_188.A (Lames Company manual, Kudajkova, M. Capillary electrophoretic monitoring of microbial growth: determination of organic acids, COPYRIGHT 2004 Eastman Academy Publishers, June 2004 Source Volume: 53 Source Issue: 1 ISSN: 1496-0124)	Water ⁴
2.74	Determination of organic acids ¹⁹ by capillary electrophoresis method with UV detection	CZ_SOP_D06_03_188.B (Lames Company manual, Kudajkova, M. Capillary electrophoretic monitoring of microbial growth: determination of organic acids, COPYRIGHT 2004 Eastman Academy Publishers, June 2004 Source Volume: 53 Source Issue: 2 ISSN: 1496-0124)	Food ²⁰ , composts, digestate
2.75	Determination of gases ²¹ by gas chromatography method with detection PID and TCD	CZ_SOP_D06_03_189 (EPA Method RSK-175)	Water ⁴ , liquid samples ²²
2.76	Low limit determination of volatile organic compounds ²³ by gas chromatography method with MS detection and calculation of volatile organic compounds sums from measured values	CZ_SOP_D06_03_190 (except chap. 12.1, 12.1.1, 13.1.2, 14.1, 16.1) (US EPA 5021, US EPA 8200)	Water ⁴
2.77	Low limit determination of volatile organic compounds ²⁴ by gas chromatography method with MS detection and calculation of volatile organic compounds sums from measured values	CZ_SOP_D06_03_190 (except chap. 12.2, 13.2.1, 13.2.2, 14.2, 16.2) (US EPA 5021, US EPA 8200)	Solid samples ²⁵
2.78	Determination of chlorinated alkanes ²⁶ by gas chromatography method with MS/MS detection	CZ_SOP_D06_03_192.A (CSN EN ISO 12010)	Building materials ²⁶
2.79	Determination of chlorinated alkanes ²⁷ by gas chromatography method with MS/MS detection	CZ_SOP_D06_03_192.B (CSN EN ISO 12010, US EPA 8200)	Building materials ²⁶ , materials for building ²⁷
2.80	Determination of aniline and aniline derivatives ²⁸ by gas chromatography method with MS detection	CZ_SOP_D06_03_193 (US EPA 8270)	Sediments, sludges, soils, rocks
2.81	Determination of chlorinated phenols ²⁹ by liquid chromatography method with MS/MS detection	CZ_SOP_D06_03_194 (JNECS 96, 96(23E))	Water ⁴
2.82	Determination of drug residues ³⁰ by liquid chromatography method with MS/MS detection and results recalculation to the volume of air	CZ_SOP_D06_03_195 (Jin, Y. et al., Biomed. Chromatogr. 2012; 25: 511-516)	Working environment ³⁰
2.83	Determination of epichlorohydrin by gas chromatography method with MS detection	CZ_SOP_D06_03_196 (Agilent Technologies Application list 5996-64382)	Water ⁴
2.84	Determination of perfluorinated and brominated compounds ³¹ by liquid chromatography with MS/MS detection	CZ_SOP_D06_03_197.A (US EPA 537, CSN P-CIN TS 15968)	Water ⁴ , extracts ³¹

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
2.85	Determination of per- and polyfluorinated and brominated compounds ³² by liquid chromatography method with MS/MS detection	CZ_SOP_D06_03_197.B (DIN 38414-14)	Sediments, sludges, soils, rocks
2.86	Determination of volatile organic compounds ³³ by gas chromatography method with TCD and PID detection and calculation of volatile organic compounds percentage from measured values	CZ_SOP_D06_03_198 (CSN EN ISO 11890-2)	Organic solvents
2.87	Determination of fat by gravimetry	CZ_SOP_D06_04_199 (US EPA 1613)	Food, feed ³⁴ , biological materials ³⁵
2.88	Determination of 3-chloro-L-2-propanediol by gas chromatography method with MS detection	CZ_SOP_D06_03_200 (US EPA 8210)	Spices
2.89	Determination of drug residues and narcotic and psychotropic substances ³⁶ by liquid chromatography method with MS detection	CZ_SOP_D06_03_201.A (US EPA 1604)	Water ⁴
2.90	Determination of organic acids ³⁷ by gas chromatography method with PID detection	CZ_SOP_D06_03_202 (Determination of Volatile Fatty Acids in sewage sludge 1979 HSGO EUR 041-75862-4)	Digestates
2.91	Determination of polycyclic aromatic hydrocarbons ³⁸ by gas chromatography with MS/MS detection, calculation of sums of polycyclic aromatic hydrocarbons from measured values and conversion of results to air	CZ_SOP_D06_03_203 (ISO 11338-2, CSN EN 15549)	Emission ¹⁶ , emission ¹⁷
3	Food Organic Chemistry	CZ_SOP_D06_04_202 (CZ_SOP_D06_03_206-1, CSN EN ISO 12666-2)	Food, feed ³⁴ , dietary supplements
3.1	Determination of cholesterol by gas chromatography method with PID detection	CZ_SOP_D06_04_205 (Prof. Ing. Jiří Dvůřek, MD et al., Laboratory Manual of Food Analysis, Journal of Chromatography A, 24 (1994) 672-1, 121-267-272)	Fatty food, non-fatty food, dietary supplements
3.2	Determination of cholesterol by gas chromatography method with PID detection	CZ_SOP_D06_04_206 (CSN EN 12823-1, CSN EN 12822)	Fats, fatty food, non-fatty food, dietary supplements, feed ³⁹ and premixes
3.4	Determination of vitamin C (ascorbic acid) by liquid chromatography method with PID detection	CZ_SOP_D06_04_207 (CSN EN 14130:2004)	Beverages, candy, dietary supplements
3.5	Determination of Soya protein by ELISA by commercial set	CZ_SOP_D06_04_208 (B- Biopharm Manual – Ralscreen Fast Scan)	Food, surface, waste, dietary supplements, feed, vegetables
3.6	Determination of substitute sweeteners ⁴⁰ by liquid chromatography method with PID detection	CZ_SOP_D06_04_209 (CSN EN 12356)	Products, jams, dietary supplements
3.7	Determination of caffeine, theobromine, and theophylline by liquid chromatography method with PID detection	CZ_SOP_D06_04_210 (CSN EN 12356)	Beverages, ices, coffee, cocoa, chocolate

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
3.8	Determination of preserving agents ⁴¹ in food by liquid chromatography method with PID detection	CZ_SOP_D06_04_211 (CSN EN 12356)	Beverages, jams, vegetable and fruit products, dairy and milk products, dietary supplements
3.9	Determination of aflatoxins B ₁ , B ₂ , G ₁ and G ₂ by liquid chromatography method with FLD detection	CZ_SOP_D06_04_212 (CSN EN 14123)	Food with low water content, beverages, feed ⁴²
3.10	Determination of the content of ochratoxin A by liquid chromatography method with FLD detection	CZ_SOP_D06_04_213 (CSN EN 15829, CSN EN 14133, CSN EN 14132)	Food with low water content, beverages, dietary supplements, feed ⁴²
3.11	Determination of nitrates by liquid chromatography method with FLD detection	CZ_SOP_D06_04_214 (CSN EN 15850)	Cereals, feed ⁴²
3.12	Determination of aflatoxin M ₁ by liquid chromatography method with FLD detection	CZ_SOP_D06_04_215 (CSN EN 14130)	Milk, dried milk, and products from them
3.13	Determination of patulin by liquid chromatography method with PID detection	CZ_SOP_D06_04_216 (CSN EN 14177)	Food with high water content, dietary supplements, beverages
3.14	Determination of deoxynivalenol by liquid chromatography method with PID detection	CZ_SOP_D06_04_217 (CSN EN 15891)	Food with low water content, dietary supplements, feed ⁴²
3.15	Determination of vitamins B ₁ , B ₂ and B ₆ by liquid chromatography method with FLD detection	CZ_SOP_D06_04_218 (CSN EN 14122, CSN EN 14121, CSN EN 14665)	Fats, fatty food, non-fatty food, feed ⁴³ , dietary supplements
3.16	Determination of folic acid by ELISA method by commercial set	CZ_SOP_D06_04_219 (R-Biopharm – Ralscreen Folic Acid Manual)	Food, feed ⁴³ , dietary supplements
3.17	Determination of biotin by ELISA method by commercial set	CZ_SOP_D06_04_220 (Demediate Manual)	Milk, milk products, cereals and cereal products, non-alcoholic beverages, baby food, feed ⁴³ , dietary supplements
3.18	Determination of gluten (gliadin) by sandwich enzyme immunoassay ELISA Method by commercial set	CZ_SOP_D06_04_221.A (R-Biopharm – Ralscreen Gliadin Manual)	Fatty food, non-fatty food, dietary supplements
3.19	Determination of gluten (gliadin) by competitive immunoassay ELISA Method by commercial set	CZ_SOP_D06_04_221.B (R-Biopharm – Ralscreen Gliadin Manual)	Fermented and hydrolyzed foods and beverages ⁴⁴
3.20	Determination of celiac allergy by ELISA method by commercial set	CZ_SOP_D06_04_222 (Bio-Check – Celiac Check Manual)	Food, dietary supplements, swabs
3.21	Determination of β-lactoglobulin allergy by ELISA method with a commercial kit	CZ_SOP_D06_04_223 (Bio-Check – β-lactoglobulin Check Manual)	Food, dietary supplements, swabs
3.22	Determination of mastitis allergen by ELISA method by commercial set	CZ_SOP_D06_04_224 (Bio-Check – Mastard Check Manual)	Food, dietary supplements, swabs

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
3.23	Determination of toxin by liquid chromatography method with PID detection	CZ_SOP_D06_04_225 (CSN EN 15802)	Fatty food, non-fatty food, feed ⁴³ , dietary supplements
3.24	Determination of mycotoxins by ELISA method by commercial set	CZ_SOP_D06_04_226 (Biotek Nergon – Serya assay Biotek Manual)	Milk products
3.25	Determination of parabens by liquid chromatography method with PID detection	CZ_SOP_D06_04_227 (HPLC for Food Analysis, Agilent Technology 1996-2001)	Cosmetics
3.26	Determination of peanut protein allergen by ELISA method by commercial set	CZ_SOP_D06_04_228 (Bio-Check – Peanut Check Manual)	Fatty food, non-fatty food, feed ⁴³ , dietary supplements
3.27	Determination of fat-soluble vitamins (D2 and D3) by two-dimensional liquid chromatography method with PID detection	CZ_SOP_D06_04_229 (AN-109 Thermo – Application list)	Fats, fatty food, non-fatty food, dietary supplements, feed ⁴³ , premixes
3.28	Determination of Vitamin B12 by ELISA method by commercial set	CZ_SOP_D06_04_230 (R-Biopharm – Ralscreen Fast Vitamin B12 Manual)	Food, feed ⁴³ , dietary supplements
3.29	Determination of fat-soluble vitamins (A, E) by liquid chromatography method with FLD detection	CZ_SOP_D06_04_231 (CSN EN 128 23-1, CSN EN 15802)	Cosmetic, masks
3.30	Determination of water-soluble vitamins (vitamin C) by liquid chromatography method with FLD detection	CZ_SOP_D06_04_232 (CSN EN 14130:2004)	Cosmetic, masks
3.31	Determination of haemolysates by ELISA method by commercial set	CZ_SOP_D06_04_234 (Bio-Check – Haemolys Check Manual)	Food, dietary supplements, swabs
3.32	Determination of egg allergen (egg white proteins) by ELISA method by commercial set	CZ_SOP_D06_04_235 (Bio-Check – Egg Check Manual)	Food, dietary supplements, swabs
3.34	Determination of milk allergen (casein and β-lactoglobulin) by ELISA method by commercial set	CZ_SOP_D06_04_236 (Bio-Check – Milk Check Manual)	Food, dietary supplements, swabs
3.35	Determination of sesame allergen by ELISA method by commercial set	CZ_SOP_D06_04_237 (Bio-Check – Sesame Check Manual)	Food, dietary supplements, swabs
3.36	Determination of penicillinic acid by liquid chromatography with PID detection	CZ_SOP_D06_04_238	Dietary supplements
4	Water Microbiology	CSN 75 7841	Surface, ground, waste, pool water
4.1	Determination of mesophilic bacteria by cultivation	CSN 75 7842	Surface, ground, waste, pool water
4.2	Enumeration of intestinal enterococci by membrane filtration	CSN EN ISO 7899-2 STN EN ISO 7899-2	Drinking, bottled, pool, raw, treated ⁴⁵ , ground water
4.3	Enumeration of coliform bacteria by membrane filtration	CSN EN ISO 6222 STN EN ISO 6222	Drinking, bottled, natural, mineral, pool, raw, treated ⁴⁵ , ground water
4.4	Enumeration of coliform bacteria by membrane filtration	CSN EN ISO 6222 STN EN ISO 6222	Drinking, bottled, natural, mineral, pool, raw, treated ⁴⁵ , ground water

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
4.5	Enumeration of thermotolerant coliform bacteria and <i>Escherichia coli</i> by membrane filtration	CSN 75 7835	Drinking, surface, ground, pool, waste water
4.6	Enumeration of <i>Escherichia coli</i> and coliform bacteria by membrane filtration	CSN EN ISO 9308-1 STN EN ISO 9308-1	Drinking, pool, bottled, raw, treated ⁴⁵ , ground water
4.7	Enumeration of <i>Pseudomonas aeruginosa</i> by membrane filtration	CSN EN ISO 16256 STN EN ISO 16256	Drinking, bottled, natural mineral, pool, surface, waste water
4.8	Enumeration of coliform-positive streptococci (<i>Streptococcus faecalis</i> and other species) by membrane filtration	CSN EN ISO 8199	Pool, surface, waste, drinking, ground water
4.9	Enumeration of <i>Candida</i> yeasts by membrane filtration	CSN EN ISO 258	Pool, surface, waste water
4.10	Enumeration of <i>Clostridium perfringens</i> by membrane filtration	CSN EN ISO 258 (GR 25/2004 Coll., Annex 6, GR No. 28/2004 Coll., Annex 3)	Drinking, bottled, pool, natural mineral, pool, surface, waste water
4.11	Detection of <i>Salmonella</i> by membrane filtration	CSN EN 15820	Drinking, bottled, waste water
4.12	Determination of biotoxins by microscopy	CSN 75 7712 STN 757112	Drinking, bottled, waste water
4.13	Determination of aflatoxin by microscopy	CSN 75 7713 STN 757113	Drinking, bottled, waste water
4.14	Detection and enumeration of <i>Legionella</i> by cultivation and membrane filtration	CSN EN ISO 11731	Drinking, bottled, waste water
4.15	Detection and enumeration of <i>Legionella</i> by cultivation	CSN EN ISO 11731	Sediments, effluents, swabs
4.16	Detection and enumeration of <i>Legionella</i> by cultivation	CSN EN ISO 11731	Swabs
4.17	Enumeration of Coliform bacteria by membrane filtration	CSN 75 7837	Non-disinfected water
4.18	Determination of sulphate of the species of sulfite-reducing anaerobes (<i>Clostridium</i>)	CSN EN 26461-2	Water ⁴⁶
4.19	Microbiological testing of water for haemolysis. Enumeration of viable microorganisms	CZ_SOP_D06_04_266 (CSN EN ISO 23500-3)	Dialysis water
4.20	Microbiological testing of dialysis fluid for haemolysis. Enumeration of viable microorganisms	CZ_SOP_D06_04_267 (CSN EN ISO 23500-5)	Dialysis fluid
4.21	Determination of the concentration of bacterial endotoxins by the LAL test: turbidimetric kinetic method	CSN EN ISO 7446-2 (Ph. Eur. chapter 2.6.14)	Dialysis water, dialysis fluid, water purified, extracts of chemical substances and agents
4.22	Determination of the total number of microorganisms	CZ_SOP_D06_04_269 (Ph. Eur. chapter 6.3.008, 6.3.1927, 6.3.0169)	Dialysis water, dialysis fluid, water purified, water highly purified, water for injection

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ALS Crech Republic, s.r.o. Na Harfě 336/9, 190 00 Praha 9 - Vršovský			
Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
4.23	Test for specific micro-organisms - Detection of <i>Pseudomonas Aeruginosa</i> bacteria	CZ_SOP_D06_04_270 (Ph. Eur. chapter 6.3.008, 6.3.1927, 6.3.0169)	Water purified, water for injection
5	Microbiology	CSN EN ISO 4832-1	Food, feed ⁴⁷ , dietary supplements
5.1	Enumeration of microorganisms by cultivation	CSN EN ISO 4832-1	Food, feed ⁴⁷ , dietary supplements
5.2	Enumeration of coliform bacteria by cultivation	CZ_SOP_D06_04_302 (CSN EN 15894)	Food, feed ⁴⁷ , dietary supplements
5.4	Enumeration of <i>Bacillus cereus</i> by cultivation	CSN EN ISO 16888-1	Food, feed ⁴⁷ , dietary supplements
5.5	Enumeration of coliform-positive streptococci (<i>Streptococcus faecalis</i> and other species) by cultivation	CSN EN ISO 8199	Food, feed ⁴⁷ , dietary supplements
5.6	Enumeration of <i>Clostridium perfringens</i> by cultivation	CSN EN ISO 258	Food, feed ⁴⁷ , dietary supplements
5.7	Detection of <i>Salmonella</i> by cultivation	CZ_SOP_D06_04_307 (except chap. 9.1.2, CSN EN ISO 6579, AHEM No. 12008)	Food, feed ⁴⁷ , dietary supplements
5.8	Detection of <i>Salmonella</i> by cultivation	CZ_SOP_D06_04_307 (except chap. 9.1.1, CSN EN ISO 6579, AHEM No. 12008)	Food, feed ⁴⁷ , dietary supplements
5.9	Detection of <i>Salmonella</i> by cultivation	CZ_SOP_D06_04_308 (O.K. Servis BioPharm Manual)	Food, feed ⁴⁷ , dietary supplements
5.10	Determination of inhibiting substances by DeLacoste method	CSN EN ISO 21528-1	Milk
5.11	Detection of <i>Salmonella</i> by ELISA method - commercial set Solus Salmonella	CSN EN ISO 21528-1	Food, feed ⁴⁷ , dietary supplements
5.12	Enumeration of yeasts and molds by cultivation	CSN EN ISO 21528-1	Food, feed ⁴⁷ , dietary supplements
5.13	Detection of <i>Escherichia coli</i> by cultivation	CSN EN ISO 21528-1	Food, feed ⁴⁷ , dietary supplements
5.14	Enumeration of spore-forming microorganisms by cultivation	CSN EN ISO 21528-1	Food, feed ⁴⁷
5.15	Enumeration of mesophilic lactic acid bacteria by cultivation	CSN EN ISO 21528-1	Food, feed ⁴⁷
5.17	Detection of <i>Shigella</i> spp. by cultivation	CSN EN ISO 21528-1	Food, feed ⁴⁷
5.18	Detection of <i>Campylobacter</i> spp. by cultivation	CSN EN ISO 21528-1	Food, feed ⁴⁷
5.19	Detection of presumptive pathogenic <i>Yersinia enterocolitica</i> by cultivation	CSN EN ISO 10273	Food, feed ⁴⁷
5.20	Enumeration of <i>Enterobacteriaceae</i> by cultivation	CSN EN ISO 21528-2	Food, feed ⁴⁷ , dietary supplements
5.21	Enumeration of beta-glucuronidase-positive <i>Escherichia coli</i> by cultivation	CSN EN 16699-2	Food, feed ⁴⁷ , dietary supplements

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Ordinal number	Test procedure/method name	Test procedure/method identification ¹⁾	Subject of the test
5.22 ²⁾	Detection and enumeration of <i>Listeria monocytogenes</i> by cultivation	CSN EN ISO 11290-1 CSN EN ISO 11290-2	Food, feed ³⁾ , dietary supplements
5.23 ²⁾	Enumeration of potentially toxigenic moulds on special media by cultivation	CZ, SOP, D06, 04_321 (AHEM No. 1/2003)	Food, feed ³⁾
5.24 ²⁾	Enumeration of microorganisms in air by aerocopy and sedimentation method	CZ, SOP, D06, 04_322 (CSN 56 0100:194, Article 149, 150 AHEM No. 1/2002)	Internal air environment
5.25 ²⁾	Determination of microbial contamination of areas, surface of equipment and packages using swab method	CZ, SOP, D06, 04_323 (CSN 56 0100:194, Article 145)	Areas, surface, packaging materials, surface of food
5.26 ²⁾	Enumeration of thermotolerant coliform bacteria and <i>Escherichia coli</i> by cultivation	CZ, SOP, D06, 04_324 (AHEM No. 1/2008, CSN EN 16609-2)	Sludge, bio waste, compost, substrates, animal and human excreta
5.27 ²⁾	Enumeration of enterococci by cultivation	CZ, SOP, D06, 04_325 (AHEM No. 1/2008 CSN EN 78099-2)	Sludge, bio waste, compost, substrates, soils, sand
5.28 ²⁾	Detection of <i>Listeria</i> by ELISA method - commercial set Selenia Listeria	CZ, SOP, D06, 04_326 (Selenia Manual)	Food, feed ³⁾ , dietary supplements
5.29 ²⁾	Determination of the number of coagulase-positive staphylococci (<i>Staphylococcus aureus</i> and other species), method of detection	CSN EN ISO 6888-3	Food, feed ³⁾ , dietary supplements
5.30 ²⁾	Determination of low numbers of <i>Bacillus</i> spp. - method of detection	CSN EN ISO 21871	Food, feed ³⁾ , dietary supplements
5.31 ²⁾	Detection of <i>Cronobacter</i> (<i>Enterobacter</i>) <i>sakazakii</i> by cultivation	CSN EN ISO 22964	Milk and milk products
5.32 ²⁾	Detection and enumeration of aerobic mesophilic bacteria by cultivation	CSN EN ISO 21149	Cosmetics
5.33 ²⁾	Detection of <i>Pseudomonas aeruginosa</i> by cultivation	CSN EN ISO 22171 CSN EN ISO 18415	Cosmetics
5.34 ²⁾	Detection of <i>Staphylococcus aureus</i> by cultivation	CSN EN ISO 22178 CSN EN ISO 18415	Cosmetics
5.35 ²⁾	Detection of <i>Candida albicans</i> by cultivation	CSN EN ISO 18416 CSN EN ISO 18415	Cosmetics
5.36 ²⁾	Detection of <i>Escherichia coli</i> by cultivation	CSN EN ISO 11510 CSN EN ISO 18415	Cosmetics
5.37 ²⁾	Enumeration of yeasts and moulds by cultivation	CSN EN ISO 16212	Cosmetics
5.38 ²⁾	Evaluation of antimicrobial protection of cosmetic product, test of conservation effectiveness	CZ, SOP, D06, 04_336 (CSN EN ISO 1930, Ph. Eur., chapter 5.1.3)	Cosmetics
5.39 ²⁾	Horizontal method for the detection and enumeration of presumptive <i>Escherichia coli</i> - Technique of most probable number	CSN ISO 7251 specie article 9.2	Food, feed ³⁾
5.40 ²⁾	Microbiological testing of non-sterile products Determination of the number of microorganisms	CSN EN ISO 4438 (Ph. Eur., chapter 2.6.12)	Pharmaceutical products, intermediates, raw materials, veterinary medicines, biopreparations, dietary supplements
5.41 ²⁾	Microbiological testing of non-sterile products Tests for specific micro-organisms	CZ, SOP, D06, 04_339 (Ph. Eur., chapter 2.6.13)	Pharmaceutical products, intermediates, raw materials

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Entity accredited according to ČSN EN ISO/IEC 17025:2018:			
ALS Crech Republic, s.r.o. Na Harfě 3369, 190 00 Praha 9 - Vršovice			
Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
7	Radioactivity		
7.1 ¹	Determination of gross alpha activity by measuring evaporated residue in a mixture with ZnS(Au) scintillator	ČSN 75 7611, chap. 4	Water ¹ , extracts ¹
7.2 ¹	Determination of gross alpha activity by measuring incinerated evaporated residue by means of proportional detector	ČSN 75 7611, chap. 5	Water ¹ , extracts ¹
7.3 ¹	Determination of gross beta activity by measuring evaporated residue by means of proportional detector and calculation of gross beta activity corrected for potassium 40 from measured values	CZ_SOP_D06_07_361 (ČSN 75 7612, ČSN EN ISO 9697, IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public source and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017)	Water ¹ , extracts ¹
7.4 ¹	Determination of radon 226 after concentration by scintillation counter	ČSN 75 7622	Water ¹ , extracts ¹
7.5 ¹	Determination of radon 222 by scintillation counter after its transportation into scintillation chamber using vacuum	CZ_SOP_D06_07_363.A (ČSN 75 7624, chap. 5)	Water ¹ , extracts ¹
7.6 ¹	Determination of radon 222 by scintillation counter with a well type NaI(Tl) crystal	CZ_SOP_D06_07_363.B (ČSN 75 7624, chap. 6)	Water ¹ , extracts ¹
7.7 ¹	Determination of radon 222 by liquid scintillation counting method (LSC)	CZ_SOP_D06_07_363.C (ČSN 75 7625)	Water ¹
7.8 ¹	Determination of uranium by spectrophotometry after separation on silica gel and calculation of ²³⁸ U from measured values	CZ_SOP_D06_07_364 (ČSN 75 7614)	Water ¹ , extracts ¹
7.9 ¹	Determination of tritium volume activity by liquid scintillation counting method (LSC)	CZ_SOP_D06_07_365 (ČSN EN ISO 9698)	Water ¹ , extracts ¹
7.10 ¹	Determination of polonium 210 after its concentration by ZnS(Ag) by the measurement of emitted scintillations	ČSN 75 7626	Water ¹ , extracts ¹
7.11 ¹	Determination of polonium 210 after natural decomposition and after its concentration by ZnS(Ag) by the measurement of emitted scintillations	CZ_SOP_D06_07_366 (ČSN 75 7626)	Soils, sludge, sediments, filters
7.12 ¹	Non-destructive determination of radionuclides ¹ by high resolution gamma-spectrometry and calculation of the mass activity index (A ₁) from the measured radioactive activities of individual radionuclides	CZ_SOP_D06_07_367 (ČSN EN ISO 10701, IAEA Recommendation "Measurement and evaluation of natural radionuclides in building materials", DB-RO-5.2 (Rev. 0.0), Prague 2017)	Solid samples with granularity up to 4 mm, food, water ¹
7.13 ¹	Determination of gross alpha mass activity by direct measurement of the sample by means of alpha radiation analyzer	CZ_SOP_D06_07_368 (ČSN 75 7611, ISO 9696)	Solid samples ¹ pulverized for grain size below 100 µm, liquid samples ¹ with boiling point above 100 °C
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ALS Crech Republic, s.r.o. Na Harfě 3369, 190 00 Praha 9 - Vršovice			
Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
7.14 ¹	Determination of gross beta mass activity by direct measurement of the sample by means of beta radiation analyzer	CZ_SOP_D06_07_369 (ČSN 75 7612, ČSN EN ISO 9697)	Solid samples ¹ pulverized for grain size below 100 µm, liquid samples ¹ with boiling point above 100 °C
7.15 ¹	Determination of lead 210 after its sorption on ZnS-coated by beta radiation analyzer	CZ_SOP_D06_07_370 (ČSN 75 7627)	Water ¹ , extracts ¹ (with low content of suspended solids or filtered through 0.45 µm filter)
7.16 ¹	Determination of gross alpha activity by co-precipitation method by measurement of filtered precipitate by means of proportional detector	CZ_SOP_D06_07_371 (ČSN 75 7610)	Water ¹ , extracts ¹
7.17 ¹	Calculation of Inductive Dose (ID ₉₀) from the measured values of volume activities of individual radionuclides	CZ_SOP_D06_07_372 (IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public sources and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017, Council Directive 2013/51/EURATOM of 22. 10. 2013)	Water ¹
7.18 ¹	Determination of strontium 90 by proportional detector after separation	CZ_SOP_D06_07_373 (ASTM D5811-06)	Water ¹
7.19 ¹	Determination of strontium 90 by proportional detector after separation	CZ_SOP_D06_07_374 (ASTM D5811-06, IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public sources and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017, Council Directive 2013/51/EURATOM of 22. 10. 2013)	Water ¹
7.20 ¹	Determination of strontium 90 by proportional detector after separation	CZ_SOP_D06_07_375 (ASTM D5811-06, IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public sources and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017, Council Directive 2013/51/EURATOM of 22. 10. 2013)	Water ¹
7.21 ¹	Determination of carbon 14 by liquid scintillation method after separation	CZ_SOP_D06_07_376 (ASTM D5811-06, IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public sources and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017, Council Directive 2013/51/EURATOM of 22. 10. 2013)	Water ¹ , soils, sludge, sediments, bioaccumulators ¹ , food
7.22 ¹	Determination of total volume alpha and beta activities by liquid scintillation counting method (LSC)	CZ_SOP_D06_07_377 (ASTM D5811-06, IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public sources and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017, Council Directive 2013/51/EURATOM of 22. 10. 2013)	Non valued water
7.23 ¹	Determination of radium 226 and 228 by liquid scintillation counting method (LSC)	CZ_SOP_D06_07_378 (ASTM D5811-06, IAEA Recommendation, Measurement and assessment of the content of natural radionuclides in drinking water from public sources and bottled water", DB-RO-5.2 (Rev. 0.0), Prague 2017, Council Directive 2013/51/EURATOM of 22. 10. 2013)	Biological materials ¹ , food
8	Hydrology		
8.1 ¹	Determination of kinematic viscosity by viscometer and viscosity index by calculation	CZ_SOP_D06_08_400 (ČSN EN ISO 3104, ČSN EN ISO 2809, ASTM D779, ASTM D7042)	Liquid fuels, lubricating oils
8.2 ¹	Determination of flash point - Pensky-Martens closed cup method by flash point analyzer	CZ_SOP_D06_08_401 (ČSN EN ISO 2719, ASTM D93)	Diesel, light fuel fuels
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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
8.3 ¹	Determination of liquid cleanliness code by particle counter	CZ_SOP_D06_08_402 (User Manual for Laser Net Fines-C use and maintenance, ČSN ISO 4406)	Liquid fuels, lubricating oils
8.4 ¹	Determination of base number by potentiometric titration	CZ_SOP_D06_08_403 (ČSN ISO 3771)	Lubricating oils, additives to lubricants
8.5 ¹	Determination of neutralization number by potentiometric titration	CZ_SOP_D06_08_404 (ČSN ISO 6619)	Lubricating oils, additives to lubricants
8.6 ¹	Determination of water content by coulometric method	CZ_SOP_D06_08_405 (ASTM D6304)	Liquid fuels, lubricating oils
8.7 ¹	Determination of flash point and burning point in open cup according to Cleveland by flash point analyzer	CZ_SOP_D06_08_406 (ASTM D92)	Liquid fuels, lubricating oils
8.8 ¹	Determination of Cold Filter Plugging Point (CFPP) by the method of gradual cooling	CZ_SOP_D06_08_407 (ČSN EN 116, ASTM D6371)	Diesel, light fuel fuels
9	General Food Chemistry		
9.1	Determination of organic acids ¹ content by capillary isotachopheresis method	CZ_SOP_D06_04_450 (Regulation, Laboratory technique - Application sheets No. 35, 39, 70)	Food, feed ¹
9.2 ¹	Gravimetric determination of fat	CZ_SOP_D06_04_451 (ČSN ISO 1443, ČSN ISO 1444, ČSN 66 7092.7)	Food, feed ¹
9.3 ¹	Gravimetric determination of dry matter and calculation of moisture from measured value	CZ_SOP_D06_04_452 (Journal of AOAC International vol 88, No.1, 2005; Journal of AOAC International vol 86, No.6, 2003)	Food, feed ¹ , dietary supplements
9.4 ¹	Determination of nitrate and nitrite by capillary isotachopheresis	CZ_SOP_D06_04_453 (ITP, Application sheet No. 33 VILLA, LABEČ-2.0.0)	Food, feed ¹
9.5 ¹	Determination of phosphates by capillary isotachopheresis	CZ_SOP_D06_04_454 (ITP, Application sheet No. 35 VILLA, LABEČ-2.0.0)	Food, feed ¹
9.6 ¹	Gravimetric determination of water extract content	ČSN 58 0113, Article 38	Coffee
9.7 ¹	Determination of acid value and acidity by titrimetry	CZ_SOP_D06_04_456 (ČSN EN ISO 1300)	Animal and vegetable fats and oils
9.8 ¹	Determination of polyols ¹ by ion chromatographic method with EC detection	CZ_SOP_D06_04_457 (ČSN EN 15006, ČSN EN ISO 2017, ČSN EN 15006)	Food, feed ¹ , dietary supplements
9.9 ¹	Gravimetric determination of ash	CZ_SOP_D06_04_458 (ČSN EN 15006)	Food, feed ¹
9.10 ¹	Determination of crude fibre by oxidation hydrolysis method	CZ_SOP_D06_04_459 (ČSN EN 15006)	Food ¹
9.11 ¹	Determination of pH by potentiometry	CZ_SOP_D06_04_460 (ČSN EN ISO 1842)	Food, feed ¹
9.12 ¹	Determination of sand by gravimetry	CZ_SOP_D06_04_461 (ČSN 56 0246-12)	Food, feed ¹
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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
9.13 ¹	Determination of relative density of liquids by pycnometer	CZ_SOP_D06_04_462 (ČSN EN 1131)	Low viscosity liquids
9.14 ¹	Titrimetric determination of acidity	CZ_SOP_D06_04_463 (ČSN ISO 750, ČSN 56 0116, ČSN 57 0530, ČSN EN 12147, ČSN 56 0246-13)	Fruit juices, fruit and vegetable products, mayonnaise, water-soluble food, dairy products, bakery products
9.15 ¹	Determination of moisture content - distillation method	CZ_SOP_D06_04_464 (ČSN EN 9092-2)	Spices, mixed condiments
9.16 ¹	Determination of starch content by enzymatically by commercial test Measurex	CZ_SOP_D06_04_465 (AOAC Method 985.29)	Cereals, baking products, cereal feeds ¹
9.17 ¹	Determination of starch content by polarimetry	CZ_SOP_D06_04_466 (O.I.K. SERVIS company Chloride Analyser manual)	Food, feed ¹ , dietary supplements
9.18 ¹	Determination of chloride by coulometric titration	CZ_SOP_D06_04_467 (O.I.K. SERVIS company Chloride Analyser manual)	Food, feed ¹ , dietary supplements
9.19 ¹	Determination of reducing sugars and total sugar after iodometric inversion and calculation of non-reducing sugar from measured values	ČSN 56 0146	Food, feed ¹ , dietary supplements
9.20 ¹	Determination of alkalinity of water-soluble ash by titration	ČSN ISO 1578	Tea
9.21 ¹	Gravimetric determination of total ash	ČSN ISO 1575	Tea
9.22 ¹	Gravimetric determination of water-soluble and water-insoluble ash	ČSN ISO 1576	Tea
9.23 ¹	Gravimetric determination of acid-insoluble ash	ČSN ISO 1577	Tea
9.24 ¹	Gravimetric determination of water extract	ČSN ISO 9768	Tea
9.25 ¹	Gravimetric determination of loss in mass at 105 °C	ČSN ISO 1573	Tea
9.26 ¹	Determination of total nitrogen by Dumas method by analyser and protein calculation from measured values	CZ_SOP_D06_04_475 (ČSN EN ISO 14991, ČSN EN ISO 16634.1, ČSN EN ISO 16634.2)	Food, feed ¹
9.27 ¹	Volumetric determination of volatile acids (essential oils) by distillation with steam	CZ_SOP_D06_04_477 (ČSN 56045, ČSN 57016-3, ČSN 580 070-3)	Spices, spicing agents, herbs
9.28 ¹	Determination of the weight of consumer packaging of food and animal feeding stuff products by gravimetry	ČSN EN ISO 8571	Dietary supplements
9.29 ¹	Determination of the mean content in meat products and products containing meat by calculation from measured values ¹	CZ_SOP_D06_04_478 (Commission Directive No. 2001/101/EC, Commission Regulation No. 2004/2002/EC, Commission Regulation No. 2429/2004/EC, Decree 130/2009 Coll.)	Meat products
9.30 ¹	Determination of carbohydrates and energy values by calculation from measured values ¹	CZ_SOP_D06_04_479 (Regulation (EU) 1169/2011, ČSN 32009 Coll.)	Food, raw materials for production of food, dietary supplements
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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
9.31 ¹	Determination of non-protein content substances by calculation ¹	ČSN 46 7092-24	Feed ¹
9.32 ¹	Determination of 4-hydroxyproline by spectrophotometry and calculation of collagen from measured values	CZ_SOP_D06_04_481 (ISO 3496)	Meat products
9.33 ¹	Determination of fat content by NMR method	CZ_SOP_D06_04_482 (Journal of AOAC International vol 88, No. 1, 2005, Journal of AOAC International vol 86, No. 6, 2003)	Selected food ¹ and raw materials for production of food, feed ¹ , dietary supplements
9.34 ¹	Volumetric determination of peroxide value	CZ_SOP_D06_04_483 (ČSN EN ISO 3900)	Fats and vegetable oils
9.35 ¹	Determination of water activity by capacitive sensor method	ČSN ISO 21807	Food, raw materials for production of food, dietary supplements
9.36 ¹	Determination of net muscle protein by calculation from the content of collagen and protein	CZ_SOP_D06_04_485 (Decree No. 69/2016 Coll.)	Meat, meat products
9.37 ¹	Identification of synthetic dyes ¹ by thin-layer chromatography method	CZ_SOP_D06_04_486 (Drozdák J., Laboratory Manual of Food Analysis, 1984)	Food
9.38 ¹	Determination of piperine content by spectrophotometry	ČSN ISO 5564	Black pepper and white pepper, whole or ground
9.39 ¹	Determination of starch in meat products by titration	CZ_SOP_D06_04_488 (BS 4401 Part 12:1979 Determination of Starch in Meat Products)	Meat products
9.40 ¹	Determination of total sulphur dioxide after distillation by titration	Laboratory Manual of Food Analysis, SNTL 1981	Food and raw materials for food production, dietary supplements
9.41 ¹	Determination of total sulphur dioxide after distillation by ITP	CZ_SOP_D06_04_489 (ČSN EN ISO 6658, ČSN EN ISO 15006, SNTL 1981, Laboratory Manual of Food Analysis, SNTL 1981)	Food and raw materials for food production, dietary supplements
9.42 ¹	Sensory testing - description test	CZ_SOP_D06_04_490 (ČSN EN ISO 6658, ČSN EN ISO 8589, ČSN EN ISO 12599, ČSN EN ISO 13306-1.2)	Food, cosmetics, packaging materials for food, consumer goods
9.43 ¹	Sensory testing - comparison to standard	CZ_SOP_D06_04_491 (ČSN EN ISO 8589, ČSN EN ISO 12599, ČSN EN ISO 13306-1.2)	Food, cosmetics, packaging materials for food, consumer goods
9.44 ¹	Assessment of characteristics of food	CZ_SOP_D06_04_492 (ČSN EN ISO 8589, ČSN EN ISO 12599, ČSN EN ISO 13306-1.2)	Food
9.45 ¹	Determination of density by density meter	CZ_SOP_D06_04_493 (ČSN 57 0530)	Milk and milk products
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Ordinal number	Test procedure/method name	Test procedure/method identification ¹	Subject of the test
9.46 ¹	Determination of sugars ¹ by ion chromatography method with EC detection	CZ_SOP_D06_04_494 (ČSN EN ISO 1300)	Food, feed ¹ , dietary supplement
9.47 ¹	Determination of ethanol after distillation by gravimetry	CZ_SOP_D06_04_495 (ČSN EN 15006, ČSN 56 010-5, ČSN 56 0210, ČSN 56 0216)	Alcoholic beverages
Annex: Flexible scope of accreditation			
Ordinal numbers of tests: 1.1; 1.12; 1.15; 1.18; 1.41; 1.44; 1.48; 1.51; 1.67; 1.68; 1.70; 1.84; 1.91; 1.113; 1.116; 1.128; 1.131; 1.132; 1.138; 1.140; 1.146; 1.151; 1.152; 1.157; 1.159; 1.165; 1.178; 1.181 2.1; 2.14; 2.16; 2.34; 2.38; 2.41; 2.43; 2.46; 2.51; 2.55; 2.57; 2.86; 2.88; 2.91 3.1; 3.22; 3.24; 3.36 6.1; 6.11 7.3; 7.12; 7.17 9.1; 9.8; 9.37; 9.46			
The Laboratory is authorized to modify the test methods listed in the Annex within the specified scope of accreditation provided the measuring principle is observed. The flexible approach to the scope of accreditation cannot be applied to the tests not included in the Annex.			
Sampling:			
Ordinal number	Sampling procedure name	Sampling procedure identification ²	Subject of sampling
11.1.4.5.6.7.8.9	Sampling of grab sample of surface water manually	CZ_SOP_D06_01_V01 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Surface water
11.1.4.5.6.7.8.9	Sampling of grab sample of waste water manually	CZ_SOP_D06_01_V02 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Waste water ¹
11.1.4.5.6.7.8.9	Sampling of drinking water and hot drinking water manually	CZ_SOP_D06_01_V03 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Drinking water, hot water
11.1.4.5.6.7.8.9	Sampling of surface swab manually	CZ_SOP_D06_01_V04 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Contaminated surfaces
11.1.4.5.6.7.8.9	Sampling of sludge from sewage and treatment plants manually	CZ_SOP_D06_01_V05 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Sludge from water treatment plants, sludge dumps
11.1.4.5.6.7.8.9	Sampling of bottom sediments manually	CZ_SOP_D06_01_V06 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Bottom sediments from streams and reservoirs
11.1.4.5.6.7.8.9	Sampling of soils manually	CZ_SOP_D06_01_V07 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Soils
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Appendix is an integral part of Certificate of Accreditation No: 73/2022 of 14/02/2022			
Entity accredited according to ČSN EN ISO/IEC 17025:2018:			
ALS Czech Republic, s.r.o. Na Harfě 336/9, 190 00 Praha 9 - Vršovice			
Ordinal number ¹	Sampling procedure name	Sampling procedure identification ¹	Subject of sampling
11.1.4.5.6.7.8.9	Sampling of mixed sample of waste water manually and using an automatic sampler	CZ_SOP_D06_01_V04 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Waste water ¹
11.1.4.5.6.7.8.9	Sampling of treated waste water manually	CZ_SOP_D06_01_V05 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Treated water ¹
11.1.4.5.6.7.8.9	Sampling of water from artificial bathing site manually	CZ_SOP_D06_01_V06 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14, ČSN EN ISO 19458, ČSN EN 15286-2, Decree No. 238/2001 (Coll.)	Pond water and filling water of artificial bathing sites
11.1.4.5.6.7.8.9	Sampling of ground water from boreholes and wells	CZ_SOP_D06_01_V07 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Ground water from boreholes and wells
11.1.4.5.6.7.8.9	Sampling of surface swab manually	CZ_SOP_D06_01_V08 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Contaminated surfaces
11.1.4.5.6.7.8.9	Sampling of sludge from sewage and treatment plants manually	CZ_SOP_D06_01_V09 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 19458)	Sludge from water treatment plants, sludge dumps
11.1.4.5.6.7.8.9	Sampling of bottom sediments manually	CZ_SOP_D06_01_V10 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-4, ČSN EN ISO 5667-6, ČSN EN ISO 5667-7, ČSN EN ISO 5667-14)	Bottom sediments from streams and reservoirs
11.1.4.5.6.7.8.9	Sampling of soils manually	CZ_SOP_D06_01_V11 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN EN ISO 5667-13, ČSN EN ISO 5667-14)	Soils

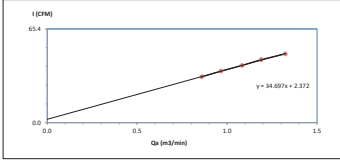
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High Volume Air Sampler Calibration Worksheet

Project Site :	UACI (Thailand) Co., Ltd	Barometric Pressure (mm Hg) :	744.7
Calibrate Location :	U/VicTan/Minzhu (Ban Wang Tan (BKK))	Temperature (°C) :	32.9
Calibrate Date :	25-Aug-25	High Volume ID :	RYG_P50399
CalibrationSheet No.:	C-250825-RYG_P50399	High Volume Model :	TE-5009X
Calibrator ID :	RYG_P50206	High Volume S/N :	5683
Calibrator Model :	TE-5020A	Calibrator Slope :	0.92987
Calibrator S/N :	1543	Calibrator Intercept :	-0.01578

Test No.	Delta H ₂ O (inch)	Q _{air} (m³/min)	I : Chart (CFM)	Linear Regression
1	1.5	0.840	32	Slope : 34.6967
2	1.8	0.964	36	Intercept : 2.3728
3	2.4	1.084	40	Correlation Coefficient : 0.9992
4	2.9	1.190	44	
5	3.6	1.324	48	



Calibrated by: *Adi T*
(Mr. Adisak Tarisorn)
RYG Field Services Scientist (3)

Approved by: *Spt S*
(Mr. Supet Salamek)
Field Services Section Head

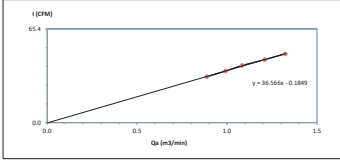
FORM NO. F-06-074 REVISION NO.2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site :	UACI (Thailand) Co., Ltd	Barometric Pressure (mm Hg) :	744.7
Calibrate Location :	U/VicTan/Minzhu (Ban Wang Tan (BKK))	Temperature (°C) :	32.9
Calibrate Date :	25-Aug-25	High Volume ID :	RYG_P50665
CalibrationSheet No.:	C-250825-RYG_P50665	High Volume Model :	TE-5009X
Calibrator ID :	RYG_P50206	High Volume S/N :	5264
Calibrator Model :	TE-5020A	Calibrator Slope :	0.92987
Calibrator S/N :	1543	Calibrator Intercept :	-0.01578

Test No.	Delta H ₂ O (inch)	Q _{air} (m³/min)	I : Chart (CFM)	Linear Regression
1	1.5	0.840	32	Slope : 36.5668
2	1.8	0.991	36	Intercept : -0.1849
3	2.4	1.084	40	Correlation Coefficient : 0.9986
4	3.0	1.210	44	
5	3.6	1.324	48	



Calibrated by: *Adi T*
(Mr. Adisak Tarisorn)
RYG Field Services Scientist (3)

Approved by: *Spt S*
(Mr. Supet Salamek)
Field Services Section Head

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

SARTORIUS



Accredited by
NSC-TISI-TIS 17025
Calibration 0426

Calibration certificate

Calibration Certificate No. 25BKL0001

Object	Electronic non-automatic weighing instrument	This calibration certificate documents the traceability to national standards.
Manufacturer	Sartorius	Uncertainties of measurements are taken into account when only statements of compliance are made.
Type	LA1305-F	This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) ICP-WI 06. This certificate relate and apply this equipment only.
Serial / OM Ident. no.	25409664 RYG_EN0001	
Customer	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)	

Order no.	2230	REVIEW BY: <i>Thantak</i>
Number of pages	4	APPROVED BY: <i>Dha</i>
Date of calibration	20 Feb 2025	NEXT CAL DATE: 20/02/26

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid. The user is obliged to have the object recalibrated at appropriate intervals.

Date	06 Mar 2025	Approval of the Calibration Certificate	Person in charge
		<i>Chonchai Inthana</i> Mr. Chonchai Inthana	<i>Kachen Laies</i> Kachen Laies

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

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Page 1 | 4

Calibration certificate No.: 25BKL0001
Calibration Certificate

Calibration object

Single range instrument

Model	LA1305-F
Serial Number	25409664
QM Ident. no / Inventory no.	RYG_EN0001 ---

Maximum capacity (Max. load)	150.0000 g
Measured range	150.0000 g
Scale interval	0.0001 g

Place of calibration

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

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

Test equipment

Test equipment type	Test equipment ID	Valid until
Thermometer	MHB-382SD shB011342 Traceable to SI unit through DKSH	21 Aug 2025
Test weight set OIML R111 E2	Certificate No.M23081975_E2(Traceable to SI unit through TGS)	23 Aug 2025

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129 Rama 9 Road, Huaykwang
10310 Bangkok

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Calibration certificate No.: 25BKL0001
Calibration Certificate

Adjustment Status

The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions

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

Measurement results | Measurement uncertainties

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

Error of indication

Testload	Indication	Error	Expansion factor	Uncertainty	Uncertainty relative
0.0100 g	0.0100 g	0.0000 g	2.00	0.00017 g	1.7 %
0.0500 g	0.0500 g	0.0000 g	2.00	0.00013 g	0.25 %
0.1000 g	0.1000 g	0.0000 g	2.00	0.00013 g	0.13 %
0.5000 g	0.5000 g	0.0000 g	2.00	0.00013 g	0.026 %
1.0000 g	1.0000 g	0.0000 g	2.00	0.00013 g	0.013 %
2.0000 g	2.0000 g	0.0000 g	2.00	0.00013 g	0.006 %
5.0000 g	5.0000 g	0.0000 g	2.00	0.00013 g	0.0026 %
10.0000 g	10.0000 g	0.0000 g	2.00	0.00013 g	0.0013 %
20.0000 g	20.0000 g	0.0000 g	2.00	0.00014 g	0.00068 %
100.0000 g	100.0000 g	0.0000 g	2.00	0.00021 g	0.00021 %
100.0000 g	149.9999 g	-0.0001 g	2.00	0.00028 g	0.00018 %
Maximum error of indication (E _{max} = 0.0001 g)					

(sE_{ref}) is the quotient of s(E_{ref}) and test load. The uncertainty of measurement (UM) is valid only if error (E) is considered. This test result reference notes on the uncertainty of measurement is not under. Depends to the calibration certificate. The uncertainty of measurement results. Expansion factor: Determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measured test is in the assigned error range.

End of calibration certificate

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10310 Bangkok

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Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

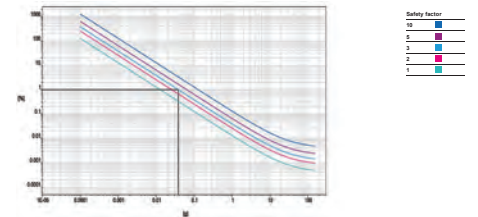
Device adjusted before measurement	Yes
Temperature deviation considered	1.5 K (isoCAL active)
Temperature coefficient considered	1 · 10 ⁻⁴ /K

Uncertainty of the weighing result U_W(W) U_W(W) = 0.00013 g + 3.96 · 10⁻⁴ · R

Reference note: The current uncertainty of measurement is calculated by entering of the reading (R) into this formula. In addition to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated at the standard uncertainty of measurement multiplied with an Expansion factor of 2, interpreted in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measured test is in the assigned error range.

Indication in % from max load	Net indication R	Uncertainty U _W (W)	Uncertainty relative U _W (W)/W
1 %	1.0000 g	0.00014 g	0.0001 %
25 %	37.0000 g	0.00026 g	0.0007 %
50 %	75.0000 g	0.00043 g	0.00057 %
75 %	112.0000 g	0.00058 g	0.00051 %
100 %	150.0000 g	0.00072 g	0.00048 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example	
Process accuracy	1.00 %
Safety factor	3
Minimum sample weight	0.0360 g

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129 Rama 9 Road, Huaykwang
10310 Bangkok

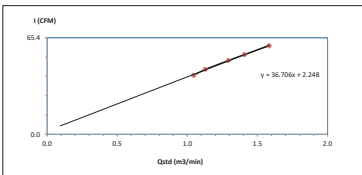
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High Volume Air Sampler Calibration Worksheet

Project Site :	UACI (Thailand) Co., Ltd	Barometric Pressure (mm Hg) :	744.7
Calibrate Location :	U/VicTan/Minzhu (Ban Wang Tan (BKK))	Temperature (°C) :	32.9
Calibrate Date :	25-Aug-25	High Volume ID :	RYG_P50661
CalibrationSheet No.:	C-250825-RYG_P50661	High Volume Model :	TE-5009X
Calibrator ID :	RYG_P50206	High Volume S/N :	6258
Calibrator Model :	TE-5020A	Calibrator Slope :	1.48469
Calibrator S/N :	1543	Calibrator Intercept :	-0.02523

Test No.	Delta H ₂ O (inch)	Q _{air} (m³/min)	I : Chart (CFM)	Linear Regression
1	2.4	1.0447	40	Slope : 36.7061
2	2.8	1.1264	44	Intercept : 2.2480
3	3.7	1.2910	50	Correlation Coefficient : 0.9984
4	4.4	1.4856	54	
5	5.6	1.5825	60	



Calibrated by: *Adi T*
(Mr. Adisak Tarisorn)
RYG Field Services Scientist (3)

Approved by: *Spt S*
(Mr. Supet Salamek)
Field Services Section Head

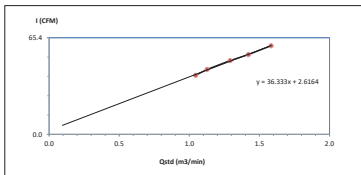
FORM NO. F-06-073 REVISION NO.2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site :	UACI (Thailand) Co., Ltd	Barometric Pressure (mm Hg) :	744.7
Calibrate Location :	U/VicTan/Minzhu (Ban Wang Tan (BKK))	Temperature (°C) :	32.9
Calibrate Date :	25-Aug-25	High Volume ID :	RYG_P50664
CalibrationSheet No.:	C-250825-RYG_P50664	High Volume Model :	TE-5009X
Calibrator ID :	RYG_P50206	High Volume S/N :	6261
Calibrator Model :	TE-5020A	Calibrator Slope :	1.48469
Calibrator S/N :	1543	Calibrator Intercept :	-0.02523

Test No.	Delta H ₂ O (inch)	Q _{air} (m³/min)	I : Chart (CFM)	Linear Regression
1	2.4	1.0447	40	Slope : 36.3327
2	2.8	1.1264	44	Intercept : 2.6164
3	3.7	1.2910	50	Correlation Coefficient : 0.9983
4	4.5	1.4212	54	
5	5.6	1.5825	60	



Calibrated by: *Adi T*
(Mr. Adisak Tarisorn)
RYG Field Services Scientist (3)

Approved by: *Spt S*
(Mr. Supet Salamek)
Field Services Section Head

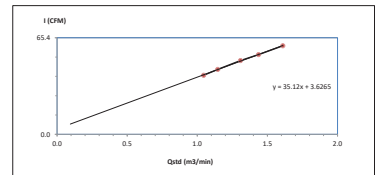
FORM NO. F-06-073 REVISION NO.2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site :	UACI (Thailand) Co., Ltd	Barometric Pressure (mm Hg) :	744.7
Calibrate Location :	U/VicTan/Minzhu (Ban Wang Tan (BKK))	Temperature (°C) :	32.9
Calibrate Date :	25-Aug-25	High Volume ID :	RYG_P50177
CalibrationSheet No.:	C-250825-RYG_P50177	High Volume Model :	TE-51700
Calibrator ID :	RYG_P50206	High Volume S/N :	4803
Calibrator Model :	TE-5020A	Calibrator Slope :	1.48469
Calibrator S/N :	1543	Calibrator Intercept :	-0.02523

Test No.	Delta H ₂ O (inch)	Q _{air} (m³/min)	I : Chart (CFM)	Linear Regression
1	2.4	1.0447	40	Slope : 35.1199
2	2.9	1.1459	44	Intercept : 3.6265
3	3.8	1.3880	50	Correlation Coefficient : 0.9993
4	4.6	1.4366	54	
5	5.8	1.6100	60	



Calibrated by: *Adi T*
(Mr. Adisak Tarisorn)
RYG Field Services Scientist (3)

Approved by: *Spt S*
(Mr. Supet Salamek)
Field Services Section Head

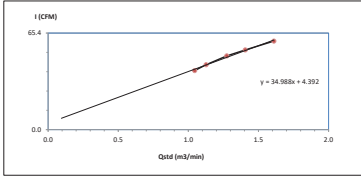
FORM NO. F-06-073 REVISION NO.2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site: UACI (Thailand) Co. Ltd Barometric Pressure (mm Hg): 743.7
Calibrate Location: Wongkarn (Ban Map Yang Pong) Temperature (°C): 32.9
Calibrate Date: 25-Aug-25 High Volume ID: RYG_F30176
Calibration/Sheet No.: C-258825-RYG_F30176 High Volume Model: TE-S1700
Calibrator ID: RYG_F30206 High Volume S/N: 4802
Calibrator Model: TE-502EA Calibrator Slope: 1.48469
Calibrator S/N: 1543 Calibrator Intercept: -0.01523

Test No.	Delta H ₂ O (inches)	Q _{avg} (m³/min)	I: Chart (CFM)	Linear Regression		
				Slope:	Intercept:	Correlation Coefficient:
1	2.4	1.9447	40	34.988x + 4.392	4.3920	0.9946
2	2.8	1.1264	44			
3	3.6	1.2738	50			
4	4.4	1.4856	54			
5	5.8	1.6100	60			



Calibrated by: Mr. Adisak Tarison
RYG Field Services Scientist (3)

Approved by: Mr. Supot Salunth
Field Services Section Head

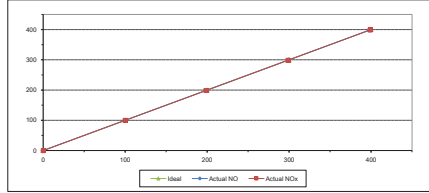
FORM NO.: F-06-073 REVISION NO.: 2 ISSUE DATE: 20/11/23



MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-25 Equipment Name: NOx Analyzer
Manufacturer: Teledyne API Model: T200
Serial No.: 2187 Equipment ID: RYG_F30255
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.88 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.10	0.10	0.10
2	200.00	198.10	-1.90	-0.95	198.70	-1.30	-0.65
3	300.00	299.30	-0.70	-0.23	299.70	-1.30	-0.43
4	400.00	398.40	-1.60	-0.40	398.80	-1.20	-0.30
AVERAGE (%)				-0.38			-0.24



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

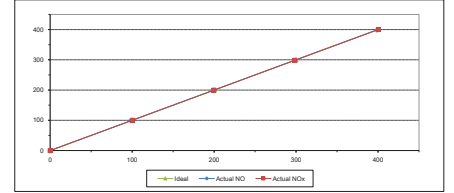
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 3-Jul-25 Equipment Name: NOx Analyzer
Manufacturer: HORIBA Model: APNA-370
Serial No.: T278YRL Equipment ID: RYG_F30467
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.88 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.30	-1.70	-1.70	100.30	0.30	0.30
2	200.00	198.40	-1.60	-0.80	199.60	-0.20	-0.10
3	300.00	298.70	-1.30	-0.43	298.50	-1.50	-0.50
4	400.00	398.60	-1.40	-0.35	400.20	0.20	0.10
AVERAGE (%)				-0.84			-0.01



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

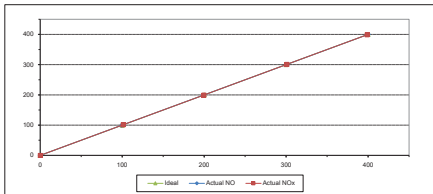
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 3-Jul-25 Equipment Name: NOx Analyzer
Manufacturer: HORIBA Model: APNA-370
Serial No.: INVER3YH Equipment ID: RYG_F30469
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.88 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.50	-0.50	-0.50	101.20	1.20	1.20
2	200.00	198.70	-1.30	-0.65	199.70	-0.30	-0.15
3	300.00	301.10	1.10	0.37	301.00	1.00	0.33
4	400.00	400.30	0.30	0.08	398.80	-1.20	-0.30
AVERAGE (%)				-0.18			0.04



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

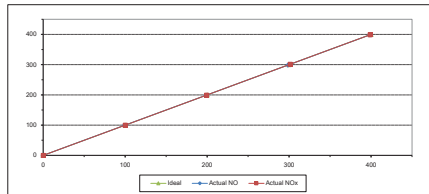
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 2-Jul-25 Equipment Name: NOx Analyzer
Manufacturer: HORIBA Model: APNA-370
Serial No.: 805143K Equipment ID: RYG_F30284
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.88 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.20	-0.80	-0.80	100.10	0.10	0.10
2	200.00	198.70	-1.30	-0.65	199.30	-0.70	-0.35
3	300.00	298.60	-1.40	-0.47	301.40	1.40	0.47
4	400.00	398.90	-1.10	-0.35	398.80	-1.20	-0.30
AVERAGE (%)				-0.44			0.00



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

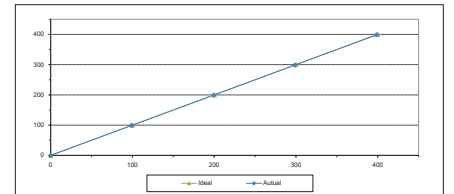
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 2-Jul-25 Equipment Name: SO2 Analyzer
Manufacturer: Teledyne API Model: T100
Serial No.: 1772 Equipment ID: RYG_F30254
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.3 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.05	0.05	0.05
1	100.00	99.00	-1.00	-1.00
2	200.00	199.60	-0.40	-0.20
3	300.00	298.50	-1.50	-0.50
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.41



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

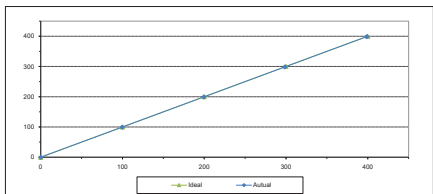
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 2-Jul-25 Equipment Name: SO2 Analyzer
Manufacturer: HORIBA Model: APSA-370
Serial No.: RDHWYDVW Equipment ID: RYG_F30468
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.3 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30
2	200.00	199.50	-0.50	-0.25
3	300.00	298.50	-1.50	-0.50
4	400.00	398.80	-1.20	-0.30
AVERAGE (%)				-0.28



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

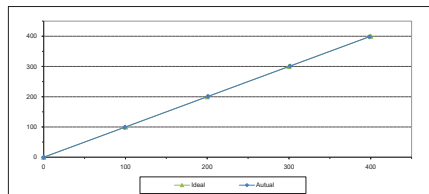
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 2-Jul-25 Equipment Name: SO2 Analyzer
Manufacturer: HORIBA Model: APSA-370
Serial No.: PAUJOTTA Equipment ID: RYG_F30468
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.3 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90
2	200.00	201.00	1.00	0.50
3	300.00	301.30	1.30	0.43
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.08



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

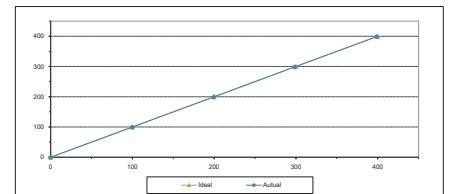
ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 2-Jul-25 Equipment Name: SO2 Analyzer
Manufacturer: HORIBA Model: APSA-370
Serial No.: YFQJL20 Equipment ID: RYG_F30283
Calibrator Manufacturer: Teledyne API Model: 700
Serial No.: 947
Std. Gas Concentration (PPM): 66.3 Cylinder No.: GN0027222
Cylinder Pressure (psi): 1800 Certified By: Algas Inc.
Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30
2	200.00	199.40	-0.60	-0.30
3	300.00	298.20	-1.80	-0.60
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.30



Calibrated By: Mr. Jirawat Salum
Field Environmental Scientist (3)

Approved By: Mr. Sanyuth Jitranont
Assistant General Manager

ALS Laboratory Group
FORM NO.: F-06-056 REVISION NO.: 1 ISSUE DATE: 02/04/12

INNOVATIVE INSTRUMENT CALIBRATION LAB.
J NAC
JIRANATEE ASSOCIATES CO., LTD.
Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TSI-170-17025
CALIBRATION 0367
Certificate Number: CWS-000-07
CERTIFICATE OF CALIBRATION
Page 1 of 2 Pages
MEASUREMENT ITEM: Gas analyser
MANUFACTURER: HANNA
MODEL: HI-9142
SERIAL NUMBER: 10000000000000000000
DATE: 10/01/2024
CUSTOMER: ALS Laboratory Group (Thailand) Co., Ltd.
RECEIVED DATE: 10/01/2024
MEASUREMENT DATE: 10/01/2024
ENVIRONMENTAL CONDITIONS: Ambient condition in the laboratory are as follows: Temperature: 23.0 ± 0.5 °C, Humidity: 50 ± 5 % RH, Atmospheric Pressure: 1013.25 hPa.
CALIBRATION CONDITIONS: Wind speed: 0.5 m/s, Wind direction: 0°, Humidity: 50 ± 5 % RH, Atmospheric Pressure: 1013.25 hPa.
PRECONDITIONING: 24 hours at ambient conditions.
TOLERANCE OF RESULTS: The table on next page give the tolerance limits.
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

INNOVATIVE INSTRUMENT CALIBRATION LAB.
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NSC-TSI-170-17025
CALIBRATION 0367
Certificate Number: CWS-000-07
CERTIFICATE OF CALIBRATION
Page 1 of 2 Pages
MEASUREMENT RESULTS: The gas analyser, Unit Under Calibration (UUC) was verified at 10.0 kPa for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 3 m/s was calibrated by a standard air velocity transducer which was installed 10 mm away from wind tunnel walls and installed 40 mm away from top of the test section. The standard air velocity 0.5 m/s to 3 m/s was calibrated by a standard air velocity transducer which was installed 10 mm away from wind tunnel walls and installed 40 mm away from top of the test section. The results of calibration and associated measurement uncertainties are reported in the table below.
Table 1: Calibration Results
Table 2: Uncertainty of Measurement
Table 3: Tolerance of Results
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

INNOVATIVE INSTRUMENT CALIBRATION LAB.
J NAC
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ISO/IEC 17025:2017
NSC-TSI-170-17025
CALIBRATION 0367
Certificate Number: CWS-000-07
CERTIFICATE OF CALIBRATION
Page 1 of 2 Pages
MEASUREMENT ITEM: Wind direction sensor
MANUFACTURER: HANNA
MODEL: HI-9142
SERIAL NUMBER: 10000000000000000000
DATE: 10/01/2024
CUSTOMER: ALS Laboratory Group (Thailand) Co., Ltd.
RECEIVED DATE: 10/01/2024
MEASUREMENT DATE: 10/01/2024
ENVIRONMENTAL CONDITIONS: Ambient condition in the laboratory are as follows: Temperature: 23.0 ± 0.5 °C, Humidity: 50 ± 5 % RH, Atmospheric Pressure: 1013.25 hPa.
CALIBRATION CONDITIONS: Wind speed: 0.5 m/s, Wind direction: 0°, Humidity: 50 ± 5 % RH, Atmospheric Pressure: 1013.25 hPa.
PRECONDITIONING: 24 hours at ambient conditions.
TOLERANCE OF RESULTS: The table on next page give the tolerance limits.
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

INNOVATIVE INSTRUMENT CALIBRATION LAB.
J NAC
JIRANATEE ASSOCIATES CO., LTD.
Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TSI-170-17025
CALIBRATION 0367
Certificate Number: CWS-000-07
CERTIFICATE OF CALIBRATION
Page 1 of 2 Pages
MEASUREMENT RESULTS: The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 10° intervals in clockwise and counter-clockwise directions after other adjustment had been made. The flow speed of wind tunnel facility is 10 m/s to 3 m/s while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.
Table 1: Calibration Results
Table 2: Uncertainty of Measurement
Table 3: Tolerance of Results
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

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Table 3: Tolerance of Results
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

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APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

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Page 1 of 2 Pages
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Table 2: Uncertainty of Measurement
Table 3: Tolerance of Results
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

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Table 1: Calibration Results
Table 2: Uncertainty of Measurement
Table 3: Tolerance of Results
APPROVED BY: [Signature]
NEXT CAL. DATE: 10/01/26

Calibration Certificate No. 288KL0006

Adjustment Status

Environmental and measuring conditions

Measurement results | Measurement uncertainties

Error of indication

Sartorius (Thailand) Co., Ltd.

Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Graphic realization of the relative uncertainty of measurement | process accuracy

Displayed example

Sartorius (Thailand) Co., Ltd.

Archemica

Certificate of Calibration

ICS-2100: Anion (ID#659)

For

ALS Laboratory Group (Thailand) Co., Ltd.

Operator Signature:

Date: June 17-24, 2025

บริษัท เกล็ดสาคีฟ เทคโนโลยี จำกัด (สำนักงานใหญ่)

ใบรายงานผลการปรับเทียบ

ผู้รับปรับเทียบ:

ผู้ปรับเทียบ:

วันที่ปรับเทียบ:

ผลการปรับเทียบ:

Service Engineer

บริษัท เกล็ดสาคีฟ เทคโนโลยี จำกัด (สำนักงานใหญ่)

Certificate of Calibration

Customer:

Address:

Calibration location:

Address:

Tools:

Environmental Condition:

Date of Calibration:

Due Date of Calibration:

Calibration Method:

Reference Standard:

Test Result:

Flow Rate of Pump:

Service Engineer

บริษัท เกล็ดสาคีฟ เทคโนโลยี จำกัด (สำนักงานใหญ่)

ใบรายงานผลการตรวจวัดเครื่องวัดก๊าซ รุ่น MiniRAE3000

ผู้รับตรวจวัด:

ผู้ตรวจวัด:

วันที่ตรวจวัด:

ผลการตรวจวัด:

Service Engineer

CALGAZ™

CALGAZ, A DIVISION OF AIRGAS USA LLC

CERTIFICATE OF ANALYSIS

Date:

Order Number:

Lot Number:

Customer:

Part Number:

Use Before:

Component:

Concentration:

Cylinder Size:

Valve:

Product comparison verified by third company to calibration standards traceable to NIST.

SITHIPORN ASSOCIATES CO., LTD.

CALIBRATION LABORATORY

491-451 Sathiporn Road, Bangkok, Thailand, 10100 Thailand

Cert. No. : ACC24054

Pages : 1 of 3

Calibration Certificate

Equipment:

Manufacturer:

Model:

Serial No.:

ID No.:

Condition As Found:

Customer:

Location:

Ambient Temperature:

Pressure:

Relative Humidity:

Received Date:

Calibration Date:

Date of Issue:

Calibrated by:

Approved by:

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

SITHIPORN ASSOCIATES CO., LTD.

CALIBRATION LABORATORY

491-451 Sathiporn Road Bangkok, Bangkok, Thailand, 10100 Thailand

Cert. No. : ACC24054

Job No. : VC38A/C0015

Pages : 2 of 3

Calibration Procedure:

Calibration Method:

Condition of this result of calibration:

1. Reference Standard Instruments:

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

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

3.1 National Institute of Metrology (Thailand).

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

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	94.09	0.09	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1001.5	0.1	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
1.55	0.10	3.0

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

End of Calibration Certificate

x Reth

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-34
Serial No.: 0073420 / 157238 / 34371
ID No.: RYC_F50026

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PHATTANAKAN, KHEE SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 07 JANUARY 2025
Calibration Date : 27 JANUARY 2025
Date of Issue : 28 JANUARY 2025

Calibrated by : Natchorn Pitsuphaem

Approved by :

x Reth
(Thamrak Petchuri)

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.

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61673-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each instruments display and also with SLM's display.

Condition of this result of calibration :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY45017075	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY53207243	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-SP 210267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-SP 200267	15-FEB-25
Digital Multimeter	34461A	MY60034273	EEL-SP 230267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2975900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAL	34560955	AA-3001-24	09-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

x Reth

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 0 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

x Reth

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.1

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

Frequency Weighting	Weighting (dB)
A-weight	9.8
C-weight	16.2
Flat	22.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	1.5	1.5	1.5	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	-4.2	-4.2	-4.2	± 3.0

x Reth

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	± 2.0
125	0.0	0.0	0.0	± 1.5
250	0.0	-0.1	-0.1	± 1.5
500	0.0	0.0	-0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
2000	-0.1	0.0	0.0	± 2.0
4000	-0.1	0.0	-0.1	± 3.0
8000	-0.1	0.0	-0.1	± 5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	93.9	-0.1	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.1	0.1	± 0.3

x Reth

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

x Reth

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	± 1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.8	0.8	± 1.1

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	2	1	108.0	107.9	-0.1	1.5 ; -5.0
		8	117.0	117.0	0.0	1.0 ; -2.5
		800	134.0	134.1	0.1	± 1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
		800	127.6	127.6	0.0	± 1.0
		1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
		800	128.0	128.1	0.1	± 1.0

x Reth

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	± 3.0
One	133.4	133.4	0.0	± 3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

x Reth



Cert. No. : ACL25076
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : KION
Model : NL-42 / Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 00734211 / 187363 / 23230
ID No. : RYG_F50027

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHWAENG PHATHANAKAN, KHEE SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 2.0) %

Received Date : 07 JANUARY 2025
Calibration Date : 21 - 23 JANUARY 2025
Date of Issue : 24 JANUARY 2025

Calibrated by : Nathakorn Pitsutaporn

Approved by :
(Nathakorn Pitsutaporn)

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.

Calibration Procedure : CP-AC-01

Calibration Method :

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

For test results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Reference Standard	33210A	MY4817976	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY33220104	EEL-BP 210267	13-FEB-25
Digital Multimeter	33461A	MY33220076	EEL-BP 210267	15-FEB-25
Digital Multimeter	33461A	MY60024273	EEL-BP 210267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560485	AA-3001-24	05-FEB-25

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

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

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

Cert. No. : ACL25076
Job No. : VCS8AC0659
Pages : 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	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25076
Job No. : VCS8AC0659
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Anacoustic Signal (dB)	Measured Value (dB)	Deviation Limits (dB)	Acceptance Limits (dB)
93.9 (0.94)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Weighting (dB)
A-weight	12.0
C-weight	17.9
Flat	23.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)	Acceptance Limits
125	0.4	±1.5
1000	0.1	±1.0
8000	2.1	±5.0

4. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

5. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
		2	117.0	117.0	0.0	1.0; -2.5
		800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
		800	127.6	127.6	0.0	±1.0
		2	99.0	98.9	-0.1	1.5; -5.0
SEL	0.25	1	108.0	108.0	0.0	1.0; -2.5
		2	108.0	108.0	0.0	1.0; -2.5
		800	128.0	128.1	0.1	±1.0

Cert. No. : ACL25076
Job No. : VCS8AC0659
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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

Cert. No. : ACL25076
Job No. : VCS8AC0659
Page : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	53.9	-0.1	±1.1
49.0	49.0	0.0	±1.1
44.0	43.9	-0.1	±1.1
39.0	38.9	-0.1	±1.1
34.0	33.9	-0.1	±1.1
30.0	29.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
28.0	27.9	-0.1	±1.1
27.0	26.9	-0.1	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.9	-0.1	±1.1

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Job No. : VCS8AC0659
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Cert. No. : ACL25076
Job No. : VCS8AC0659
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10. Peak C sound level

Number of cycle test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.4	±1.5

12. High level stability

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

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

End of Calibration Certificate

Cert. No. : ACL34184
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : KION
Model : NL-42 / Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 00877057 / 171591 / 73333
ID No. : RYG_F50381

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHWAENG PHATHANAKAN, KHEE SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 2.0) %

Received Date : 23 SEPTEMBER 2024
Calibration Date : 09 OCTOBER 2024
Date of Issue : 09 OCTOBER 2024

Calibrated by : Nathakorn Pitsutaporn

Approved by :
(Nathakorn Pitsutaporn)

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

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

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Cert. No. : ACL3404
Job No. : VC87ACB14
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017976	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY53202742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-RP 21/02/27	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-RP 20/02/27	15-FEB-25
Digital Multimeter	34461A	MY60054273	EEL-RP 22/02/27	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-5001-24	05-FEB-25

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

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

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

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Cert. No. : ACL3404
Job No. : VC87ACB14
Pages : 3 of 8

Summary of Measurement Result :

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

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Cert. No. : ACL3404
Job No. : VC87ACB14
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.7

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

Frequency Weighting (dB)	Weighting (dB)
A-weight	13.4
C-weight	19.3
Flat	25.0

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	1/31	C-weight	A-weight	Acceptance Limits (dB)
125	0.3	0.4	0.4	±1.5
1000	0.1	0.1	0.1	±1.0
8000	0.1	1.2	1.2	±5.0

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Cert. No. : ACL3404
Job No. : VC87ACB14
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 dB.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
40	0.0	0.0	0.0	±2.0
125	0.1	0.1	0.1	±1.5
250	0.1	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.1	0.1	±0.3

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Cert. No. : ACL3404
Job No. : VC87ACB14
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.3
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.1	0.1	±1.1
24.0	24.0	0.0	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1
4.0	4.0	0.0	±1.1

T. Petch.

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Cert. No. : ACL3404
Job No. : VC87ACB14
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	30.0	30.1	0.1	±1.1

9. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 : -5.0
	2	8	117.0	117.0	0.0	1.0 : -2.5
	200	800	124.0	124.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 : -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 : -5.0
SEL	2	8	108.0	108.0	0.0	1.0 : -2.5
	200	800	128.0	128.1	0.1	±1.0

T. Petch.

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CALIBRATION LABORATORY

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Cert. No. : ACL3404
Job No. : VC87ACB14
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, kPa (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±0.0
One	134.4	133.9	-0.5	±0.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	±2.0
Positive half cycle	134.4	133.2	-1.2	±2.0
Negative half cycle	134.4	133.2	-1.2	±2.0

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

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Cert. No. : ACL3405
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NR-42 / Microphone UC-52 / Pre-amplifier NR-24
Serial No. : 00873109 / 171842 / 75485
ID No. : RTG 390884

Condition As Found : GOOD

Customer : AJS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KIWAENG PHATHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location : -
Ambient Temperature : (25.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 23 SEPTEMBER 2024
Calibration Date : 09 OCTOBER 2024
Date of Issue : 09 OCTOBER 2024

Calibrated by : (Nathasorn Pansupatt)

Approved by : T. Petch.
(Nathasorn Pansupatt)

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

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Cert. No. : ACL3405
Job No. : VC87ACB14
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017976	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY53202742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-RP 21/02/27	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-RP 20/02/27	15-FEB-25
Digital Multimeter	34461A	MY60054273	EEL-RP 22/02/27	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-5001-24	05-FEB-25

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

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

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

T. Petch.

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Cert. No. : ACL2406
Job No. : VC87ACB164
Pages : 3 of 8

Summary of Measurement Result :

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

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Cert. No. : ACL2406
Job No. : VC87ACB164
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.1

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

Frequency Weighting	Weighting (dB)
A-weight	-13.1
C-weight	-18.8
Flat	-23.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.5	0.5	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-1.4	-1.3	-1.3	±0.0

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Cert. No. : ACL2406
Job No. : VC87ACB164
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting accuracy response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limit
63	0.0	0.0	0.0	±2.0
125	0.1	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Fast	94.0	94.0	0.0	±0.3
Slow	94.0	94.0	0.0	±0.1
1sq	94.0	94.0	0.0	±0.3

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limit (dB)
A-weight	94.0	94.0	0.0	±0.3

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Cert. No. : ACL2406
Job No. : VC87ACB164
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
137.0	137.0	0.0	±1.3
136.0	136.0	0.0	±1.3
135.0	135.0	0.0	±1.3
134.0	134.0	0.0	±1.3
133.0	133.0	0.0	±1.3
132.0	132.0	0.0	±1.3
131.0	131.0	0.0	±1.3
129.0	129.0	0.0	±1.3
128.0	128.0	0.0	±1.3
119.0	119.0	0.0	±1.3
118.0	118.0	0.0	±1.3
109.0	109.0	0.0	±1.3
108.0	108.0	0.0	±1.3
99.0	99.0	0.0	±1.3
98.0	98.0	0.0	±1.3
89.0	89.0	0.0	±1.3
88.0	88.0	0.0	±1.3
79.0	79.0	0.0	±1.3
78.0	78.0	0.0	±1.3
69.0	69.0	0.0	±1.3
68.0	68.0	0.0	±1.3
59.0	59.0	0.0	±1.3
58.0	58.0	0.0	±1.3
49.0	49.0	0.0	±1.3
48.0	48.0	0.0	±1.3
39.0	39.0	0.0	±1.3
38.0	38.0	0.0	±1.3
29.0	29.0	0.0	±1.3
28.0	28.1	0.1	±1.3
27.0	27.2	0.2	±1.3
26.0	26.2	0.2	±1.3
25.0	25.2	0.2	±1.3

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Cert. No. : ACL2406
Job No. : VC87ACB164
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
130	30.0	30.1	0.1	±1.3

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Fast	0.25	1	106.0	107.9	-0.1	1.5-5.0
	2	8	117.0	117.0	0.0	1.0-2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5-5.0
	200	800	127.6	127.8	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5-5.0
SEL	2	8	108.0	108.0	0.0	1.0-2.5
	200	800	128.0	128.1	0.1	±1.0

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Cert. No. : ACL2406
Job No. : VC87ACB164
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leq (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Continuous	133.0	133.0	0.0	±1.0
One	136.4	136.2	-0.2	±3.0

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

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petch.

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Tel: +66 (0)2333 8331 Email: calibration@sithiporn.com



Cert. No. : ACL25108
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphonic UC-52 / Pre-amplifier NH-24
Serial No. : 00900072 / 158465 / 01734
ID No. : RYG_FS8091

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN ROAD, PHATTANAKAN ROAD, KHWAENG PHU THIAN, KHUET SIAM LIANG, BANGKOK, 10250 THAILAND.

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

Received Date : 14 JANUARY 2025
Calibration Date : 27-29 JANUARY 2025
Date of Issue : 30 JANUARY 2025

Calibrated by : Nubakorn Poupaissu

Approved by : T. Petch.
(Thanakul Petchuri)

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T. Petch.



Calibration Procedure : CP-AC-01

Calibration Method :

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

For tests results of each items were made by observation of each instruments display and also with SLMV display.

Condition of this result of calibration :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	34461A	MY12202104	EEL-BP 210267	13-FEB-25
Digital Multimeter	34461A	MY53200676	EEL-BP 210267	15-FEB-25
Digital Multimeter	34461A	MY54005213	EEL-BP 210267	15-FEB-25
Programmable Attenuator	MA7-1070	62100114	D3-9008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

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



Cert. No. : ACL25108
Job No. : VC88AC0064
Pages : 2 of 8

Cert. No. : ACL25108
Job No. : VC88AC0064
Pages : 3 of 8

Summary of Measurement Result :

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

T. Petch.

Cert. No. : ACL25108
Job No. : VC68AC0064
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

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

Frequency Weighting (dB)	Weighting Limits (dB)
A-weight	12.0
C-weight	17.0
Flat	22.9

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)	Acceptance Limits (dB)
125	0.5	±1.5
1000	0.2	±1.0
8000	-0.4	±5.0

Cert. No. : ACL25108
Job No. : VC68AC0064
Page : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

Cert. No. : ACL25108
Job No. : VC68AC0064
Page : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	78.9	-0.1	±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	48.9	-0.1	±1.1
44.0	43.9	-0.1	±1.1
39.0	38.9	-0.1	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	0.0	±1.1
24.0	24.0	0.0	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1

Cert. No. : ACL25108
Job No. : VC68AC0064
Page : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.8	-0.2	±1.1

9. Tone burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

Cert. No. : ACL25108
Job No. : VC68AC0064
Page : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.1	-0.3	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	+1.5

12. High level stability

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

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

End of Calibration Certificate

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Page : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 00900073 / 188466 / 01735
ID No. : RYG-FS0494

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PHATTANAKAN, KHET SUAN LUANG,
BANGKOK, 10200 THAILAND.Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %Received Date : 14 JANUARY 2025
Calibration Date : 27-29 JANUARY 2025
Date of Issue : 30 JANUARY 2025

Calibrated by : Naphorn Puspipaisan

Approved by : *P. Petch.*
(Thanakul Petchuni)This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced
other than in full, except with the prior written approval of the head of Calibration Laboratory.Cert. No. : ACL25109
Job No. : VC68AC0064
Page : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

For test results of each item were made by observation of each instrument display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	34461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY50054273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MA7-107B	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

3. This certificate is traceable to the international system of unit maintained at :
3.1 National Institute of Metrology (Thailand).
3.2 Thailand Institute of Scientific and Technological Research (TISTR).Cert. No. : ACL25109
Job No. : VC68AC0064
Page : 3 of 8

Summary of Measurement Result :

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

Cert. No. : ACL25109
Job No. : VC68AC0064
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting (dB)	Weighting Limits (dB)
A-weight	12.0
C-weight	18.3
Flat	24.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)	Acceptance Limits (dB)
125	0.1	±1.5
1000	0.0	±1.0
8000	1.0	±5.0

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Cert. No. : ACL24419
Job No. : VC68AC0051
Pages : 3 of 8

Summary of Measurement Result :

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

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Cert. No. : ACL24419
Job No. : VC68AC0051
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Nominal test

Measured Value (dB)
14.2

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

Frequency Weighting (dB)	Weighting (dB)
A - weight	12.6
C - weight	19.1
Flat	24.6

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.6	0.6	±1.5
1000	0.1	0.1	0.2	±1.0
8000	0.8	0.8	0.8	±5.0

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Job No. : VC68AC0051
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	±0.3

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Job No. : VC68AC0051
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
25.0	25.0	-0.1	±1.1
20.0	20.0	0.0	±1.1
27.0	26.9	-0.1	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.9	-0.1	±1.1

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Job No. : VC68AC0051
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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)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	124.0	124.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5; -5.0
SHL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.1	0.1	±1.0

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leq _{avg} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

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Cert. No. : ACL24420
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Pre-amplifier NF-24
Serial No. : 0067389 / 198636 / 26417
ID No. : RYG_FS0614

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PIATTHANAKAN 40, PIATTHANAKAN ROAD,
KHUAEANG WU, PIATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 12 DECEMBER 2024
Calibration Date : 23 - 24 DECEMBER 2024
Date of Issue : 26 DECEMBER 2024

Calibrated by : Nattakorn Pitsutaporn

Approved by : T. Petchu-
(Thanakul Petchu)

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Cert. No. : ACL24420
Job No. : VC68AC0051
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow IEC-61672-3 (2013) Standard for sound level meter (SLM). The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with A-weight (chamber and Reference Standard Instruments).

For test results of each item were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP-210267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP-200707	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP-220267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

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

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Cert. No. : ACL24420
Job No. : VC68AC0051
Pages : 3 of 8

Summary of Measurement Result :

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

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Cert. No. : ACL24420
Job No. : VCSAC0051
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.5

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

Frequency Weighting (dB)	Weighting (dB)
A-weight	9.9
C-weight	16.8
Flat	72.7

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)
	Flat C-weight A-weight Acceptance Limits
125	0.3 0.4 0.4 ±1.5
1000	0.2 0.2 0.2 ±1.0
8000	0.4 0.5 0.5 ±5.0

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Job No. : VCSAC0051
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting (dB)	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 (dB)	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
25.0	25.0	0.0	±1.1
20.0	20.0	0.0	±1.1
15.0	15.0	0.0	±1.1
10.0	10.0	0.0	±1.1
5.0	5.0	0.0	±1.1

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Cert. No. : ACL24420
Job No. : VCSAC0051
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.8	-0.2	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Th (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5; -5.0
SEL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

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Job No. : VCSAC0051
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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

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

12. High level stability

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

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

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Cert. No. : ACL24421
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 00623390 / 198037 / 26418
ID No. : RYG-F50615

Condition As Found : GOOD
Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHUANG PHATTANAKAN, KHUANG SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3.3) °C
Pressure : (101.3 ± 3.3) kPa
Relative Humidity : (50.0 ± 20.0) %

Received Date : 12 DECEMBER 2024
Calibration Date : 23 - 24 DECEMBER 2024
Date of Issue : 26 DECEMBER 2024

Calibrated by : Nuthakorn Pitsuraporn

Approved by : T. Petch
(Thanakul Petchurani)

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Cert. No. : ACL24421
Job No. : VCSAC0051
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Calibration Procedure : CP-AC-01

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Use Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52202742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53230104	EEL-0021-24	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-0020-24	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-0022-24	05-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

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

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Cert. No. : ACL24421
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Summary of Measurement Result :

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

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Cert. No. : ACL24421
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Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting (dB)	Weighting (dB)
A-weight	13.1
C-weight	19.5
Flat	24.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)
	Flat C-weight A-weight Acceptance Limits
125	0.5 0.5 0.5 ±1.5
1000	0.2 0.2 0.2 ±1.0
8000	0.0 0.0 0.0 ±5.0

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Cert. No. : ACL24421
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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

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Cert. No. : ACL24421
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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	132.9	-0.1	±1.1
132.0	131.9	-0.1	±1.1
131.0	130.9	-0.1	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	27.9	-0.1	±1.1
27.0	27.0	0.0	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.9	-0.1	±1.1

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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)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	79.0	79.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	107.0	107.9	+0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5; -5.0
SEL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

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

12. High level stability

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

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

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Cert. No. : ACL24422
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Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NI-42A / Microphone UC-32 / Praunpiller ME 24
Serial No. : 00623391 / 198638 / 25419
ID No. : RYG_F50616

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PHATTANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 12 DECEMBER 2024
Calibration Date : 23 - 24 DECEMBER 2024
Date of Issue : 26 DECEMBER 2024

Calibrated by : Nishikom Pitsupat

Approved by : T. Petch
(Thanakul Petchurai)

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Cert. No. : ACL24422
Job No. : VC08ACW051
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC 61672-3 (2013) Standard E_{eq} and level meter (SLM).
The SLM had tests to Acoustical gain Electrical signal tests of frequency weighting with Anechoic chamber and Reference
Standard Instruments.

For tests results of each items were made by observation of each instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33510A	MY52302742	EP-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EP-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220004	EEL-BP 21/0267	15-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EP-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

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

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Cert. No. : ACL24422
Job No. : VC08ACW051
Pages : 3 of 8

Summary of Measurement Result :

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

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Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.7

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

Frequency Weighting	Weighting (dB)
A-weight	14.8
C-weight	21.3
Flat	26.9

3. Acoustical signal tests of frequency weightings

Mixer free field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.6	0.6	± 1.5
1000	0.2	0.2	0.2	± 1.0
8000	-0.7	-0.6	-0.6	± 5.0

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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
177.0	177.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	24.9	-0.1	±1.1

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Cert. No. : ACL24422
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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)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.4	0.4	±1.1

9. Tone burst response

Time	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Weighting	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Fast	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5; -5.0
SEL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

T. Petchu

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Cert. No. : ACL24422
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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
Positive half cycle	135.4	135.3	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

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

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

End of Calibration Certificate

T. Petchu

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-453/1 Sathorn Road, Bangrak, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL25079
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No. : 00623394 / 198641 / 26422
ID No. : RYG F50619

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PRATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %
Received Date : 07 JANUARY 2025
Calibration Date : 21-23 JANUARY 2025
Date of Issue : 24 JANUARY 2025

REVIEW BY : S.T.S.
APPROVED BY : [Signature]
NEXT CAL DATE : 21/ 01/ 2026

Calibrated by : Nuhakorn Pitsupaporn

Approved by : T. Petchu
(Thanakul Petchu)

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



SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Calibration Procedure : CP-AC-01

Calibration Method :

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

For tests results of each items were made by observation of each instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017016	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 210267	13-FEB-23
Digital Multimeter	33461A	MY53220076	EEL-BP 210267	15-FEB-23
Digital Multimeter	34461A	MY60024273	EEL-BP 210267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	3977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

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

T. Petchu



SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : ACL25079
Job No. : VC68AC0059
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Weighting (dB)
A-weight	12.6
C-weight	19.1
Flat	24.5

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.4	±1.5
1000	0.1	0.1	0.1	±1.0
8000	0.1	0.1	0.1	±1.0

T. Petchu



SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : ACL25079
Job No. : VC68AC0059
Page : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

T. Petchu



SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : ACL25079
Job No. : VC68AC0059
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
177.0	177.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.1	0.1	±1.1
30.0	30.1	0.1	±1.1
29.0	29.1	0.1	±1.1
28.0	28.1	0.1	±1.1
27.0	27.1	0.1	±1.1
26.0	26.1	0.1	±1.1
25.0	25.1	0.1	±1.1

T. Petchu

Cert. No. : ACL15079
Job No. : VC68AC3059
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	79.0	78.9	-0.1	±1.1

9. Tone burst response

Time	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Weighting	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Fast	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

Cert. No. : ACL15079
Job No. : VC68AC3059
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	89.5	89.6	0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	132.0	132.9	+0.9	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive	89.6	0.1
Negative	89.6	0.1

12. High level stability

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

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

End of Calibration Certificate

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research
DATE OF ISSUE 13 February 2025

CERTIFICATE NUMBER 232797

Cirrus Research
Acoustic House
Bridlington Road
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signature
E. Thomas
Electronically signed:

doseBadge Reader : IEC 60942:2003

Instrument information
Manufacturer: Cirrus Research plc
Model: RC110A
Serial number: 73729
Class: 2

Notes:

Test summary
Date of calibration: 12 February 2025

The doseBadge reader detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942:2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.3 kPa using the manufacturer's data.

The doseBadge Reader has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2003 for the sound pressure levels and frequency (weighting) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of doseBadge Reader conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, no general statement or certification can be made about conformance of the doseBadge Reader to the requirements of IEC 60942:2003.

Notes:

REVIEW BY SJS
APPROVED BY SJS
NEXT CAL DATE 11/02/2026

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing authority. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

CERTIFICATE OF CALIBRATION

Certificate Number: 232797
Page 2 of 2

Environmental conditions

The following conditions were recorded at the time of the test:
Before Pressure: 101.42 kPa Temperature: 25.1 °C Humidity: 33.1 %
After Pressure: 101.42 kPa Temperature: 25.2 °C Humidity: 35.9 %

Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	1063074
Environmental Monitor	Comet	T7510	21962628

Initial Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	112.51	112.45	112.61	112.52	-1.48	±0.75	0.11 dB
Distortion (%)	< 4.00	1.46	1.70	2.01	1.72	1.72	+4.00	0.13 %
Frequency (Hz)	1000.0	998.2	998.2	998.2	998.2	-1.8	±20.0	0.1 Hz

The measured quantities or deviations (as applicable), extended by the expanded combined uncertainty of measurement, must not exceed the corresponding tolerance.

Adjusted Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.99	114.01	114.01	114.00	0.00	±0.75	0.11 dB
Distortion (%)	< 4.00	0.97	0.96	0.95	0.96	0.96	+4.00	0.13 %
Frequency (Hz)	1000.0	998.1	998.1	998.1	998.1	-1.9	±20.0	0.1 Hz

Functionality Results

Function	Result
Keyboard	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

End of results

Accredited calibration laboratory
ISO/IEC 17025:2017
CALIBRATION 0167
Accredited calibration laboratory
CALIBRATION services departmentAccredited calibration laboratory
ISO/IEC 17025:2017
CALIBRATION 0167
Accredited calibration laboratory
CALIBRATION services department

CALIBRATION REPORT

Page 1 of 3 Pages

MEASUREMENT ITEM

MANUFACTURER

MODEL TYPE

SERIAL NUMBER

ID NUMBER

CONDITION AS RECEIVED

CUSTOMER

RECEIVED DATE

MEASUREMENT DATE

ISSUE DATE

ENVIRONMENTAL CONDITIONS:

Ambient conditions in the laboratory are as follows:

Temperature

Relative Humidity

Atmospheric Pressure

PRECISION/TESTING

The dose meter (Unit Under Calibration) was preconditioning 24 hours at ambient conditions prior to calibration being performed.

STANDARD USED DURING CALIBRATION:

Instrument name

Manufacturer

Model

Serial number

REMARKS: DoseBadge Reader (Unit Under Calibration) was calibrated against Cirrus Research plc's ISO/IEC 17025:2017 calibrated and certified as accurate with the requirements of IEC 60942:2003 Class 2.

CALIBRATION RESULTS:

Table 1: The results of dose meter calibration are reported in the table below:

DoseBadge Reader Level

Noise Dosimeter reading

Error

Status

114.0

114.0

0.0

Pass

Calibrated by

APPROVED SIGNATURE

Mr. P. Thomas

Calibration Department Manager

REMARKS:

The calibration of standard dosimeter reader that supplied to Unit Under Calibration.

The calibration was performed in accordance with the requirements of IEC 60942:2003 Class 2.

THIS CALIBRATION REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Accredited calibration laboratory
ISO/IEC 17025:2017
CALIBRATION 0167
Accredited calibration laboratory
CALIBRATION services department

CALIBRATION REPORT

Page 1 of 3 Pages

MEASUREMENT ITEM

MANUFACTURER

MODEL TYPE

SERIAL NUMBER

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RECEIVED DATE

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Relative Humidity

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Model

Serial number

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CALIBRATION 0167
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CALIBRATION REPORT

Page 1 of 3 Pages

MEASUREMENT ITEM

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SERIAL NUMBER

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CUSTOMER

RECEIVED DATE

MEASUREMENT DATE

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Temperature

Relative Humidity

Atmospheric Pressure

PRECISION/TESTING

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STANDARD USED DURING CALIBRATION:

Instrument name

Manufacturer

Model

Serial number

REMARKS: DoseBadge Reader (Unit Under Calibration) was calibrated against Cirrus Research plc's ISO/IEC 17025:2017 calibrated and certified as accurate with the requirements of IEC 60942:2003 Class 2.

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Noise Dosimeter reading

Error

Status

114.0

114.0

0.0

Pass

Calibrated by

APPROVED SIGNATURE

Mr. P. Thomas

Calibration Department Manager

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CALIBRATION 0167
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CALIBRATION services department

CALIBRATION REPORT

Page 1 of 3 Pages

MEASUREMENT ITEM

MANUFACTURER

MODEL TYPE

SERIAL NUMBER

ID NUMBER

CONDITION AS RECEIVED

CUSTOMER

RECEIVED DATE

MEASUREMENT DATE

ISSUE DATE

ENVIRONMENTAL CONDITIONS:

Ambient conditions in the laboratory are as follows:

Temperature

Relative Humidity

Atmospheric Pressure

PRECISION/TESTING

The dose meter (Unit Under Calibration) was preconditioning 24 hours at ambient conditions prior to calibration being performed.

STANDARD USED DURING CALIBRATION:

Instrument name

Manufacturer

Model

Serial number

REMARKS: DoseBadge Reader (Unit Under Calibration) was calibrated against Cirrus Research plc's ISO/IEC 17025:2017 calibrated and certified as accurate with the requirements of IEC 60942:2003 Class 2.

CALIBRATION RESULTS:

Table 1: The results of dose meter calibration are reported in the table below:

DoseBadge Reader Level

Noise Dosimeter reading

Error

Status

114.0

114.0

0.0

Pass

Calibrated by

APPROVED SIGNATURE

Mr. P. Thomas

Calibration Department Manager

REMARKS:

The calibration of standard dosimeter reader that supplied to Unit Under Calibration.

The calibration was performed in accordance with the requirements of IEC 60942:2003 Class 2.

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Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate of Calibration
Cert.No.: 25C03008
Page: 1 of 2

Equipment: Burette
Capacity: 50 mL
Serial No.: -
ID No.: RYG_EN0216
Manufacturer: Wilog
Made in: Germany
Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.
Rayong Branch
616/10 Moo 5 T.Maanam Khu, A.Pluakdaeng
Rayong 21140, Thailand

Ambient Temperature: (20 ± 2.5) °C
Relative Humidity: (50 ± 10) %
Barometric Pressure: 753 mmHg
Calibration Procedure: ASTM E 542- 01
Calibrated by: Srisuda Khathia
Approved by: () Ponpan Paipim
(✓) Chakrit Wanwanjua
Issue Date: 19 September 2025

The Uncertainties are for a confidence probability of approximately 95%
This certificate may not be reproduced other than in full, except with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate of Calibration
Cert.No.: 25C03008
Page: 2 of 2

Equipment: Burette
Received Date: 16 September 2025
Condition As-Received: Used Item
Calibration Date: 18 September 2025
Reference: 2509-0564DSC-3

Condition of this result of calibration
1. Reference Standard Instruments
Instruments Model Serial No. ID No. Certificate No. Traceability Due date
1) Balance XP205 8134206712 140RC007 25MM296 TPA 16 July 2026
2) Humidity/BaroTemp MHS-362SD AM.42259 140EC016 25H1016 TPA 14 Aug 2026
3) Digital Thermometer H4076 23060555 140EC013 25H1740 TPA 17 Jan 2026
This measurement result is traceable to SI Unit
2. The certificate is valid only to the item calibrated on date and place of calibration.
3. True value is converted to true volume at the standard temperature of 20 °C

Calibration result:
Nominal capacity (mL) Reading (mL) Uncertainty (± mL) k Factor
10 10.0264 0.0082 2.00
25 25.0141 0.0087 2.00
50 49.9952 0.010 2.00

Remark: mL = cm³
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%.

-o-o-

Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate of Calibration
Cert.No.: 25C03008
Page: 1 of 3

Equipment: Spectrophotometer
Model: DR6000
Serial No. for ID: 1627845 (RYG_EN0037)
Manufacturer: HACH
Condition: In Condition

Customer: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maanam Khu, A.Pluakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature 24.4 °C ± 0.3 °C
Humidity 85.0 %RH ± 3.5 %RH

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
(Wet Chemistry Lab.)
616/10 Moo 5 T.Maanam Khu, A.Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr.Pirote Phoonchai
Calibration Date: 18 March 2025
The Method used: In-house method, CAL-M-04, based on ASTM E 275-08 and ASTM E 387-04
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Sigma Scientific Limited.
The standard for Wavelength Certificate No. 111583 and 111584
The standard for Photometric Certificate No. 911494 and 111588
The standard for Stray Light Certificate No. 111585 and 111586
The standard for Spectral resolution Certificate No. 111587

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TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate No.: C04200108
Page 2 of 3

Calibration Results:
Without Adjustment
Wavelength Accuracy (nm), The spectral bandwidth of 50 nm at 2 nm and UVC at 2 nm
Standard Wavelength Unit Under Calibration Correction Uncertainty
418.1 nm 418.5 -0.4 0.13
538.8 nm 539.7 -0.9 0.13
637.8 nm 638.3 -0.5 0.13
748.8 nm 749.8 -1.0 0.13
807.3 nm 807.5 -0.2 0.13

Photometric Accuracy (Absorbance)
Wavelength Standard absorbance Unit Under Calibration Correction Uncertainty
420 nm 0.0000 0.0000 0.0000 0.0045
0.2930 0.291 -0.002 0.0045
3.8188 0.818 -0.0012 0.0045
1.0298 1.021 -0.0082 0.0045
440 nm 0.0000 0.0000 0.0000 0.0045
0.2697 0.265 0.0047 0.0045
1.0693 1.069 -0.0003 0.0045
0.0000 0.0000 0.0000 0.0045
0.2218 0.220 0.0018 0.0045
485 nm 0.4895 0.481 -0.0085 0.0045
0.5934 0.593 -0.0004 0.0045
0.0000 0.0000 0.0000 0.0045
0.2481 0.248 0.0001 0.0045
0.4852 0.486 -0.0008 0.0045
0.8468 0.848 -0.0012 0.0045
500 nm 0.0000 0.0000 0.0000 0.0045
0.2384 0.239 0.0004 0.0045
0.5045 0.505 -0.0005 0.0045
1.0693 1.069 -0.0007 0.0045
0.0000 0.0000 0.0000 0.0045
0.2578 0.258 0.0002 0.0045
635 nm 0.5897 0.591 0.0013 0.0045
0.8720 0.873 -0.0010 0.0045

Delivering Growth - In Asia and Beyond.

Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate No.: C04200108
Page 3 of 3

Calibration Results:
Without Adjustment
Wavelength Standard absorbance Unit Under Calibration Correction Uncertainty
235 nm 0.0000 0.0000 0.0000 0.0045
0.7355 0.738 -0.0025 0.0045
257 nm 0.0000 0.0000 0.0000 0.0045
0.6874 0.687 0.0004 0.0045
313 nm 0.0000 0.0000 0.0000 0.0045
0.2684 0.266 -0.0024 0.0045
350 nm 0.0000 0.0000 0.0000 0.0045
0.6374 0.637 0.0004 0.0045

Stray light *
Standard: cut-off UVC: Wavelength (nm) UVC: Transmission (%) Absorbance (A)
260.02 ± 0.11 nm 260.0 266.9 1.7 1.770
361.44 ± 0.11 nm 361.4 374.4 1.4 1.884

Spectral Resolution *
Nominal Concentration 0.02 % w/v Peak Trough Ratio SNR
Standard Wavelength (nm) 268.66 268.99 1.38 2.96
UVC: Wavelength (nm) 268.6 268.2
Std Absorbance (A) 0.4988 0.2190
UVC Absorbance (A) 0.413 0.296

* Correction Marked "Not Test Accepted" in this Certificate have been excluded for completeness.

The End of Certificate

Delivering Growth - In Asia and Beyond.

Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม
Cert.No.: 25C03008
Page: 1 of 3

Calibration Results:
Function: pH Measurement
Performing three buffers standard curve by using buffer nominal pH (4.7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading (mV)	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.007	4.008	181.1	0.0044	2.00
SN: 5211504	7.000	7.000	4.9	0.0084	2.00
	10.010	10.007	-170.6	0.0096	2.00

Function: Temperature Measurement
(*) Without adjustment
This equipment was connected with Temperature Probe;
- Model: InLabExpert Pro-ISM
- Serial No.: 5211504
- Dimension of probe:
- Length: 120 mm.
- Diameter: 12 mm.
- Immersion Depth: 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.001	25.1	0.099	0.13	2.00

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

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Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate of Calibration
Cert.No.: 25CH7091
Page: 1 of 3

This Certificate was issued to re place to the Certificate No.25CH709

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenExcellence
Serial No.: B834291445
ID No.: RYG_EN0152
Condition As-Received: Used Item
Received Date: 12 June 2025
Calibration Date: 18 June 2025
Reference: 2506-0407DSC-2
Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.
Rayong Branch
616/10 Moo 5 T.Maanam Khu, A.Pluakdaeng, Rayong 21140, Thailand

Ambient Temperature: (25 ± 2.5) °C
Relative Humidity: (50 ± 15) %
Calibration Procedure: In-house method:
- CP-CH6 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)
- CP-CH6 by comparison with temperature standard

Calibrated by: Walailak Sirinhean
Approved by: () Chakrit Wanwanjua
() Ponpan Paipim
(✓) Salipha Meangmai
Issue Date: 1 July 2025

The Uncertainties are for a confidence probability of approximately 95%
This certificate may not be reproduced other than in full, except with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate of Calibration
Cert.No.: 25CH7091
Page: 2 of 3

Condition of this calibration result
1. Reference Standard Instrument
Instrument Serial No. ID No. Cert. No. Due Date
1) Document Process Calibrator 54030049 130RC116 24E2759 25 Aug 2025
2) Ref. Standard Thermometer 4862054 110RC044 24E757 14 July 2025
This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)
2. Certified Reference Materials
The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
The measurement results are traceable to SI through CPA Chem Ltd., ANSL-ASD National Accreditation Board, Accredited No. AR-1835

Buffer Solution Manufacturer Lot No. Exp. date
pH 4.007 CPA chem 1086665 18 Jan 2027
pH 7.000 Hach Lange GmbH C03232 02 Dec 2026
pH 10.010 CPA chem 1086669 18 Jan 2026

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results
Function: mV Measurement
Performing standard curve by Document Process Calibrator at pH (4.7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading	Uncertainty of Measurement (mV)	Coverage factor k
pH Meter	4.005	177.48	177.3	0.058	2.00
SN: B834291445	7.000	0.00	-0.1	0.058	2.00
	10.000	-177.48	-177.5	0.058	2.00

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Technology Promotion Association (Thailand-Japan)
Corporate Services 3: Equipment Calibration and Testing Services
5344 Pratakarin Road 301 18, Suwanluang, Suwanluang Bangkok 10250
TEL: 0-2715-3008-29 FAX: 0-2715-9484

Certificate of Calibration
Cert.No.: 25CH7091
Page: 3 of 3

Calibration Results:
Function: pH Measurement
Performing three buffers standard curve by using buffer nominal pH (4.7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading (mV)	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.007	4.008	181.1	0.0044	2.00
SN: 5211504	7.000	7.000	4.9	0.0084	2.00
	10.010	10.007	-170.6	0.0096	2.00

Function: Temperature Measurement
(*) Without adjustment
This equipment was connected with Temperature Probe;
- Model: InLabExpert Pro-ISM
- Serial No.: 5211504
- Dimension of probe:
- Length: 120 mm.
- Diameter: 12 mm.
- Immersion Depth: 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.001	25.1	0.099	0.13	2.00

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

Delivering Growth - In Asia and Beyond.

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 EQUIPMENT CALIBRATION AND TESTING SERVICES
1344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2373-3803/3434 FAX. 0-2379-8844

Certificate of Calibration
Certificate No. : 25E19791
Page : 2 of 2

This Certificate was issued to replace to the Certificate No. 25E1979

Equipment : pH Meter
Manufacturer : Metro Toledo
Model : SevenExcellence
Serial No. : 803201445
ID No. : RYG_EN0152
Condition As-Received : Used Item
Received Date : 12 June 2025
Calibration Date : 16 June 2025
Reference : 2506-0407DSC
Ambient Temperature : (23 ± 2) °C
Relative Humidity : (50 ± 10) %

Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand

Procedure used: Calibration were conducted using calibration procedure No. CP-E17 According to EURAMET cp-15.

Condition of this result of calibration
1. Reference standards instruments :
Instrument Model Serial No. Certificate No. Due Date
1) Multi-Product Calibrator 5550A 63150111 25E1027 19 May 2026
2. This result of calibration was made on request at the point specified by customer.
3. The certificate is valid only to the item calibrated on date and place of calibration.
4. This measurement result is traceable to the International System of Unit maintained through:
-Technology Promotion Association (Thailand-Japan), NSC-ONSIC Accredited No. Calibration 0008

Calibrated by : Wichitarnpong Pheethong
Issue Date : 01 July 2025
Approved Signatory :
[] Phaithe Pheethong
[✓] Nuntawat Khanchai
[] Pongsakon Boonyaporn

Cert. No.: 25E19791
Page: 2 of 2

Result of calibration: (*) Without adjustment () After adjustment
Function: DC voltage measurement Range: 2000 mV

Standard Value	UUC Reading	Error	Uncertainty
(mV)	(mV)	(mV)	(± μV)
-200.0000	-199.9	0.1	68
-150.0000	-150.0	0.0	65
-100.0000	-100.0	0.0	63
-50.0000	-50.0	0.0	61
0.0000	0.0	0.0	58
50.0000	50.0	0.0	61
100.0000	100.0	0.0	63
150.0000	149.9	-0.1	65
200.0000	199.9	-0.1	68

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 %

UUC = Unit Under Calibration.

Accredited by NSC-TISI-TIS 17025 Calibration 0426

Calibration certificate Calibration Certificate No. 25BKL0003

Object Electronic non-automatic weighing instrument
Manufacturer Sartorius
Type MSU224S-100-DU
Serial / OM Ident. no. 31709552 / RYG_EN0003
Customer ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand
Order no. 2230
Number of pages 4
Date of calibration 20 Feb 2025

REVIEW BY: Thanyak
APPROVED BY: Dhan
NEXT CAL DATE: 20/02/26

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.
The user is obliged to have the object recalibrated at appropriate intervals.

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

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 1 | 4

Calibration certificate No. : 25BKL0003
Calibration Certificate

Calibration object
Single range instrument

Model MSU224S-100-DU
Serial Number 31709552
QM Ident. no / Inventory no. RYG_EN0003 / ---

Maximum capacity (Max. load) 220.0000 g
Measured range 220.0000 g
Scale interval 0.0001 g

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

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

Test equipment
Test equipment type Test equipment ID Valid until
Thermometer MHS-382SD shB011342 Traceable to SI unit through DKSH 21 Aug 2025
Test weight set OIML R111 E2 Certificate No.M23081975_E2(Traceable to SI unit through TGS) 23 Aug 2025

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 2 | 4

Calibration certificate No. : 25BKL0003
Calibration Certificate

Adjustment Status
The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions
Date of calibration 20 Feb 2025
Temperature at place of calibration / Temp. diff. 24.7 °C / 0.3 K
The installation site is suitable. The device was levelled. Balance was loaded up to Max before test.
Humidity 62.3 %RH

Measurement results | Measurement uncertainties

Repeatability	Eccentricity
Test load (nominal): 10 g, 200 g	Test load (nominal): 100 g
1 10.0000 g 200.0000 g	Centre 100.0000 g
2 10.0000 g 200.0001 g	Front left 100.0000 g
3 9.9999 g 200.0000 g	Back left 100.0001 g
4 10.0000 g 200.0000 g	Back right 99.9999 g
5 10.0000 g 200.0001 g	Front right 99.9999 g
6 9.9999 g 200.0000 g	Maximum deviation from centric loading indication
7 10.0000 g 200.0000 g	(Max)max = 0.0001 g
8 10.0000 g 200.0000 g	
9 10.0000 g 200.0000 g	
10 10.0000 g 200.0001 g	
s = 0.00004 s = 0.00005 g	

Error of indication

Testload	Indication	Error	Expansion factor	Uncertainty	Uncertainty relative
L	I	E	k	U(E)	U(E)/I
0.0100 g	0.0100 g	0.0000 g	2.00	0.00017 g	1.7 %
0.1000 g	0.1000 g	0.0000 g	2.00	0.00013 g	0.13 %
0.5000 g	0.5000 g	0.0000 g	2.00	0.00013 g	0.026 %
1.0000 g	1.0000 g	0.0000 g	2.00	0.00013 g	0.013 %
5.0000 g	5.0000 g	0.0000 g	2.00	0.00013 g	0.0026 %
10.0000 g	10.0000 g	0.0000 g	2.00	0.00013 g	0.0013 %
20.0000 g	20.0000 g	0.0000 g	2.00	0.00014 g	0.00068 %
50.0000 g	50.0000 g	0.0000 g	2.00	0.00015 g	0.00029 %
100.0000 g	100.0001 g	0.0001 g	2.00	0.00018 g	0.00018 %
200.0000 g	200.0000 g	0.0000 g	2.00	0.00028 g	0.00014 %
220.0000 g	220.0000 g	0.0000 g	2.00	0.00032 g	0.00015 %

Maximum error of indication (E_max = 0.0001 g)

End of calibration certificate

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 3 | 4

Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Device adjusted before measurement Yes
Temperature deviation considered 1.5 K (isoCAL active)
Temperature coefficient considered 1 · 10⁻⁶ /°K

Uncertainty of the weighing result U₉₅(W) U₉₅(W) = 0.00013 g ± 3.42 · 10⁻⁶ · R

Indication in % from max load

	Net indication R	Uncertainty U ₉₅ (W)	Uncertainty relative U ₉₅ (W)/I
1 %	2.2000 g	0.00014 g	0.0063 %
25 %	55.0000 g	0.00022 g	0.0004 %
50 %	110.0000 g	0.00051 g	0.00046 %
75 %	165.0000 g	0.00059 g	0.00042 %
100 %	220.0000 g	0.00069 g	0.00040 %

Graphic realization of the relative uncertainty of measurement | process accuracy

Displayed example
Process accuracy 1.00 %
Safety factor 3
Minimum sample weight 0.0360 g

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 4 | 4

SCG Metrology Center
SCI ECO Services Company Limited
61 Moo 8, Tukwong, Kaeng Khoi, Saraburi, Thailand 18260
Bangkok Tel : +669 8205 6851 / +669 81924 0058
Saraburi Tel : +669 8247 2380
Website: www.scieco.co.th E-Mail: calibrate@scg.co.th

Certificate No. T251269 Calibration Report Page 1 of 3

Equipment : Liquid Bath (Water)
Manufacturer : Memmert
Model : WNE29
Serial No. : L623.0105
Customer Code : RYG_EN0220
ID No. : T5650A5
Customer : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenamkoo, A.Pluakdaeng, Rayong 21140
Customer Location : Wet Chemistry Lab
Date of Receipt : 19 November 2025
Calibrated By : Sujjar Nakakred (Site Calibration Manager)
Approved By : Pongchai Suriyayong (Site Calibration Manager)
Date of Issue : 01 DEC 2025

The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

FM-TL06 0027-03-08

SCG Metrology Center
SCI ECO Services Company Limited
61 Moo 8, Tukwong, Kaeng Khoi, Saraburi, Thailand 18260

Certificate No. T251269 Calibration Report Page 2 of 3

Equipment : Liquid Bath (Water)
Date of Calibration : 27 November 2025
Environment :
Temperature : 25.5-25.7 °C
Line Voltage : 221.8-225.5 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :
1. This equipment was calibrated by insert five resistance thermometer detectors into its water bath , the other one (bathocouple type T) use for ambient temperature measurement. The calibration was done in according to W-174 (based on ASTM E715-90 (Reapproved 2022)).
All data show below were final values and the initial data from customer request . The temperature static and was based on ITS - 90 .
2. Reference Standard Instrument :
Instrument Model Instrument No Certificate No. Due Date
RTD 1100 OHM 3418 (CH115) T251758 17 October 2026
DATA LOGGER 2470TA T261 T251758 17 October 2026
3. This certificate is traceable to : National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244) .
4. Condition of calibrated item : good
Equipment Description :
Time Constant : 1 Hour 3 Minute At 63 °C
5. Adjustment : (X) without adjustment () after adjustment

Approved By: Pongchai

FM-TL07 0027-03-08

SCG Metrology Center
SCI ECO Services Company Limited
61 Moo 8, Tukwong, Kaeng Khoi, Saraburi, Thailand 18260

Certificate No. T251269 Calibration Report Page 3 of 3

Side View Top View
Working space dimension : 59 X 35 X 14 (WxLxH)
The quoted uncertainty exclude "uniformity"
The calibration result apply only the above calibrated item.
The result of test was found accurate as shown on date and place of test only.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which a distribution, providing a level of confidence of approximately 95 % .

Measurement Results:

Calibration Point	Average Standard Reading at each position (°C)				
	CH-1	CH-2	CH-3	CH-4	CH-5
63	62.93	63.13	62.94	63.10	63.05
85	85.15	85.33	85.21	85.43	85.20

Liquid Bath (Water)
Reading (°C)
Average Stability Uniformity Uncertainty Coverage
Setting (°C) Min , Max Average (°C) (± °C) (± °C) (± °C) Factor A

63.0	62.9, 63.1	63.0	63.04	0.08	0.17	0.27	2.06
85.0	84.8, 85.2	85.0	85.26	0.13	0.24	0.43	2.23

Approved By: Pongchai

FM-TL07 0027-03-08

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
134/6 PATTANAKARN ROAD SOI 18, SUKHUMVIT, SUKHUMVIT BANGKOK 10250
TEL.8-2715-3000-25 FAX.8-2715-8484

Certificate of Calibration
Cert.No.: 25CH757
Page: 1 of 3

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go S2
Serial No. : C222171773
ID No. : RYG_FS0595
Condition As-Received: Used Item
Received Date : 24 June 2025
Calibration Date : 25 June 2025
Reference : 2506-0762DSC-3
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu,
A.Pluakdaeng, Rayong 2140, Thailand

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure :
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

Calibrated by : Wansorn Lemngatrukul
Approved by : [Signature]
Approved Signatory

() Chakrit Wanewangua
() Porpan Pajin
(✓) Saithip Meangmai
Issue Date : 26 June 2025

The Uncertainties are for a confidence probability of approximately 95%
This certificate may not be reproduced other than in full, except with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

Cert.No.: 25CH757
Page: 2 of 3

Condition of this calibration result
1. Reference Standard Instrument
Instrument Serial No. ID No. Cert. No. Due Date
1) Document Process Calibrator 54030049 130RC116 24E2759 25 Aug 2025
2) Ref. Standard Thermometer 4962054 119RC044 24I757 14 July 2025
- This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)
ANSI-ASQ National Accreditation Board, Accredited No. AB-1835

2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AB-1835

Buffer Solution Manufacturer Lot No. Exp. date
pH 4.007 CPA chem 1066665 18 Jan 2027
pH 6.965 CPA chem 1066667 18 Jan 2026
pH 10.010 CPA chem 1114385 08 June 2026

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results
Function : mV Measurement
Performing standard curve by Document Process Calibrator at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading	Uncertainty of Measurement (± mV)	Coverage factor k
pH Meter	4.00	177.48 mV	178 mV	0.08	2.00
SN: C222171773	7.00	0.00	0	0.08	2.00
	10.00	-177.48	-178	0.08	2.00

Cert.No.: 25CH757
Page: 3 of 3

Calibration Results
Function : pH Measurement
Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.007	4.01	182	0.0071	2.00
SN: 4270659	6.965	6.97	9	0.0099	2.00
	10.010	10.01	-165	0.0098	2.00

Function : Temperature Measurement
(*) Without adjustment
This equipment was connected with Temperature Probe:
- Model : InLab®Expert Go-ISM
- Serial No. : 4270659

Dimension of probe
- Length : 120 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.002	24.9	-0.102	0.13	2.00
45.0	45.006	45.0	-0.006	0.13	2.00

Remark : * UUC* = Unit Under Calibration

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

Accredited by NSC-TISI-TIS 17025 Calibration (Q426)

Calibration certificate Calibration Certificate No. 25BKL0002

Object Electronic non-automatic weighing instrument
Manufacturer Sartorius
Type MCE224S-2500-U
Serial / QM Ident. no. 38110399 / RYG_EN0163
Customer ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 2140, Thailand.
Order no. 2230
Number of pages 4
Date of calibration 20 Feb 2025

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.
The user is obliged to have the object recalibrated at appropriate intervals.

Date 08 Mar 2025 Approval of the Calibration Certificate Person in charge
Mr. Chondai Inthana Kachen Lalae

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 1 | 4

Calibration certificate No. 25BKL0002
Calibration Certificate

Calibration object
Single range instrument

Model MCE224S-2500-U
Serial Number 38101399
QM Ident. no / Inventory no. RYG_EN0163 / ---

Maximum capacity (Max. load) 220.0000 g
Measured range 220.0000 g
Scale interval 0.0001 g

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

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

Test equipment
Test equipment ID Valid until
Thermometer MHS-382SD shB011342 Traceable to SI unit through DKSH 21 Aug 2025
Test weight set OIML R111 E2 Certificate No.M23081975_E2(Traceable to SI unit through TGS) 23 Aug 2025

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 2 | 4

Calibration certificate No. 25BKL0002
Calibration Certificate

Adjustment Status
The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions
Date of calibration 20 Feb 2025
Temperature at place of calibration / Temp. diff. 24.4 °C / 0.6 K
Twilights - Triax Measuring conditions
Comments Humidity 58.0 %RH

Measurement results | Measurement uncertainties

Repeatability	Eccentricity
Test load (nominal): 10 g 200 g	Test load (nominal): 100 g
1 10.0000 g 200.0000 g	Center 100.0000 g
2 10.0000 g 200.0000 g	Front left 100.0000 g
3 10.0000 g 200.0000 g	Back left 100.0000 g
4 9.9999 g 200.0000 g	Back right 100.0000 g
5 9.9999 g 200.0000 g	Front right 99.9999 g
6 10.0000 g 200.0000 g	Maximum deviation from center loading indication
7 10.0000 g 200.0000 g	(Max)max = 0.0001 g
8 10.0000 g 200.0000 g	
9 9.9999 g 200.0000 g	
10 10.0000 g 200.0000 g	
s = 0.00005 s = 0.00005 g	

Error of indication

Testload	Indication	Error	Expansion factor	Uncertainty (U(E))	Uncertainty relative U(E)/E
0.0100 g	0.0100 g	0.0000 g	2.00	0.00013 g	1.3 %
0.1000 g	0.1000 g	0.0000 g	2.00	0.00013 g	0.13 %
0.5000 g	0.5000 g	0.0000 g	2.00	0.00013 g	0.026 %
1.0000 g	1.0000 g	0.0000 g	2.00	0.00013 g	0.013 %
5.0000 g	5.0000 g	0.0000 g	2.00	0.00013 g	0.0026 %
10.0000 g	9.9999 g	-0.0001 g	2.00	0.00013 g	0.0013 %
20.0000 g	20.0000 g	0.0000 g	2.00	0.00014 g	0.00069 %
50.0000 g	50.0001 g	0.0001 g	2.00	0.00016 g	0.00032 %
100.0000 g	100.0000 g	0.0000 g	2.00	0.00018 g	0.00018 %
200.0000 g	200.0000 g	0.0000 g	2.00	0.00028 g	0.00014 %
220.0000 g	220.0000 g	0.0000 g	2.00	0.00032 g	0.00015 %
Maximum error of indication (E)max = 0.0001 g					

End of calibration certificate

Sartorius (Thailand) Co., Ltd. 129 Rama 9 Road, Huaykwang 10310 Bangkok
Verical® Version 6.5 Page 3 | 4

Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Device adjusted before measurement Yes
Temperature deviation considered 1.5 K (ISO/CAL active)
Temperature coefficient considered 1 · 10⁻⁶ /°K

Uncertainty of the weighing result U₉₅(W)
U₉₅(W) = 0.00013 g + 1.16 · 10⁻⁶ · R

Indication in % from max load	Net indication R	Uncertainty U ₉₅ (W)	Uncertainty relative U ₉₅ (W)/R
1 %	2.0000 g	0.00016 g	0.0071 %
25 %	50.0000 g	0.00077 g	0.0014 %
50 %	100.0000 g	0.0014 g	0.0013 %
75 %	160.0000 g	0.0020 g	0.0012 %
100 %	220.0000 g	0.0027 g	0.0012 %

Graphic realization of the relative uncertainty of measurement | process accuracy

Displayed example
Process accuracy 1.00 %
Safety factor 3
Minimum sample weight 0.0381 g

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Verical® Version 6.5 Page 4 | 4

SCG Metrology Center
SCI ECO Services Company Limited
51 Moo 8, Tukwong, Kaeng Khoi, Saraburi, Thailand 18260
Bangkok Tel : +668 9205 6851 +668 81904 0059
Saraburi Tel : +669 8947 2360
Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T251530 Page 1 of 3

Certificate of Calibration

Equipment : Chamber (Oven)
Manufacturer : MEMMERT
Model : UF 110
Serial No. : B416.2420
Customer Code : RYG_EN0012
ID No. : T6444A5
Customer : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenamkoon,
A.Pluakdaeng, Rayong 21140
Customer Location : ENVIRONMENT LABORATORY
Date of Receipt : 3 September 2025
Calibrated By : Sattjar Naknared (Site Calibration Manager)
Approved By : Boonchai Suriyawong (Site Calibration Manager)
Date of Issue : 17 SEP 2025

The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrology Center.

FM-TL1818-02-27-03-08

SCG Metrology Center
SCI ECO Services Company Limited
51 Moo 8, Tukwong, Kaeng Khoi, Saraburi, Thailand 18260

Certificate No. T251530 Page 2 of 3

Calibration Report

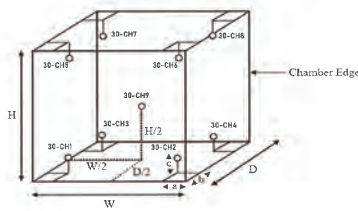
Equipment : Chamber (Oven)
Date of Calibration : 10 September 2025
Environment : Temperature : 35.7-36.6 °C
Line Voltage : 226.8-233.7 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :
1. This equipment was calibrated by insert use resistance thermometer detectors into its chamber , the other use resistance thermometer detector use for ambient temperature measurement . The calibration was done in accordance with ISO 17025 based on ASTM E1145-94 (Reapproved 2019) and ASTM E1195-1.
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .
2. Reference Standard Instrument : Instrument Model Instrument No. Certificate No. Due Date
RTD 100 ubn 36-(C11)-103 T242203 9 November 2025
DATA LOGGER 3497RA T47 T242203 9 November 2025
3. This certificate is traceable to : National Institute of Metrology (Thailand) through Metrology Center (NSC-TISI-TIS 17025 CALIBRATION) K044.
4. Condition of calibrated item : good
Equipment Description :
Time Constant : 3 Hour 29 Minute at 104 °C
Fresh Air Damper : ☒ Open ☐ Close ☐ Medium ☐ Max
☐ Not Available
5. Adjustment : () without adjustment (X) after adjustment

Approved By : [Signature]

FM-TL1818-02-27-03-08

Calibration Report



Remark : Internal Dimensions of Chamber : W (30-CH1) = 56 cm, H (30-CH1) = 48 cm, and D (Depth) = 40 cm.
Size of installed Standard sensor number 30-CH1 to number 30-CH8 : a = 5 cm, b = 5 cm, and c = 5 cm.
Size of installed Standard sensor number 30-CH9 : W/2 = 56 cm/2, H/2 = 48 cm/2, and D/2 = 40cm/2

Measurement Results

Average Standard Reading at each position (°C)									
Calibration Point	30-CH1	30-CH2	30-CH3	30-CH4	30-CH5	30-CH6	30-CH7	30-CH8	30-CH9
104	104.62	103.77	104.91	104.16	104.31	104.08	104.01	104.33	103.82
180	180.57	179.78	180.38	179.95	179.36	180.27	180.98	181.04	179.48

Chamber (Down)		Temperature Distribution				
Setting °C	Reading (°C)		Average (°C)	StdDev (°C)	Uncertainty (± °C)	Coverage Factor k
	Min.	Max				
104.0	103.9	104.1	104.0	0.08	0.62	2.00
180.0	179.9	180.1	180.0	0.22	1.51	2.00

* The quoted uncertainty includes 1-sigma

The calibration result applies after the date of latest item.

The result of test was found accurate as shown on date and place of test only.

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

End of Certificate

Approved By:

PM-TLUT 0027-03-68

Certificate of Calibration

Cert.No.: 25CHO537
Page: 1 of 3

Equipment :
Manufacturer :
Model :
Serial No. :
ID No. :
Condition As-Received :
Received Date :
Calibration Date :
Reference :
Submitted by :

Spectrophotometer

HACH

DR3900

2021559

BKK_EN0356

Used Item

08 October 2025

08 October 2025

2510-004200-11

ALS Laboratory Group (Thailand) Co.Ltd.

104 Phatthanasak Rd.,

Khwaeng Phatthanasak, Khet Suan Luang,

Bangkok 10250 Thailand

Wet Chemistry Lab 2

Calibration Place :

Ambient Temperature :

Relative Humidity :

Calibration Procedure :

Calibrated by :

Approved by :

() Chakrit Watanavajana

() Porpan Papijan

(✓) Sathip Meangmai

Issue Date :

Uthen Kankaw

Approved Signatory

9 October 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

Condition of calibration result

1. Reference Standard Material :

Material	Serial No.	Certificate No.	Due date
1. Absorbance Standard set	44487	122584	31 May 2026
2. Wavelength Standard set	36730	118120	15 Jan 2026
3. Wavelength Standard set	36730	118121	15 Jan 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certificate is traceable to the International System of Unit maintained through :
- Starna Scientific Ltd.

4. Spectral Bandwidth : 5 nm
Scan Speed : - nm/min

Calibration Results : without adjustment

WaveLength Accuracy	Certified Values of Reference Material (nm)	UUC Reading (nm)	Uncertainty of Measurement (± nm)	Coverage Factor k
	418.40	418	0.59	2.00
	476.86	480	0.59	2.00
	513.75	513	0.59	2.00
	537.00	536	0.59	2.00
	636.00	636	0.59	2.00
	747.61	748	0.59	2.00
	807.04	807	0.59	2.00



Cert. No. : 25CHO537

Page : 3 of 3

Calibration Results : without adjustment

Photometric Accuracy

Wavelength (nm)	Certified Values of Reference Material (Abs.)	UUC Reading (Abs.)	Uncertainty of Measurement (± Abs.)	Coverage Factor k
420.0	Zero	0.000	0.0028	2.00
	0.5750	0.573	0.0028	2.00
	0.7156	0.713	0.0028	2.00
	1.0176	1.014	0.0028	2.00
440.0	Zero	0.000	0.0028	2.00
	0.5598	0.557	0.0028	2.00
	0.7037	0.700	0.0028	2.00
	1.0013	0.997	0.0028	2.00
465.0	Zero	0.000	0.0028	2.00
	0.5222	0.522	0.0028	2.00
	0.6646	0.664	0.0028	2.00
	0.9444	0.945	0.0028	2.00
546.1	Zero	0.000	0.0028	2.00
	0.5234	0.523	0.0028	2.00
	0.7007	0.700	0.0028	2.00
	0.9962	0.999	0.0028	2.00
590.0	Zero	0.000	0.0028	2.00
	0.5573	0.556	0.0028	2.00
	0.7760	0.773	0.0028	2.00
	1.1104	1.108	0.0028	2.00
635.0	Zero	0.000	0.0028	2.00
	0.5648	0.565	0.0028	2.00
	0.7654	0.765	0.0028	2.00
	1.0961	1.096	0.0028	2.00

Remark

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer

- 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 %.

-00-

ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

പ്രശ്നം: 1. 1000 രൂപയുടെ ഒരു പണി

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
20	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Formaldehyde	Distillation, Colorimetric Method ⁽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	สารมลพิษ	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass spectrometric Method ⁽⁴⁾
42	Methiocarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽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 Phosphorus	Digestion, Colorimetric Method ⁽⁴⁾
57	Total Suspended Solids	Dried from 103-105 °C ⁽⁴⁾
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
60	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

น้ำใต้ดิน...

น้ำใต้ดิน จำนวน 126 รายการ

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

18 Bis(2-ethylhexyl)phthalate...

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

36 Chrysene...

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

56 1,3-Dichloropropene...

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

76 γ-HCH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-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	สารมลพิษ	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾ 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₈ -C ₁₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(4,25)

110 TPH (C₈-C₁₆)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C ₁₀ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^{9,22}
111	TPH (C ₁₆ -C ₃₅)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^{9,22}
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁶¹
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁶¹
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁶² 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁶¹
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁶² 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹
2	Arsenic	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹ 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹
3	Beryllium	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹ 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹
4	Cadmium	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹ 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹
5	Carbon Monoxide	1) Instrumental Analyzer Method ⁶² 2) Sampling Bag Non-Dispersive Infrared Method ⁶¹
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ⁶¹ 2) Isokinetic Sampling, Ion Chromatographic Method ⁶¹
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
10	Cresol	Absorption Sampling, Gas Chromatographic Method ⁶¹
11	Dioxins	Isokinetic Sampling ⁶¹
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ⁶¹ 2) Isokinetic Sampling, Ion Chromatographic Method ⁶¹
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ⁶¹ 2) Isokinetic Sampling, Ion Chromatographic Method ⁶¹
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁶¹

15 Lead...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁶¹ 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁶¹
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
19	Opacity	Ringelmann's Method ⁶¹
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁶¹ 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ⁶¹ 3) Instrumental Analyzer Method ⁶¹
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁶¹ 2) Instrumental Analyzer Method ⁶¹
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ⁶¹
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ⁶¹ 2) Paired Train, Isokinetic Sampling, Gravimetric Method ⁶¹

27 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁶¹ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁶¹
28	Xylene	Absorption Sampling, Gas Chromatographic Method ⁶¹

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^{1,9,26} 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{16,26} 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^{1,16}
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,16} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,16} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^{1,6,16} 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{1,6,17} 3) Digestion, Inductively Coupled Plasma Method ^{7,16} 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^{7,17}

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 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 ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.19) 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 (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.14.19) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.17.19) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.8.16.19) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.8.17.19)

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 ^(1.6.16) 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)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 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 ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
14	DDO	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24)

2) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 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 ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)

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 ^(1.6.30) 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾ 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽²¹⁾
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.28) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.28) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.17)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 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 ^(1.9.26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10.26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11.26)

- 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',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29) Electrometric Method ^(23,24)
29	pH	
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

31 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

ดิน...

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
2	Acetone	1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ⁽¹³⁾
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,25)

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
15	Benzog(h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,25)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,25)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(13,25)
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,29)

23 Cadmium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 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 ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 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 ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,14,15) 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	สารเคมี	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(27,28,29)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 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 ^(9,26) 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	สารเคมี	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 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 ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

63 Di-n-Octyl Phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 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 ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(9,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽¹³⁾

73 n-Hexane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
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 ⁽²⁰⁾ 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽²¹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
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 ^(13,25)
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	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,2',3,4,6'-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',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	สารมลพิษ	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 ^(13,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
108	TPH (C ₅ -C ₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
109	TPH (C ₈ -C ₁₆)	1) Automate Extraction, Gas Chromatographic Method ^(12,22) 2) Solvent Extraction, Gas Chromatographic Method ^(12,23) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(12,23)
110	TPH (C ₁₈ -C ₃₅)	1) Automate Extraction, Gas Chromatographic Method ^(12,22) 2) Solvent Extraction, Gas Chromatographic Method ^(12,23) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(12,23)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)

115 2,4,5-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
115	2,4,5-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,29)
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,29)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)

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ที่ ๒๒/๒๕๖๖/๔๓๒๒

กรมโรงงานอุตสาหกรรม
แบบพระราชที่ ๖ แห่งราชบัญญัติ
เลขาธิการฯ กรุงเทพมหานคร ๑๐๕๐๐

๒๕ มีนาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนเอเอส แล็บอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ มีนาคม ๒๕๖๗

ตามที่ขอที่อ้างถึง บริษัท เอนเอเอส แล็บอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ที่ขอปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๐๔-๙-๐๑๔ ของพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดดังนี้

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

- ให้อยู่เดิมจำนวนที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย
 - นางสาวพรณิศา ทุมมกร ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๔๕
 - นายกฤษณ์ สุทธิเมศ ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๔๖
 - นางสาวศุภรดา นิยมสุภา ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๔๗
- ให้เพิ่มจำนวนที่ขอปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๒ ราย
 - นางสาวฐาณิศา เกียรติจิรา ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๔๘
 - นางสาวณิษฐภัทร ลาภคำ ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๔๙
 - นางสาวณิษฐภัทร กับนายศักดิ์ ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๐
 - นายอำนาจ วรพาศน ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๑
 - นายฤทธิเดช นิยมสุภา ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๒
 - นายณัฐกร ทรรษา ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๓
 - นายวิจิตร ฝั่งสาธิตน ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๔
 - นายณัฐพงศ์ โสภา ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๕
 - นายคิรินทร์ ปานพิง ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๖
 - นายณัฐพล ชุ่มชื่น ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๗
 - นายธนา สุภาพินดี ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๘
 - นายบรรณ แก้วพินิจ ทะเบียนเลขที่ ๖-๒๐๐๔-๙-๐๑๕๙

อนึ่ง หนังสือฉบับนี้...

อนึ่ง ทนุสือฉบับนี้จะส่งมอบพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๒

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรศ กสิณารอง)
รองเลขาธิการ
อธิบดีกรมอุตสาหกรรม

กองวิจัยและเตือนภัยพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th

ที่ อก ๐๓๑๐(๑)/ ๑๒๓๖ ๘ ๑



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ ธันวาคม ๒๕๖๑

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒ ธันวาคม ๒๕๖๑

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๘ ราย ได้แก่

๑) นายประพนธ์ วรรณชัย	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๐
๒) นายจิรชัย ขาวละออ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๑
๓) นายพิพัฒน์ กำคำ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๒
๔) นางสาวอรุษา คำคำล่อง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๓
๕) นายกิตติพงศ์ แซ่ลี	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๔
๖) นายจิรเมธ ประเสริฐศิริพงษ์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๕
๗) นายภัทรพงษ์ มณฑาทอง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๖
๘) นางสาวจารุวรรณ กระจำพันธุ์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๗

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
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โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th

ที่ อก ๐๓๑๐(๑)/ ๑๒๓๖ ๘ ๑



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๐ เมษายน ๒๕๖๒

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒ เมษายน ๒๕๖๑

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๒ ราย ได้แก่

๑) นายสิริพงศ์ บัวแดง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๒
๒) นายมงคล ผลาทิพย์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๓

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th

ที่ อก ๐๓๑๐(๑)/ ๑๒๓๖ ๘ ๑



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๕ มิถุนายน ๒๕๖๒

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๙ พฤษภาคม ๒๕๖๑

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน
จำนวน ๑๑ ราย ได้แก่

๑) นายอุดมกร มั่นชื่น	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๔
๒) นายชัชวาล แสนมา	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๕
๓) นายเอกรินทร์ บุคสิทธิ์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๖
๔) นายพิชานนท์ อินทริ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๗
๕) นายศรธรรม แก้วกันหา	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๘
๖) นายวิกรม มีศิริ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๐๙
๗) นายศุภณันท์ คำจันทร์	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๑๐
๘) นายธีรวิทย์ มีใหญ่	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๑๑
๙) นายธีรพงษ์ ศรีคำแหง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๑๒
๑๐) นายอภิสิทธิ์ ศรีคำแหง	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๑๓
๑๑) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศิริ	ทะเบียนเลขที่ ๖-๒๐๔-๑-๐๑๑๔

อนึ่ง ทนุสือฉบับนี้จะส่งมอบพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th



ที่ ฮก ๐๓๑๐(๒)/ ๒๕๐๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๐๐๐

๒๑ สิงหาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท แอลแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษที่ต้องปฏิบัติการวิเคราะห์เอกสาร
ลงวันที่ ๒๗ มิถุนายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท แอลแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๖ แผ่น

ตามคำขอที่อ้างถึง บริษัท แอลแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ต้องปฏิบัติตาม
วิเคราะห์เอกสาร เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท แอลแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในใบที่ได้ยื่น สิ่งปลูกและวัสดุที่ไม่ใช่แล้ว และคืน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะมีผลใช้บังคับเมื่อได้รับหนังสือตอบยืนยันขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกสาร
ในวันที่ ๒ กันยายน ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวปัทมวรรณ คุณประเสริฐ)
ผู้อำนวยการศูนย์วิเคราะห์และประเมินผลโรงงาน
ปฏิบัติการตามระเบียบกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๖ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๖ ๖๓๑๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ srabanguldw@mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท แอลแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ ฮก ๐๓๑๐(๒)/ ๒๕๐๘

ลงวันที่ ๒๑ สิงหาคม ๒๕๖๕

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔๐ รายการ

นำสืบ จำนวน ๔ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aluminum	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽²⁾
2	Copper	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽²⁾
3	Iron	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽²⁾
4	Molybdenum	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽²⁾

สิ่งปลูกและวัสดุที่ไม่ใช่แล้ว จำนวน 17 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
2	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
3	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)

Beryllium

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
4	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
5	Gadolinium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
6	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
7	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,3,4,8) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,3,7,8) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(4,5,6,8) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(4,5,7,8)
8	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7)

3) Digestion...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Copper	3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
10	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
11	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
12	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
13	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)

14 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,6) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
15	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,6) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
16	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,6) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
17	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,6) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)

สิ้น จำนวน 19 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aluminum	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
2	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)

3 Arsenic...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
4	Barium	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
5	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
6	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
7	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
8	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(9,5,8) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(9,5,8)
9	Copper	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
10	Iron	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
11	Lead	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
12	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
13	Molybdenum	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
14	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)

15 pH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	pH	Electrometric Method ⁽⁹⁾
16	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
17	Silver	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
18	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)
19	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(8,6) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(5,7)

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ที่ อก ๐๓๐๓(๑)๕๐ ๑๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๖ กันยายน ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากร ชื่อตัวและชื่อสกุลของบุคลากร

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอมติการสมัครของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๑ สิงหาคม ๒๕๖๕

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัดต้องปฏิบัติตามวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๕ สถานที่ตั้งเลขที่ ๓๐๕ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ชื่อตัวและชื่อสกุลของบุคลากร สอดคล้องตามเอกสารแนบ

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้อยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นางสาวพุดดี คุณนาม ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๑๓๕

๒) นางสาวอรณิศา เทียนคำ ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๑๓๕

๒. ให้เปลี่ยนชื่อตัวและชื่อสกุลของเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จากเดิม

นายอาทิตย์ ศรีเสน เป็น นายวิฑูรย์ ทวีกิจวรรณ ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๘๔

อนึ่ง หนังสือฉบับนี้จะสิ้นสุดอายุพร้อมหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ในวันที่ ๒ กันยายน ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

๒

(นางสาวปัทมาวรรณ คุณประเสริฐ)
ผู้อำนวยการอาวุโสและโฆษกและประชาสัมพันธ์
ปฏิบัติการแผนกสนับสนุนกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนามิเตอร์โรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ sarabangadiv@mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"





๐๘ สิงหาคม ๒๕๖๗

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอนแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๗ พฤษภาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอนแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๓ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอนแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๓๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอลำปาง จังหวัดลำปาง ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอนแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน

๑) นายเดช ช้างชน

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๑

๒) นางสาวณิษฐ์ บริรักษ์

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๒

๓) นายสุพจน์ สยามเดช

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๓

ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน

๑) นายณัฐพงษ์ เพ็ชรนา

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๑

๒) นางสาวกัญญารัตน์ รักดี

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๒

๓) นางสาวจุฑารัตน์ สีทองกลาง

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๓

๔) นางสาวจิตสุภา ประเทืองสุข

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๔

๕) นายสรสรณ์ คุ้มก้อย

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๕

๖) นายณัฐวุฒิ อมรมพรวราช

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๖

๗) นายจิตรกร สีเสนา

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๗

๘) นายสิทธิวิทย์ สุวรรณรัตน์

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๘

๙) นายสิทธิพันธ์ เสนาธิ์

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๐๙

๑๐) นายอนุวัฒน์ เตม

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๑๐

๑๑) นายสุวิทย์ นาทพงษ์

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๑๑

๑๒) นายณัฐพล เขียววิวัฒน์

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๑๒

๑๓) นายชานนท์ บุญชื่น

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๑๓

๑๔) นายณัฐกานต์ วงศ์อินทร์อยู่

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๑๔

๑๕) นายอานนท์ โพธิ์พรหมทอง

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๑๕

๑๖) นายณิชาพล...

๑๖) นายณิชาพล ถักกลาง
๑๗) นายศุภณัฐ พิสัยพันธ์
๑๘) นายสันต์ คินันต์
๑๙) นายวิญญู วัฒนศิริ
๒๐) นายศุภณัฐ สกฤตติมงคล
๒๑) นายเอกชัย ถิ่นทอง
๒๒) นายพงษ์เทพ สิทธิเสนา
๒๓) นายพินกร ภุมมา
๒๔) นางสาวนันทยา บุญจันทร์
๒๕) นายสิทธิชัย อันพิมาย
๒๖) นางสาวภาวณีน พลทอง
๒๗) นางสาวพจนา สีดา
๒๘) นางสาวอนิศา กลุศิริวงศ์
๒๙) นายพิทยา ทองแดง
๓๐) นางสาวธิดา สุขเกษ
๓๑) วาที่ร้อยตรี ธนชัย ม่วงมา
๓๒) นายวรวิทย์ พันพา
๓๓) นายศักดิ์รินทร์ จรัสกาย
๓๔) นายสุรศักดิ์ สาขิน
๓๕) นายสฤตกร งามแก้ว
๓๖) นายสุทธิดำรง โชคดีนันท์
๓๗) นายวิมลกร หันไชยเนาว์
๓๘) นางสาววนิดา เจริญตระกูล
๓๙) นายธนสิทธิ์ วงศ์ไชย
๔๐) นายชัยนุสรณ์ เลิศนันท์กุลชัย
๔๑) นายสุจิตา เพ็ชรแสง
๔๒) นายกมลภณ มณีสัมพันธ์
๔๓) นายอริณทร อิกจินดา
๔๔) นายศุภชัย วงศ์สุริยา
๔๕) นายโสภณ ดันท์
๔๖) นางสาวกิตติยา สัตยาธิปไตย
๔๗) นางสาวอริณทร ดันท์
๔๘) นายพิพัฒน์ นิกิตร์เศรษฐ์
๔๙) นายศิริวัชร เรืองสม
๕๐) นายปารเมศ สัตยาคุณ
๕๑) นายณพนาถ ธรรมเสโร
๕๒) นางสาวศุภกานต์ โลจันท์

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ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๕๓

๕๓) นายพชรกร...

๕๒) นายพชรกร เจริญ
๕๓) นายทิวากร เจริญ
๕๔) นายอนุวัตร ทองขจรศักดิ์
๕๕) นายอภิชาติ วิลาศ
๕๖) นายจิรวิทย์ ศรีวิภา
๕๗) นายประสาธน์ เจริญพร
๕๘) นายภาณุวัฒน์ วัง
๕๙) นายสันติ ชัยชนะ
๖๐) นายสันติ ชัยชนะ
๖๑) นายทินกร กุลชาติ

ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๕๔
ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๕๕
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ทะเบียนเลขที่ ๖-๓๒๓-๙-๐๐๖๒

ค. ขอบข่ายชนิดสารเคมีที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย

ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒๘ มิถุนายน ๒๕๖๘ หากประสงค์จะต่ออายุหนังสือ

รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงาน

อุตสาหกรรมภายใน ๖๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพชรกิต ภาณุภรณ์)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและพัฒนาระบบพลังงานภาคตะวันออก
โทร. ๐ ๓๓๓๓ ๖๐๕๔ ต่อ ๕๐๐๑-๒
อีเมล: ewr@ewr.go.th



อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอนแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓

ที่ อก ๐๑๒๐/ ๗ ๕๓ ๘ ลงวันที่ ๐๘ สิงหาคม ๒๕๖๗

ขอขยายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

น้ำเสีย จำนวน ๑๔ รายการ

ลำดับ ที่	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 ^[1]
6	Free Chlorine	DPD Ferrous Titrimetric Method ^[2]
7	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method ^[2]
8	pH	Electrometric Method ^[2]
9	Phenols	1) Distillation, Chloroform Extraction Method ^[2] 2) Distillation, Direct Photometric Method ^[2]
10	Sulfide	ZnS Precipitation, Iodometric Method ^[2]
11	Temperature	Field Method ^[2]
12	Total Dissolved Solids	Dried at 180 °C ^[2]
13	Total Kjeldahl Nitrogen	Semi-Macro Kjeldahl Method ^[2]
14	Total Suspended Solids	Dried at 103-105 °C ^[2]

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับ ที่	สารเคมี	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[2]
2	pH	Electrometric Method ^[2]
3	Phenols	Distillation, Direct Photometric Method ^[2]

อากาศเสีย...

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ^[5] 2) Instrumental Analyzer Method ^[9]
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
3	Opacity	Ringelmann's Method ^[5,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[8] 2) Instrumental Analyzer Method ^[10]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Acid Method ^[5] 2) Instrumental Analyzer Method ^[11]
6	Sulfuric Acid	Isokinetic Sampling, Barium – Titrimetric Method ^[6]
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[7]

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7. United States...

7. United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2020.
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11. United States Environmental Protection Agency. Determination of Sulfur dioxide Emission from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 6C, 2017.



ที่อก ๐๓๑๐/ ๑๐๐๕๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๕ ตุลาคม ๒๕๖๕

เรื่อง แก้ไขรายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอนแอล เอส แอวราทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง หนังสือ บริษัท เอนแอล เอส แอวราทอรี่ กรุ๊ป (ประเทศไทย) จำกัด เลขที่ EN 2024/005

ลงวันที่ ๑๙ สิงหาคม ๒๕๖๕

ตามที่สำนักงานได้แจ้ง บริษัท เอนแอล เอส แอวราทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอบึงสามพัน จังหวัดพะเยา ขอแก้ไขเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน เนื่องจากมีความคลาดเคลื่อน ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรม ได้รับทราบและดำเนินการแก้ไขรายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๕ ราย ตามที่แจ้งเรียบร้อยแล้ว เป็นดังนี้

ลำดับที่ ๒๗ นางพจนา สีดา

ลำดับที่ ๒๘ นายสุวณัฐ ภูสุมังค

ลำดับที่ ๓๐ นายชัชวาล สุบงกช

ลำดับที่ ๓๖ นายสุทธิศักดิ์ โชคดีสิน

ลำดับที่ ๔๒ นายกันตพล มณีสินพันธ์

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายพรชัย กลิ่นกรอ)
รองอธิบดี (ปฏิบัติ) สาขามลพิษ
สิ่งแวดล้อม กรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและพัฒนาระบบเทคโนโลยีสารสนเทศ

โทร. ๐ ๒๓๒๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ ew@dw.m.go.th

 "อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่อก ๐๓๑๐(๒)/ ๔๒๔๖



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๐ พฤษภาคม ๒๕๖๕

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนแอล เอส แอวราทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

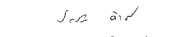
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๐ เมษายน ๒๕๖๕

ตามที่ขอขึ้นทะเบียน บริษัท เอนแอล เอส แอวราทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอบึงสามพัน จังหวัดพะเยา ขอแจ้งยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ออกให้เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑ ราย ได้แก่ นายปารมศ สัตยาคุณ ทะเบียนเลขที่ ๖-๑๒๓-๖๐๐๕๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายประสม คำพงษ์)
ผู้อำนวยการศูนย์พัฒนาระบบเทคโนโลยีสารสนเทศ
กรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและพัฒนาระบบเทคโนโลยีสารสนเทศ

โทร. ๐ ๒๓๒๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ ew@dw.m.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๓)/ ๕๕๐ ๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๗ พฤษภาคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงชื่อ-สกุลบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๕ พฤษภาคม ๒๕๖๘

ตามคำขอที่ยังถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่แก้ว อำเภอลำปาง
จังหวัดลำปาง ขอเปลี่ยนแปลงชื่อ-สกุลบุคลากร ความละเอียดแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เปลี่ยนแปลงชื่อ-สกุลบุคลากร จำนวน ๑ ราย
จากนายธนสิทธิ์ วงศ์ไชย เป็น นายอมลวิทย์ วงศ์ไชย

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงพงษ์)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติการตามหนังสือกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ einw@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



ที่ อก ๐๓๑๐(๓)/ ๕๗๖ ๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๒ ธันวาคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๑ ตุลาคม ๒๕๖๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามคำขอที่ยังถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่แก้ว อำเภอลำปาง
จังหวัดลำปาง ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในน้ำเสีย และน้ำใต้ดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะส่งอายุพร้อมหนังสือต่ออายุฉบับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒๘ มิถุนายน ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวปัทมวรรณ คุณประเสริฐ)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติการตามหนังสือกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน
ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ einw@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓

ที่ อก ๐๓๑๐(๓)/ ๕๗๖ ๕ ลงวันที่ ๐๒ ธันวาคม ๒๕๖๘

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๓ รายการ

น้ำเสีย จำนวน 13 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Arsenic	Digestion, Inductively Coupled Plasma Method
2	Barium	Digestion, Inductively Coupled Plasma Method
3	Cadmium	Digestion, Inductively Coupled Plasma Method
4	Chromium	Digestion, Inductively Coupled Plasma Method
5	Copper	Digestion, Inductively Coupled Plasma Method
6	Hexavalent Chromium	Colorimetric Method
7	Lead	Digestion, Inductively Coupled Plasma Method
8	Manganese	Digestion, Inductively Coupled Plasma Method
9	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method
10	Nickel	Digestion, Inductively Coupled Plasma Method
11	Selenium	Digestion, Inductively Coupled Plasma Method
12	Trivalent Chromium	Calculation
13	Zinc	Digestion, Inductively Coupled Plasma Method

น้ำใต้ดิน จำนวน 20 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aluminum	Digestion, Inductively Coupled Plasma Method
2	Antimony	Digestion, Inductively Coupled Plasma Method
3	Arsenic	Digestion, Inductively Coupled Plasma Method
4	Barium	Digestion, Inductively Coupled Plasma Method
5	Beryllium	Digestion, Inductively Coupled Plasma Method
6	Cadmium	Digestion, Inductively Coupled Plasma Method
7	Chromium	Digestion, Inductively Coupled Plasma Method
8	Chromium (III)	Calculation
9	Chromium (VI)	Colorimetric Method
10	Copper	Digestion, Inductively Coupled Plasma Method

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Iron	Digestion, Inductively Coupled Plasma Method
12	Lead	Digestion, Inductively Coupled Plasma Method
13	Manganese	Digestion, Inductively Coupled Plasma Method
14	Mercury	Digestion Cold-Vapor Atomic Absorption Spectrometric Method
15	Molybdenum	Digestion, Inductively Coupled Plasma Method
16	Nickel	Digestion, Inductively Coupled Plasma Method
17	Selenium	Digestion, Inductively Coupled Plasma Method
18	Silver	Digestion, Inductively Coupled Plasma Method
19	Vanadium	Digestion, Inductively Coupled Plasma Method
20	Zinc	Digestion, Inductively Coupled Plasma Method

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24th ed. Washington, DC: APHA, 2023.