

## ภาคผนวก ง

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Nitrogen Dioxide	NO <sub>2</sub> Analyzer	SGK_FS0094	3-Jul-24	3-Jan-25	6
Ambient	Nitrogen Dioxide	NO <sub>2</sub> Analyzer	BKK_FS1082	3-Jul-24	3-Jan-25	6
Ambient	Nitrogen Dioxide	NO <sub>2</sub> Analyzer	SGK_FS0092	3-Jul-24	3-Jan-25	6
Ambient	Nitrogen Dioxide	NO <sub>2</sub> Analyzer	BKK_FS1084	3-Jul-24	3-Jan-25	6
Ambient	Particulate Matter (PM-10)	High Volume	SGK_FS0087	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	SGK_FS0065	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	BKK_EN0403	3-Jun-24	3-Jun-25	12
Ambient	Total Suspended Particulate	High Volume	SGK_FS0085	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	SGK_FS0119	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	BKK_EN0403	3-Jun-24	3-Jun-25	12
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	SGK_FS0036	3-Jul-24	3-Jan-26	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	SGK_FS0035	3-Jul-24	3-Jan-26	18
Ambient	Formaldehyde	Field Rotameter	SGK_FS0141	2-Jul-24	2-Oct-24	3
Ambient	Formaldehyde	Field Rotameter	BKK_FS1007	2-Jul-24	2-Oct-24	3
Ambient	Formaldehyde	Field Rotameter	SGK_FS0138	2-Jul-24	2-Oct-24	3
Ambient	Formaldehyde	Field Rotameter	SGK_FS0138	2-Oct-24	2-Jan-25	3
Ambient	Formaldehyde	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Ambient	Formaldehyde	GC-FID	BKK_EN0126	22-Oct-24	22-Apr-26	18
Noise	Leq 24 hrs	Sound Calibrator	SGK_FS0114	19-Dec-23	18-Dec-24	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0128	11-Mar-24	10-Mar-25	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0127	11-Mar-24	10-Mar-25	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0133	17-Jun-24	17-Jun-25	12
Workplace	Formaldehyde	Field Rotameter	BKK_FS1007	2-Jul-24	2-Oct-24	3
Workplace	Formaldehyde	Field Rotameter	SGK_FS0138	2-Oct-24	2-Jan-25	3
Workplace	Formaldehyde	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Formaldehyde	GC-FID	BKK_EN0126	22-Oct-24	22-Apr-26	18
Workplace	Methanol	Field Rotameter	BKK_FS1007	2-Jul-24	2-Oct-24	3
Workplace	Methanol	Field Rotameter	SGK_FS0138	2-Oct-24	2-Jan-25	3
Workplace	Methanol	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Methanol	GC-FID	BKK_EN0126	22-Oct-24	22-Apr-26	18
Workplace	Total Dust	Field Rotameter	BKK_FS0592	2-Jul-24	2-Oct-24	3
Workplace	Total Dust	Field Rotameter	SGK_FS0140	2-Oct-24	2-Jan-25	3
Workplace	Total Dust	Analytical Balance 5 D.	SGK_CL0077	15-Jan-24	15-Jan-25	12
Workplace	Total Hydrocarbon	Total Hydrocarbon Analyzer	BKK_FS1068	11-Dec-23	11-Jun-25	18
Noise	Leq 8 hrs	Sound Calibrator	SGK_FS0114	19-Dec-23	18-Dec-24	12
Noise	Leq 8 hrs	Sound Level Meter	SGK_FS0134	17-Jun-24	17-Jun-25	12
Noise	Leq 8 hrs	Sound Level Meter	SGK_FS0023	12-Jan-24	11-Jan-25	12
Noise	Noise Dose, TWA	Dose Badge Reader	SGK_FS0006	12-Jun-24	12-Jun-25	12
Heat	Heat Stress	Heat Stress Monitor	SGK_FS0008	11-Sep-23	11-Sep-24	12
Heat	Heat Stress	Heat Stress Monitor	SGK_FS0009	11-Sep-23	11-Sep-24	12
Heat	Heat Stress	Heat Stress Monitor	SGK_FS0041	5-Jan-24	4-Jan-25	12
Heat	Heat Stress	Heat Stress Monitor	SGK_FS0042	26-Apr-24	25-Apr-25	12
Illuminance	Illuminance	Lux Meter	SGK_FS0012	26-Sep-23	26-Sep-24	12
Illuminance	Illuminance	Lux Meter	SGK_FS0020	26-Aug-24	26-Aug-25	12
Songkhla Lab	BOD	Incubator	SGK_CL0028	13-Jul-23	13-Jan-25	18
Songkhla Lab	BOD	DO/BOD Analyser	SGK_CL0073	21-May-24	21-Nov-25	18
Songkhla Lab	COD	COD Reactor	SGK_CL0085	24-Jan-24	24-Jan-25	12
Songkhla Lab	COD	Spectrophotometer	SGK_CL0038	24-Jan-24	24-Jan-25	12
Songkhla Lab	Formaldehyde	Spectrophotometer	SGK_CL0040	25-Jan-24	25-Jan-25	12
Songkhla Lab	Formaldehyde	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	pH at 25 °C	pH meter	SGK_CL0030	19-Oct-24	19-Apr-26	18
Songkhla Lab	Oil & Grease	Electronic Top-Loading Balance	SGK_CL0045	15-Jan-24	15-Jan-25	12
Songkhla Lab	Oil & Grease	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Songkhla Lab	Oil & Grease	Water Bath	SGK_CL0035	13-Jul-23	13-Jan-25	18
Songkhla Lab	Total Dissolved Solids 180°C	Electronic Top-Loading Balance	SGK_CL0045	15-Jan-24	15-Jan-25	12
Songkhla Lab	Total Dissolved Solids 180°C	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Songkhla Lab	Total Suspended Solids	Electronic Top-Loading Balance	SGK_CL0045	15-Jan-24	15-Jan-25	12
Songkhla Lab	Total Suspended Solids	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Songkhla Lab	Conductivity	Conductivity Meter	SGK_CL0032	6-May-24	6-May-25	12



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Songkhla Lab	Total Coliform	Autoclave	SGK_ML0001	1-Jul-24	1-Jan-26	18
Songkhla Lab	Total Coliform	Incubator	SGK_ML0013	15-Jan-24	15-Jul-25	18
Songkhla Lab	Total Coliform	pH Meter	SGK_ML0016	2-Jul-24	2-Jan-26	18
Songkhla Lab	Total Coliform	Water Bath	SGK_ML0021	1-Jul-24	1-Jan-26	18
Songkhla Lab	Fecal Coliform	Autoclave	SGK_ML0001	1-Jul-24	1-Jan-26	18
Songkhla Lab	Fecal Coliform	Incubator	SGK_ML0013	15-Jan-24	15-Jul-25	18
Songkhla Lab	Fecal Coliform	pH Meter	SGK_ML0016	2-Jul-24	2-Jan-26	18
Songkhla Lab	Fecal Coliform	Water Bath	SGK_ML0021	1-Jul-24	1-Jan-26	18
Songkhla Lab	Arsenic	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Arsenic	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Cadmium	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Cadmium	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Chromium	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Chromium	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Copper	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Copper	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Iron	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Iron	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Lead	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Lead	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Zinc	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Zinc	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Songkhla Lab	Mercury	ICP-MS	SGK_CL0048	2-Aug-23	2-Feb-25	18
Songkhla Lab	Mercury	Cold Room Water	SGK_CL0065	1-Jul-24	1-Jan-26	18
Water Lab	Sulfate	Ion Chromatography	BKK_EN0069	12-Jan-24	12-Jan-25	12
Water Lab	Ammonia Nitrogen	Discrete analyzer	BKK_EN0037	16-Aug-24	16-Aug-25	12
Water Lab	Chloride	Ion Chromatography	BKK_EN0069	12-Jan-24	12-Jan-25	12

MULTIPOINT CALIBRATION REPORT

Calibration Date 5-Jul-24  
 Manufacturer NOXTEKA  
 Serial No. NKRT13TF  
 Calibrator Manufacturer Teklynx AP1  
 Serial No. 647  
 Blk Gas Concentration (PPM) 85.68  
 Cylinder Pressure (psig) 1800  
 Certified Date 5-Feb-22

Equipment Name N2O Analyzer  
 Model APNA-370  
 Equipment ID SKC\_F300A4  
 Model 700  
 Cylinder No. 0N1027222  
 Certified By Alpina Inc.  
 Expiry Date 5-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	97.20	-2.80	-2.80	100.90	0.90	0.90
2	200.00	198.50	-1.50	-0.75	201.50	1.50	0.65
3	300.00	298.50	-1.50	-0.50	301.10	1.10	0.37
4	400.00	398.30	-1.70	-0.42	402.10	2.10	0.53
AVERAGE (%)				-0.47			0.51

The graph displays the calibration results for the N2O Analyzer. The x-axis represents the Ideal concentration in PPM, ranging from 0 to 400. The y-axis represents the Actual concentration in PPM, ranging from 0 to 400. The legend indicates three data series: Ideal (dashed line), Actual NO (solid line with circles), and Actual NOx (solid line with circles). The Actual NO data points are approximately (0, 0.1), (100, 97.2), (200, 198.5), (300, 298.5), and (400, 398.3). The Actual NOx data points are approximately (0, 0.1), (100, 100.9), (200, 201.5), (300, 301.1), and (400, 402.1). The graph shows a linear relationship between the Ideal and Actual concentrations, with the Actual NO data points slightly below the Ideal line and the Actual NOx data points slightly above the Ideal line.

Collected By


(Mr. Javedul Islam)  
 Field Environmental Scientist (S)

Approved By

(Mr. Sarayuth Sitthamont)  
 Assistant Chemical Manager

ALS Laboratory Group

FORM NO. F-06-08 REVISING NO. - ISSUE DATE: 02/04/12


		<b>MULTIPOINT CALIBRATION REPORT</b>	
Calibration Date	<u>3-Jul-24</u>	Equipment Name	<u>NOx Analyzer</u>
Manufacturer	<u>HORIBA</u>	Model	<u>APNA-5T0</u>
Serial No.	<u>X08UJ8C0</u>	Equipment ID	<u>BK06_F81062</u>
Calibrator Manufacturer	<u>Telintech AP1</u>	Model	<u>700</u>
Cal No.	<u>847</u>	Cylinder No.	<u>0N0027222</u>
Std. Gas Concentration (PPM)	<u>65.64</u>	Certified By	<u>Alexis Inc.</u>
Cylinder Pressure (psi)	<u>1800</u>	Expired Date	<u>5-Jul-30</u>
Certified Date	<u>5-Jul-23</u>		

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	98.10	-1.90	-1.90	101.30	1.30	1.30	
2	200.00	202.25	2.25	1.10	198.00	-1.00	-0.50	
3	300.00	301.00	1.00	0.33	294.50	-1.50	-0.50	
4	400.00	398.30	-1.70	-0.42	401.50	1.50	0.38	
<b>AVERAGE (%)</b>				<b>-0.16</b>			<b>0.15</b>	


  

Called By



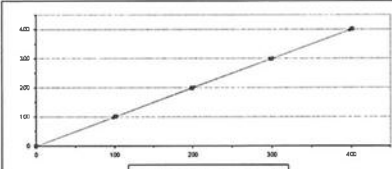
(Mr. Vincent Bidman)  
Field Environmental Scientist (F)

Approved By



(Mr. Sempyth Aitken)  
Assistant General Manager



ALS Laboratory Group  
 FORM NO. F-06-09 REVISED - ISSUE DATE: 6/24/13

MULTIPOINT CALIBRATION REPORT

Calibration Date	3-Jul-24	Equipment Name	N <sub>2</sub> O Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	WH86GLLL	Equipment ID	BKG_F30682
Calibrator Manufacturer	TeddyGAP	Model	700
Serial No.	847		
Btl. Gas Concentration (PPM)	0.5M	Cylinder No.	GND077222
Cylinder Pressure (psi)	1800	Certified By	Angus Inc.
Certified Date	8-Feb-22	Expiry Date	8-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	99.20	-0.80	-0.80	321.50	1.50	1.10
2	200.00	199.50	-0.50	-0.25	201.30	1.30	0.65
3	300.00	298.50	-1.50	-0.50	303.10	1.10	0.37
4	400.00	398.50	-1.50	-0.38	421.50	1.50	0.38
AVERAGE (%)				-0.46			0.52

Legend:   
 - Ideal (solid line)   
 - Actual NO (dashed line)   
 - Actual NOx (dotted line)

Point	Ideal	Actual NO	Actual NOx
0	0.00	0.10	0.10
1	100.00	99.20	321.50
2	200.00	199.50	201.30
3	300.00	298.50	303.10
4	400.00	398.50	421.50

Collected By

Approved By

*(Signature)*  
 (Mr. Arvind Salaram)  
 Field Environmental Scientist (2)

*(Signature)*  
 (Mr. Ganesh Athiraman)  
 Assistant General Manager

ALS Laboratory Group  
 FORM NO. F 08/26 REVISED ON 10-11-2016

MULTIPOINT CALIBRATION REPORT

Calibration Date	9-Jul-24	Equipment Name	N2O Analyzer
Manufacturer	HDRISA	Model	APNA-875
Serial No.	WJMT77NG	Equipment ID	MOC_F1084
Calibrator Manufacturer	Tylosyns API	Model	700
Serial No.	847		
Est. Gas Concentration (PPM)	53.88	Cylinder No.	0N0627223
Cylinder Pressure (psi)	1800	Certified by	Angus Inc.
Certified Date	8-Feb-23	Expired Date	8-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	0.10
1	100.00	100.10	0.10	0.10	100.70	0.70	0.70	0.70
2	200.00	199.50	-1.50	-0.75	199.20	-1.80	-0.90	-0.90
3	300.00	301.20	1.20	0.40	301.10	1.10	0.37	0.37
4	400.00	401.50	1.50	0.38	402.00	2.00	0.50	0.50
AVERAGE (%)				0.04			0.15	

Legend: — Ideal — Actual NOx — Actual NOx


Collected By

Approved By

*[Signature]*  
 (Mr. Arnaud Belam)  
 Field Environmental Scientist (3)

*[Signature]*  
 (Mr. Benayth) Assistant  
 Assistant General Manager

ALS Laboratory Group  
 FORM NO. F 06-06 REMISIONS - ISSUE DATE 05/04/22



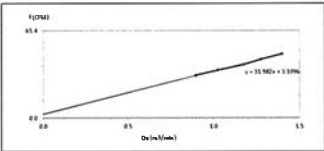
## High Volume Air Sampler Calibration Worksheet

Project Site :	AT&T Storage Co. Ltd.	Barometric Pressure (mm Hg) :	766.3
Calibrator Location :	Wichita Falls, TX 76703	Temperature (°C) :	33
Calibrator Date :	6-26-91	High Volume ID :	SCS 775087
Calibrator Name (PNA) :	C-041113-SCS-PNA087	High Volume Model :	TE-5001K
Calibrator ID :	SCS 775083	High Volume S/N :	1503
Calibrator 1 Weir (d) :	TE-5001K	Calibrator Class :	1-22579
Calibrator 2 S/N :	3339	Calibrator Interlog :	-0.04165

Test No.	Droplet (D) (microns)	Q <sub>sp</sub> (mg/m <sup>3</sup> )	F <sub>1</sub> Chart (mg)	Linear Regression
1	1.0	0.007	3.8	Slope: 21.7620 Y-intercept: 2.0796 Correlation Coefficient: 0.9982
2	2.4	0.036	26	
3	3.2	0.175	60	
4	3.8	0.274	64	
5	6.6	0.776	60	




Calibrated by: Nonweiler K

(Weir Manufacturer's Representative)  
(Field Service Technician)

Approved by: SLS

(Weir Representative)  
(Field Service Technician)

FORM NO. FSA-04 REVISED 1-1988 DATE 01/11/91



## High Volume Air Sampler Calibration Worksheet

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Project Site: ALC Marine Co. Ltd

Calibrator Location: 67, Vengal Rao Rd, Kumbakonam-612 005

Calibrator Date: 8-Nov-24

Calibrator/Model No.: C-043 (E-4) SC-4 (E-046)

Calibrator ID#: SC-4 (F0008)

Calibrator Model#: TT-500 (S)

Calibrator S. No.: 3835

Barometric Pressure (mm Hg): 755.8

Temperature (°C): 33.8

High Volume ID: SC-4 (F0008)

High Volume Model#: TT-500 (S)

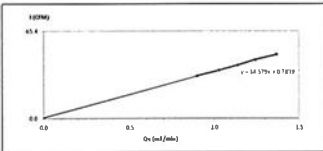
High Volume S.No.: 85

Calibrator Serial No.: 67-3835

Calibrator Label Temp.: -0.04 (S)

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Test No.	Delta $\pm$ $\mu$ (mmHg)	Q <sub>95</sub> (m³/min)	E Chart (CFM)	Linear Regression
1	1.8	0.897	32	Slope: 34.91 %
2	2.4	3.826	35	Intercept: 0.783 %
3	3.0	5.529	40	Correlation Coefficient: 0.9993
4	3.6	5.242	49	
5	4.4	5.366	49	



Calibrated by: Norolthen K

(Mr Norolthen Karayannan)  
[Field Service Technician]

Approved by: SLS

(Mr Suresh Kumar)  
[Field Service Technician]

FORM NO. 3-06-019 REVISED ON: 2-2006 E-046 (S) 11/12/20

PT. INDIKA TEKNOLOGI CEMPAK, LIMITED  
 17th Floor, Building 17, Parkside Hotel, 100, North Bridge Road,  
 Singapore 078583, Republic of Singapore  
 www.indika.com.sg

PT. INDIKA

## CERTIFICATE OF CALIBRATION

Certificate No: **F17-0336-24**

W/O No: **W/O-0055-24**

### Customer

Company: **PT. INDIKA TEKNOLOGI CEMPAK, LTD.**  
 Address: **17th Floor, Building 17, Parkside Hotel, 100, North Bridge Road,  
 Singapore 078583, Republic of Singapore**  
 City / Province: **100 North Bridge Road, Singapore**  
 Zip/Postal: **100000**

Page No: **1 of 1**

### Device

Equipment:	<b>Electronic Balance</b>	Capacity:	<b>1000g</b>
Manufacturer:	<b>OHAUS</b>	Resolution:	<b>0.0001g/0.001g</b>
Model:	<b>N1111N-115</b>	Dr No:	<b>000100000</b>
Serial No:	<b>150007445</b>		
Condition:	<b>Normal</b>		

### Environment Condition

Temperature Calibration:	<b>20.00 ± 0.05 °C</b>
Relative Humidity:	<b>50% ± 5% (20 ± 5) %RH</b>
Atmospheric Pressure:	<b>1013.25 ± 0.05 mmHg</b>
Comments:	

Date of Receipt:	<b>2024.05.10</b>
Date of Calibration:	<b>2024.05.10</b>
Next Date:	<b>2024.05.10</b>
Evaluator by:	<b>MR. RIZKI RAHMATULLAH</b>

Approved by:


**Mr. RIZKI RAHMATULLAH**  
 Approval Signature:

This certificate is valid only for the equipment and the conditions of use specified in the scope of accreditation.

This certificate is issued in accordance with the requirements of international standards for the calibration of mass standards which have been approved by the International Union of Pure and Applied Chemistry (IUPAC) and the International Union of Pure and Applied Physics (IUPAP). The certificate is valid only for the equipment and the conditions of use specified in the scope of accreditation. The certificate is valid only for the equipment and the conditions of use specified in the scope of accreditation. The certificate is valid only for the equipment and the conditions of use specified in the scope of accreditation.


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ACT-00000000




RAY SOLUTIONS

RAY SOLUTIONS TECHNOLOGY COMPANY LIMITED  
 179, Pichayong Road, Rajahmundry - 526 002 (India)  
 Tel: +91 883 03 54900 Fax: +91 883 03 54901  
 Email: ray@raysol.com



ISO 9001:2015



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## CERTIFICATE OF CALIBRATION

Certificate No. : PMS-0219-24

WITD No. : WITD-0055-24

Result of Calibration : **Within Acceptance**

Page No. : 4 of 5

### 1. Repeatability




Physically Range	A	Normal Value	B	Range 10 Repeats	C
Test Item No.	1234	50	50	50.000	50.0000
		234	234	234.000	234.0000

### 2. Linearity, Exposure of radiation from reference value

Physically Range	A	Normal Value	B	Range 10 Repeats	C	Exposure of radiation	D
0.00	0.0000	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.01	0.0100	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.02	0.0200	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.03	0.0300	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.04	0.0400	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.05	0.0500	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.06	0.0600	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.07	0.0700	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.08	0.0800	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.09	0.0900	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.10	0.1000	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.11	0.1100	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.12	0.1200	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.13	0.1300	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.14	0.1400	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.15	0.1500	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.16	0.1600	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.17	0.1700	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.18	0.1800	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.19	0.1900	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500
0.20	0.2000	0.7500	0.7500	0.75000	0.750000	0.7500	0.7500

T-040

Page 4 of 4

	<b>PLAY SOLUTION TECHNOLOGIES COMPANY LIMITED</b> 127/11, Nanning Road, Pongkor Estate, Chulabhorn, Bangkok 10110 Tel: +66 2 622 6740, Fax: +66 2 622 6750 Email: info@psst.com		
---	--	---	---

## CERTIFICATE OF CALIBRATION


Certificate No. : PS/2026-24      WJ/148 : WD4003-01

---


**Result of Calibration**      Page No. : 1 of 3

**Customer/Ref:**      **Equipment:**

The calibration was carried out by the following equipment, type and serial number, and other information from the manufacturer and the calibration certificate (see below):



☒



☐

**Calibration Sample :**

Item No.	QTY	U
1	1	mm
2	1	mm
3	1	mm
4	1	mm
5	1	mm
6	1	mm
7	1	mm
8	1	mm
9	1	mm
10	1	mm
11	1	mm
12	1	mm
13	1	mm
14	1	mm
15	1	mm
16	1	mm
17	1	mm
18	1	mm
19	1	mm
20	1	mm
21	1	mm
22	1	mm
23	1	mm
24	1	mm
25	1	mm
26	1	mm
27	1	mm
28	1	mm
29	1	mm
30	1	mm
31	1	mm
32	1	mm
33	1	mm
34	1	mm
35	1	mm
36	1	mm
37	1	mm
38	1	mm
39	1	mm
40	1	mm
41	1	mm
42	1	mm
43	1	mm
44	1	mm
45	1	mm
46	1	mm
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55	1	mm
56	1	mm
57	1	mm
58	1	mm
59	1	mm
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80	1	mm
81	1	mm
82	1	mm
83	1	mm
84	1	mm
85	1	mm
86	1	mm
87	1	mm
88	1	mm
89	1	mm
90	1	mm
91	1	mm
92	1	mm
93	1	mm
94	1	mm
95	1	mm
96	1	mm
97	1	mm
98	1	mm
99	1	mm
100	1	mm

**Statistical method:**

The calibration was performed by the following statistical methods: ☐ ANOVA ☐ Linear ☐ Multiple ☐ Regression ☐ Correlation ☐ Hypothesis Testing ☐ Control Chart ☐ Process Capability ☐ Taguchi ☐ DOE ☐ SPC ☐ FMEA ☐ Six Sigma ☐ Lean ☐ TQM ☐ ISO 9001 ☐ ISO 14001 ☐ ISO 45001 ☐ ISO 26000 ☐ ISO 27001 ☐ ISO 28000 ☐ ISO 31000 ☐ ISO 34000 ☐ ISO 37000 ☐ ISO 39000 ☐ ISO 40000 ☐ ISO 41000 ☐ ISO 43000 ☐ ISO 44000 ☐ ISO 45000 ☐ ISO 46000 ☐ ISO 47000 ☐ ISO 48000 ☐ ISO 49000 ☐ ISO 50000 ☐ ISO 51000 ☐ ISO 52000 ☐ ISO 53000 ☐ ISO 54000 ☐ ISO 55000 ☐ ISO 56000

[illegible][illegible][illegible]



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**Defectant Status:** Pass

**Zone:** Open

**Temperature:** 230.0 °C

**Accuracy:** 0.8 °C

**Agilent Recommended:** ±1.0 °C ±1.0 °C ±1.0 °C

**Defectant Status:** Pass

**Zone:** Open

**Temperature:** 120.0 °C

**Accuracy:** 0.9 °C

**Agilent Recommended:** ±1.0 °C ±1.0 °C ±1.0 °C

**Overall GC Oven Temperature Accuracy Test Status**

**Pass**

---

**GC Oven Temperature Stability**

**Name:** 1567

**Defectant Status:** Pass

**Temperature:** 150.0 °C

**Stability:** 0.1 °C

**Agilent Recommended:** ±0.5 °C

**Overall GC Oven Temperature Stability Test Status**

**Pass**

---

**Standalone Run**

**Tested Combination:** Front 22L / Front FD

**Name:** TSDA

---

**Date:** April 21, 2023 2:28:28 PM

**System ID:** CH1141/098

Page 3 of 23

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---

**Injection Station:** Completed

**Injection Volume on Column:** 1.0 uL

**Overall Bounding Run Status:**  
Completed

---

**Notes and Data:**

---

**Tested Combination:** Front SIL / Front PID

**Name:** 7990

**Injection Station:** Front

**Run Signal:** 22.7 min

ASTM Noise

pA

0.06

DRI

pA/N

0.25

**Agilent Recommended:** min 3.10 min 2.30

**Status:** Pass Pass

---

**Overall Noise and DRI Test Status:**  
Pass

---

**Injection Precision:**

---

**Tested Combination:** Front SIL / Front PID

**Name:** 7990A

**Injection Station:** Front

**Injection Volume on Column:** 1.0 uL

**Area RSD:** 0.32 %

**Agilent Recommended:** min 2.00 %

**Retention Time RSD:** 0.07 %

**Overall Injection Precision Test Status:**  
Pass

---

**Signal to Horse:**

---

**Date:** April 21, 2023 2:39:38 PM  
**System ID:** C011461068

Page 1/20

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Agilent CrossLab Compliance Software

Tested Combination1	Flow	SSL	/	Port	FD
Name:	Injection Tower				
Signal to Noise:	7930				
Agilent Recommended:	Pass				
Overall Signal to Noise Test Status	721958				
	Pass				
	200000				
	Pass				

Scouting Run

Tested Combination2	Back	SSL	/	Back	FD
Name:	Injection Tower				
Signal to Noise:	7930A				
Injection Volume on Column:	Completed				
Overall Scouting Run Status	1.0				
Completed	Pass				

Noise and Drift

Tested Combination2	Back	SSL	/	Back	FD
Name:	7930				
Signal to Noise:	Pass				
Base Signal:	22.4				
	ASTM Noise				
	Drift				
	pA				
	0.07				
	5.09				
Agilent Recommended:	Pass				
Status:	Pass				

Date: April 21, 2023 9:24:36 PM  
 System ID: 0011481086

Page 7/23

<p>© 2022 by Agilent Technologies</p> <p>Overall Noise and EIRP Test Status</p> <p>Pass</p> <p>Injection Precision</p> <p>Tested Combination:2      Back      SS      /      Back      FD</p> <p>Name:      7165A</p> <p>Sequint Status:      Pass</p> <p>Injection Volume on Calibrator:      1.0      uL</p> <p>Area RSD:      1.28      %      Retention Time RSD:      0.83      %</p> <p>Agilent Recommended:      1.00      %</p> <p>Overall Injection Precision Test Status</p> <p>Pass</p>	<p>Signal to Noise</p> <p>Tested Combination:2      Back      SS/L      /      Back      F/D</p> <p>Name:      7165D</p> <p>Sequint Status:      Pass</p> <p>Signal to Noise:      2424208</p> <p>Agilent Recommended:      1000000</p> <p>Overall Signal to Noise Test Status</p> <p>Pass</p>
--	--

Date:      April 21, 2023 2:28:34 PM

System ID:      C:\11481005

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<h1>Instrument Details</h1>					
<b>Purpose</b>					
This section describes the as found system configuration.					
<b>Details</b>					
<b>System</b>					
System ID	CH-11461068				
Manufacturer	Agilent Technologies				
Name	7890				
Flow Data Input	Manual Data				
Temperature Data Input	Manual Data or Other Data Logging				
<b>Tested Configuration 1</b>					
Injection Technique	Injection Tower				
Sample Identifier	Sample 1				
Inlet	Front				
Detector	Front				
LTM Included?	No				
<b>Tested Configuration 2</b>					
Injection Technique	Injection Tower				
Sample Identifier	Sample 2				
Inlet	Back				
Detector	Back				
LTM Included?	No				
<b>Sample 1</b>					
Manufacturer	Agilent Technologies				
Type	Trey				
Name	7890A				
Model Number	G1514A				
Serial Number	CH 15360230				
Firmware Revision	A.11.01				
Valve Heater	Not Installed				

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Sample 3					
Manufacturer	Agilent Technologies				
Type	Injection Toner				
Name	T055A				
Model Number	G4513A				
Serial Number	C211230123				
Firmware Revision	A.10.09				
Usage	Sample Injection				
Location	Front				
Syringe Volume (uL)	10				
Sample 3					
Manufacturer	Agilent Technologies				
Type	Injection Toner				
Name	T050A				
Model Number	G4513A				
Serial Number	C2112349123				
Firmware Revision	A.10.09				
Usage	Sample Injection				
Location	Back				
Syringe Volume (uL)	10				
Maintenance 1					
Manufacturer	Agilent Technologies				
Name	T030				
Model Number	G345A				
Serial Number	C211481066				
Firmware Revision	Version 4.27				
Own Type	Standards				
<div> <div>Date:</div> <div>April 21, 2023 3:28:38 PM</div> </div> <div> <div>System ID:</div> <div>C:\1-481-066</div> </div> <div>Page 10/23</div>					

© 2022 by Agilent Technologies		Agilent GasSelect Compliance Services			
Pilot 1					
Manufacturer	Agilent Technologies				
Name	7590				
Type	SSL				
Location	Forsk				
Carrier Gas	Helium				
Control Type	Electronic Pressure Control (EPC)				
Purged Inlet	Yes				
Pilot 2					
Manufacturer	Agilent Technologies				
Name	7590				
Type	SSL				
Location	Forsk				
Carrier Gas	Helium				
Control Type	Electronic Pressure Control (EPC)				
Purged Inlet	Yes				
Detector 1					
Manufacturer	Agilent Technologies				
Name	7590				
Type	FID				
Adapter	Capillary				
Control Type	Electronic Pressure Control (EPC)				
Location	Forsk				
Maintenance Gas	Nitrogen				
Detector 2					
Manufacturer	Agilent Technologies				
Name	7590				
Type	FID				
Adapter	Capillary				
Control Type	Electronic Pressure Control (EPC)				
Location	Forsk				
Maintenance Gas	Nitrogen				

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<h2>Electronic Signature</h2>			
<p>Purpose</p> <p>This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including addendums. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal presence. The Agilent representative who has performed the service understands the meaning and legal status of an electronic signature. As a trusted official position, the Agilent representative had a unique password and login to access ACE and electronically sign this document. (Other signatures can be applied in this document using a Document Content Management or other authorized method defined in your data access and control procedures.)</p>			
<p>Date:</p> <p>Full Name of Signer:</p> <p>Logged On User Name:</p> <p>Signature Creation Date:</p> <p>Reason for Signature:</p>		<p>Samuel Trench</p> <p>smayor@slam@nsl.agilent.com</p> <p>April 21, 2023</p> <p>(Executed protocol and published this original version of document)</p>	
<p><b>Regulatory Disclaimer</b></p> <p>This document provides a protocol to verify and record instrument configuration and existence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Violation depends upon many factors and use of this protocol alone does not ensure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.</p>			
<p><b>Warranty</b></p> <p>Agilent Technologies makes no warranty of any kind to the material, including but not limited to, the original warranties or merchantability and fitness for a particular purpose. Agilent Technologies will not be liable for any consequential or other indirect or consequential damages in connection with the furnishing, performance, or use of this material.</p>			
<hr/>			
<p>Date: April 21, 2023 3:26:58 PM</p> <p>System ID: CMT461088</p>		<p>Page 12 of 23</p>	

[illegible]



DocId: 35292526

# © DHD by Agilent Technologies

Agilent CrossLab Compliance Screen

## Overall Holes and Drift Test Status

Pass
------

## Injection Precision

Tested Component(s)	Rack	SRL	/ Back	FID
In-use	7802A			
Sequenced Status:	Pass			
Injection Volume on Column:	1.0 µL			
Area RSD:	1.90 %		Retention Time RSD	0.99 %
Agilent Reagents Installed:	3.00 %			1.01 %

## Overall Injection Precision Test Status

Pass
------

## Signal to Noise

Tested Component(s)	Rack	SRL	/ Back	FID
In-use	7802			
Sequenced Status:	Pass			
Signal to Noise:	1271291			
Signal to Noise:	1271291			
Agilent Reagents Installed:	100.000			

## Overall Signal to Noise Test Status

Pass
------

Date: October 23, 2024 8:27:05 AM  
Review ID: CQC\_031140106

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Contract No.	24-018-0000
Project No.	24-018-0000

Carl No. : ACL20184  
Page : 1 of 8

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

*Journal of Environmental & Development*, 15(4), 367-382

Cert. No. : ACL24184  
Job No. : VC67AC010  
Page : 1 of 8

Cert. No. : ACT 24184  
Job No. : VC67AC0104

7. Peter.

Parameter	Usability (dB)	Maximum-permitted usability of measurements (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.7	N/A
3. Acoustical signal levels of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
5000 Hz	0.3	0.7
4. Electrical signal levels of frequency weightings		
F = 10 Hz to 4 kHz	0.3	0.9
F = 4 kHz to 10 kHz	0.3	0.7
F = 10 kHz to 20 kHz	0.3	0.8
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level brackets in the extended level range	0.2	0.5
8. Level brackets including the level range extend	0.2	0.3
9. Time response	0.2	0.3
10. Peak-to-peak ratio	0.2	0.35
11. Overload indication	0.5	0.25
12. High-level stability	0.1	0.1

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (9; 94)	94.0	0.0	±0.5

Measured Value (cB)
11.0

Frequency Weighting	Measured value (dB)
A-weight	7.8
C-weight	13.2
Flat	19.1

Frequency (Hz)	Deviate in three various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Exponential 1 in 10
125	0.2	0.3	0.3	+1.0
1000	0.1	0.1	0.1	+0.7
3000	0.6	0.7	0.7	+1.5, +2.5

7. Petrus

SITHIPORN;  
ASSOCIATES

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Cart. No. : ACL24184  
Job No. : VT67AC0104

Cert. No. : AUL241  
 Job No. : VC67A0

Frequency Weighting	SLM Display at 100%	SLM Display at 120%	Devoted Value	Assessment
A-weighting	1.00	0.95	0.9	0.9

Assess type	Material	Devised	Meanings
Value ( $\pm 0.1$ )	Value ( $\pm 0.1$ )	Value ( $\pm 0.1$ )	Value ( $\pm 0.1$ )
137.6	137.4	0.1	0.0
136.9	136.1	0.1	0.0
135.6	135.1	0.1	0.0
134.9	134.1	0.1	0.0
133.9	133.5	0.0	0.0
132.6	132.0	0.0	0.0
131.2	131.0	0.0	0.0
129.9	129.0	0.0	0.0
128.9	128.0	0.0	0.0
127.9	127.0	0.0	0.0
126.9	126.0	0.0	0.0
125.9	125.0	0.0	0.0
124.9	124.0	0.0	0.0
123.9	123.0	0.0	0.0
122.9	122.0	0.0	0.0
121.9	121.0	0.0	0.0
120.9	120.0	0.0	0.0
119.9	119.0	0.0	0.0
118.9	118.0	0.0	0.0
117.9	117.0	0.0	0.0
116.9	116.0	0.0	0.0
115.9	115.0	0.0	0.0
114.9	114.0	0.0	0.0
113.9	113.0	0.0	0.0
112.9	112.0	0.0	0.0
111.9	111.0	0.0	0.0
110.9	110.0	0.0	0.0
109.9	109.0	0.0	0.0
108.9	108.0	0.0	0.0
107.9	107.0	0.0	0.0
106.9	106.0	0.0	0.0
105.9	105.0	0.0	0.0
104.9	104.0	0.0	0.0
103.9	103.0	0.0	0.0
102.9	102.0	0.0	0.0
101.9	101.0	0.0	0.0
100.9	100.0	0.0	0.0
99.9	99.0	0.0	0.0
98.9	98.0	0.0	0.0
97.9	97.0	0.0	0.0
96.9	96.0	0.0	0.0
95.9	95.0	0.0	0.0
94.9	94.0	0.0	0.0
93.9	93.0	0.0	0.0
92.9	92.0	0.0	0.0
91.9	91.0	0.0	0.0
90.9	90.0	0.0	0.0
89.9	89.0	0.0	0.0
88.9	88.0	0.0	0.0
87.9	87.0	0.0	0.0
86.9	86.0	0.0	0.0
85.9	85.0	0.0	0.0
84.9	84.0	0.0	0.0
83.9	83.0	0.0	0.0
82.9	82.0	0.0	0.0
81.9	81.0	0.0	0.0
80.9	80.0	0.0	0.0
79.9	79.0	0.0	0.0
78.9	78.0	0.0	0.0
77.9	77.0	0.0	0.0
76.9	76.0	0.0	0.0
75.9	75.0	0.0	0.0
74.9	74.0	0.0	0.0
73.9	73.0	0.0	0.0
72.9	72.0	0.0	0.0
71.9	71.0	0.0	0.0
70.9	70.0	0.0	0.0
69.9	69.0	0.0	0.0
68.9	68.0	0.0	0.0
67.9	67.0	0.0	0.0
66.9	66.0	0.0	0.0
65.9	65.0	0.0	0.0
64.9	64.0	0.0	0.0
63.9	63.0	0.0	0.0
62.9	62.0	0.0	0.0
61.9	61.0	0.0	0.0
60.9	60.0	0.0	0.0
59.9	59.0	0.0	0.0
58.9	58.0	0.0	0.0
57.9	57.0	0.0	0.0
56.9	56.0	0.0	0.0
55.9	55.0	0.0	0.0
54.9	54.0	0.0	0.0
53.9	53.0	0.0	0.0
52.9	52.0	0.0	0.0
51.9	51.0	0.0	0.0
50.9	50.0	0.0	0.0
49.9	49.0	0.0	0.0
48.9	48.0	0.0	0.0
47.9	47.0	0.0	0.0
46.9	46.0	0.0	0.0
45.9	45.0	0.0	0.0
44.9	44.0	0.0	0.0
43.9	43.0	0.0	0.0
42.9	42.0	0.0	0.0
41.9	41.0	0.0	0.0
40.9	40.0	0.0	0.0
39.9	39.0	0.0	0.0
38.9	38.0	0.0	0.0
37.9	37.0	0.0	

Range	Anticipated Value (d1)	Measured Value (d2)	Deviated Value (d3)	Acceptance Limit (d4)
Auto	94.0	94.0	0.0	+0.3

Time Weighting	Time Interval, Hrs	Cycle	Attributed Value, \$ (d1)	Measured Value, \$ (d2)	Deviated Value, \$ (d3)	Acceptance Limit, \$ (d4)
Fast	0.25	1	100.0	107.6	-6.1	1.0; -3.0
	2	8	117.0	116.6	-0.1	1.0; -1.5
	250	100	134.9	134.6	0.0	0.5
Slow	2	8	100.0	100.0	0.0	1.0; -2.0
	200	100	127.6	127.6	0.0	0.5
	0.25	1	99.0	99.9	-0.1	1.0; -2.0
50%	2	8	100.0	100.0	0.0	1.0; -2.0
	200	100	128.0	128.0	0.0	0.5

Number of cycles in test regime	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit
Continuous	133.0	133.6	0.6	<2.0
One	126.4	125.6	-0.8	<2.0

Number of cycles in test regime	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit
Continuous	133.0	133.6	0.6	<2.0
Positive half cycle	125.4	125.2	-0.2	<1.6
Negative half cycle	125.4	125.2	-0.2	<1.6

7 P. 1. 1.







**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**CERTIFICATE OF CALIBRATION**  
Page 1 of 2 Pages

Confidence No.: 158-001-01

**MEASUREMENT ITEM:** Heat Stress Monitor  
**MANUFACTURER:** Delta O-M  
**MODEL:** HSD-12  
**SERIAL NUMBER:** 158-001-01  
**CONDITION AS RECEIVED:** Good  
**CUSTOMER:** N/A

**MEASUREMENT DATE:** 15 Jan 2023  
**MEASUREMENT DATE:** 15 Jan 2023

**ENVIRONMENTAL CONDITIONS:**  
Ambient Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 50 ± 5 %

**NOTES:** The sample was used in the form of a standard and was not used for calibration.

**TABULATION OF RESULTS:**  
The table below shows the measured values.

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

THIS CERTIFICATE MAY NOT BE REPRODUCED OR REPRODUCED IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY.

**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**Certification of Certificate of Calibration Number 158-001-01**  
Page 2 of 2 Pages

**Result of Calibration:** (1) Without adjustment (2) With adjustment  
**Calibration Range:** 10 - 40 °C

**Table 1:** This equipment was connected with wet bulb probe Model: HSD-12, 2.5 m, 158-001-01.  
Dimension: Diameter 3.3 mm, Length 250 mm.

Temperature (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
10	10.0	10.0	0.0	0.1
20	20.0	20.0	0.0	0.1
30	30.0	30.0	0.0	0.1
40	40.0	40.0	0.0	0.1

**Table 2:** This equipment was connected with Delta probe Model: HSD-12, 2.5 m, 158-001-01.  
Dimension: Diameter 3.3 mm, Length 250 mm.

Temperature (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
10	10.0	10.0	0.0	0.1
20	20.0	20.0	0.0	0.1
30	30.0	30.0	0.0	0.1
40	40.0	40.0	0.0	0.1

**Table 3:** This equipment was connected with temperature probe Model: HSD-12, 2.5 m, 158-001-01.  
Dimension: Diameter 3.3 mm, Length 250 mm.

Temperature (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
10	10.0	10.0	0.0	0.1
20	20.0	20.0	0.0	0.1
30	30.0	30.0	0.0	0.1
40	40.0	40.0	0.0	0.1

**UUC: Unit Under Calibration**

**Method of Certificate of Calibration:**  
[Signature]  
[Signature]

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**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**CERTIFICATE OF CALIBRATION**  
Page 1 of 2 Pages

Confidence No.: 158-001-01

**MEASUREMENT ITEM:** Heat Stress Monitor  
**MANUFACTURER:** Delta O-M  
**MODEL:** HSD-12  
**SERIAL NUMBER:** 158-001-01  
**CONDITION AS RECEIVED:** Good  
**CUSTOMER:** N/A

**MEASUREMENT DATE:** 15 Jan 2023  
**MEASUREMENT DATE:** 15 Jan 2023

**ENVIRONMENTAL CONDITIONS:**  
Ambient Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 50 ± 5 %

**NOTES:** The sample was used in the form of a standard and was not used for calibration.

**TABULATION OF RESULTS:**  
The table below shows the measured values.

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

THIS CERTIFICATE MAY NOT BE REPRODUCED OR REPRODUCED IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY.

**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**Continuation of Certificate of Calibration Number 158-001-01**  
Page 2 of 2 Pages

**Result of Calibration:** (1) Without adjustment (2) With adjustment  
**Calibration Range:** 10 - 40 °C

**Table 1:** This equipment was connected with wet bulb probe Model: HSD-12, 2.5 m, 158-001-01.  
Dimension: Diameter 3.3 mm, Length 250 mm.

Temperature (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
10	10.0	10.0	0.0	0.1
20	20.0	20.0	0.0	0.1
30	30.0	30.0	0.0	0.1
40	40.0	40.0	0.0	0.1

**Table 2:** This equipment was connected with Delta probe Model: HSD-12, 2.5 m, 158-001-01.  
Dimension: Diameter 3.3 mm, Length 250 mm.

Temperature (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
10	10.0	10.0	0.0	0.1
20	20.0	20.0	0.0	0.1
30	30.0	30.0	0.0	0.1
40	40.0	40.0	0.0	0.1

**Table 3:** This equipment was connected with temperature probe Model: HSD-12, 2.5 m, 158-001-01.  
Dimension: Diameter 3.3 mm, Length 250 mm.

Temperature (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
10	10.0	10.0	0.0	0.1
20	20.0	20.0	0.0	0.1
30	30.0	30.0	0.0	0.1
40	40.0	40.0	0.0	0.1

**UUC: Unit Under Calibration**

**Method of Certificate of Calibration:**  
[Signature]  
[Signature]

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**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**Certificate of Calibration**  
Page 1 of 2

**Equipment:** Wet Bulb  
**Manufacturer:** Delta O-M  
**Model:** HSD-12  
**Serial No:** 158-001-01  
**ID No:** 158-001-01  
**Condition As Received:** Good  
**Received Date:** 15 Jan 2023  
**Calibration Date:** 15 Jan 2023  
**Reference:** 23.0 ± 0.5 °C  
**Ambient Temperature:** 23.0 ± 0.5 °C  
**Relative Humidity:** 50 ± 5 %

**Result of calibration:** (1) Without adjustment (2) With adjustment  
**Function:** Humidity Measurement  
**Standard Value:** 50.0  
**UUC Reading:** 50.0  
**Error:** 0.0  
**Uncertainty:** 0.1

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

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**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**Cert. No.: 23H103**  
Page: 2 of 2

**Result of calibration:** (1) Without adjustment (2) With adjustment  
**Function:** Humidity Measurement  
**Standard Value:** 50.0  
**UUC Reading:** 50.0  
**Error:** 0.0  
**Uncertainty:** 0.1

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

THIS CERTIFICATE MAY NOT BE REPRODUCED OR REPRODUCED IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY.

**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**Certificate of Calibration**  
Page 1 of 2

**Equipment:** Wet Bulb  
**Manufacturer:** Delta O-M  
**Model:** HSD-12  
**Serial No:** 158-001-01  
**ID No:** 158-001-01  
**Condition As Received:** Good  
**Received Date:** 15 Jan 2023  
**Calibration Date:** 15 Jan 2023  
**Reference:** 23.0 ± 0.5 °C  
**Ambient Temperature:** 23.0 ± 0.5 °C  
**Relative Humidity:** 50 ± 5 %

**Result of calibration:** (1) Without adjustment (2) With adjustment  
**Function:** Humidity Measurement  
**Standard Value:** 50.0  
**UUC Reading:** 50.0  
**Error:** 0.0  
**Uncertainty:** 0.1

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

THIS CERTIFICATE MAY NOT BE REPRODUCED OR REPRODUCED IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY.

**J NAC**  
JANUARY 2023  
CALIBRATION 0357

**Cert. No.: 23H103**  
Page: 2 of 2

**Result of calibration:** (1) Without adjustment (2) With adjustment  
**Function:** Humidity Measurement  
**Standard Value:** 50.0  
**UUC Reading:** 50.0  
**Error:** 0.0  
**Uncertainty:** 0.1

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

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**Southern Calibration Service Co., Ltd.**  
60/15 Kampanan Rd., Bangkok, Thailand 10200  
Tel: 02-000-0000, 02-000-0001, 02-000-0002, 02-000-0003

**CALIBRATION CERTIFICATE**  
Page: 1 of 3

**Issued Date:** 15 Jan 2023  
**Cert. No.:** 23H103  
**Cust. No.:** 23H103

**Customer:** J NAC  
**Calibration Place:** J NAC  
**Measurement Name:** Humidity  
**Manufacturer:** Delta O-M  
**Model:** HSD-12  
**Serial No:** 158-001-01  
**ID No:** 158-001-01  
**Received Date:** 15 Jan 2023  
**Calibration Date:** 15 Jan 2023  
**Ambient Temperature:** 23.0 ± 0.5 °C  
**Relative Humidity:** 50 ± 5 %

**Calibration Method Used:**  
The instrument was calibrated using the Calibration - 'Youss' method. NAC 10107 based on GUM - 20.  
The Southern Calibration Service Co., Ltd. calibration system complies with the requirements of ISO/IEC 17025:2017.

**Calibration by:** J NAC  
**Approved Signature:** [Signature]  
**Approved Signature:** [Signature]

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Certificate No. : 23TH008  
CGR No. : A2659743  
Page : 2 of 3

**Details of Calibration**

1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Setup Unit	3487DA	MY2005813	23SDA1004	25-May-2024

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

3. This certificate is not certified any commercial transaction.

4. Condition of item: normal condition, no indication for any damage or malfunction.

**Result of Calibration:** (✓) Without Adjustment ( ) After Adjustment

1. Screen Installation Diagram

Sensor Installation Details

Dimension of the chamber

Parameter	Value
W	43.0 cm
H	43.0 cm
D	31.0 cm

Certificate No. : 23TH006  
CGR No. : A2659743  
Page : 2 of 3

**Result of Calibration**

2. Temperature Measurement Accuracy Test

The measurement results of the incubator and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	Avg. 9	Uncertainty (± °C)
20	20.10	20.04	20.03	19.97	20.08	20.20	20.10	19.94	20.07	0.08

3. Performance Result

The performance of the incubator are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20	20.0	20.0	0.04	0.17	0.32

UUC = Unit Under Calibration

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

... End ...

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534 PATTANAKARN ROAD SOI 13, SUANLUANG, SUANLUANG BANGKOK 10550  
TEL: 0-2717-8800 FAX: 0-2717-8844

**Certificate of Testing**

Cert. No.: 24TH006  
Page: 1 of 2

Equipment: DO Meter  
Manufacturer: YSI  
Model: 5000  
Serial No.: 178181473  
ID No.: 50K\_CL0073  
Received Date: 17 May 2024  
Test Date: 21 May 2024  
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.  
Reference: 1401 Moo 8 Kamchanwanich Rd., T. Ban Phu, A. Muang, Songkhla 90250 Thailand  
Laboratory Condition: Temperature (25 ± 5) °C, Humidity (50 ± 20) %  
Test Procedure: In-house method: CP-009  
By Comparison Technique with Active Modulator Method

Reviewed by: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 21/11/25

Tested by: [Signature]  
Approved by: [Signature]  
Accepted Signature: [Signature]

Issue Date: 21 May 2024

Cert. No.: 24TH006  
Page: 2 of 2

**Condition of this result of calibration**

1. Reference Standard Instruments

This certificate is issued to the International System of Unit through the reference standards Laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan)

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	1538218	23CG1172	23 Ma 2023	
2. Balance	14733571	19HR0001	23AR1005	18 July 2024

2. Standard Material

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AA17032316	100.2%

**Result:** Dissolved Oxygen Meter Adjustment With Air 100 %  
Dissolved Oxygen Probe No.: 178100183

Titration Method (Acidic Modification Method)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.18	0.0071

This report was certified only for the instrument we tested it is allowable to use for study hence to use for advertising and selling purpose is prohibited. This report may not be reproduced other in all written version approval of the laboratory.

... End ...

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534 PATTANAKARN ROAD SOI 13, SUANLUANG, SUANLUANG BANGKOK 10550  
TEL: 0-2717-8800 FAX: 0-2717-8844

**Certificate of Calibration**

Cert. No.: 24TH007  
Page: 1 of 2

Equipment: DO Meter with Sensor  
Manufacturer: YSI  
Model: 5000-115  
Serial No.: 178181473  
ID No.: 50K\_CL0073

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.  
Songkhla Branch  
114/1 Moo 8 Kamchanwanich Rd., T. Ban Phu, A. Muang, Songkhla 90250 Thailand  
Location: TPA On Site Calibration Laboratory

Received Order: 17 May 2024  
Calibration Date: 21 May 2024  
Ambient Temperature: (25 ± 10) °C  
Relative Humidity: (50 ± 35) %  
AC Line Voltage: (230 ± 21) V

Calibrated by: [Signature]  
Approved by: [Signature]  
Approved Signature: [Signature]

Issue Date: 26 May 2024

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

This certificate has no commercial value and is not valid if altered or tampered with.  
Approved by the head of Corporate Services 3: Equipment Calibration and Testing Services

Equipment: DO Meter with Sensor  
Condition As-Received: Used item  
Reference: 2405-000500-02

Calibration was conducted using in-house calibration procedure CP-0101 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath. The temperature scale used was based on ITS-90.

**Condition of this result of calibration**

1. Reference standard instrument: Instrument Serial No. Certificate No. Traceable Due Date  
1) Digital Thermometer 2189009 23-12-15 TPA 11 Oct 2024

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

3. This certificate is traceable to the International System of Unit  
Remark: TPA: Technology Promotion Association (Thailand - Japan)

**Result of Calibration:** (✓) Without Adjustment ( ) After Adjustment

This instrument was connected with temperature sensor, SN: 178100183

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor
20.00	60	20.005	19.79	-0.215	0.15	2.00

UUC: Unit Under Calibration

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

... End ...

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534 PATTANAKARN ROAD SOI 13, SUANLUANG, SUANLUANG BANGKOK 10550  
TEL: 0-2717-8800 FAX: 0-2717-8844

**Certificate of Calibration**

Cert. No.: 24TH152  
Page: 1 of 3

Equipment: COD Reactor  
Manufacturer: Hach  
Model: DRB200  
Serial No.: 21-20C1313  
ID No.: 50K\_CL0085

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.  
Songkhla Branch  
114/1 Moo 8 Kamchanwanich Rd., Banphu, Muang, Songkhla 90250 Thailand

Location: Chemistry Room

Received Order: 24 January 2024  
Calibration Date: 24 - 25 January 2024  
Ambient Temperature: (25 ± 10) °C  
Relative Humidity: (50 ± 35) %

Calibrated by: Kanthi Promrat  
Approved by: [Signature]  
Approved Signature: [Signature]

Issue Date: 28 January 2024

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

This certificate has no commercial value and is not valid if altered or tampered with.  
Approved by the head of Corporate Services 3: Equipment Calibration and Testing Services

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534 PATTANAKARN ROAD SOI 13, SUANLUANG, SUANLUANG BANGKOK 10550  
TEL: 0-2717-8800 FAX: 0-2717-8844

**Certificate of Calibration**

Cert. No.: 24TH152  
Page: 2 of 3

Equipment: COD Reactor  
Condition As-Received: Used item  
Reference: 2405-004500-03

As agreed with customer the calibration was performed using in-house calibration method according to described measurement method with Data Acquisition which connected with Thermocouple Type T.

The temperature scale used was based on ITS-90.

**Condition of this result of calibration**

1. Reference standard instrument: Instrument Serial No. Certificate No. Traceable Due Date  
1) Data Acquisition MY4073281 23JAN05 TPA 18 Jan 2024

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

3. This certificate is traceable to the International System of Unit.  
Remark: TPA: Technology Promotion Association (Thailand - Japan)

**Result of Calibration:** (✓) Without Adjustment ( ) After Adjustment

Function of UUC: Temperature Source

Heat transfer medium used: Alumina Calced

Environment during calibration	Beginning	Finished
Temp (°C)	25	27
REL Hum (h)	54	61
AC Supply (Vrms)	228	227

Position	ID No. of Sensor	Position	ID No. of Sensor
L1	23-01TC-01	R1	23-01TC-01
L2	23-01TC-02	R2	23-01TC-02
L3	23-01TC-03	R3	23-01TC-03
L4	23-01TC-04	R4	23-01TC-04
L5	23-01TC-05	R5	23-01TC-05
L6	23-01TC-06	R6	23-01TC-06
L7	23-01TC-07	R7	23-01TC-07
L8	23-01TC-08	R8	23-01TC-08
L9	23-01TC-09	R9	23-01TC-09
L10	23-01TC-10	R10	23-01TC-10
L11	23-01TC-01	R11	23-01TC-01
L12	23-01TC-02	R12	23-01TC-02
L13	23-01TC-03	R13	23-01TC-03
L14	23-01TC-04	R14	23-01TC-04
L15	23-01TC-05	R15	23-01TC-05

Top View

Equipment: COD Reactor  
Condition As-Received: Used item  
Reference: 2405-004500-03

**Result of Calibration:** (✓) Without Adjustment ( ) After Adjustment

Function of UUC: Temperature Source

Calibration Point: 150 °C

UUC Reading (°C)	UUC Position	Measured Temperature (°C)	Temperature stability (± °C)	Uncertainty (± °C)	Coverage Factor
Left	L13, L14, L15, R13, R14, R15	148.241, 148.241, 148.230, 148.199, 148.015, 148.018	0.12		
Right	L4, L5, L6, L7, L8, L9, R4, R5, R6, R7, R8, R9	149.450, 149.602, 149.310, 149.845, 150.020, 150.266, 149.759, 149.784, 149.809, 150.332, 149.962, 150.233, 149.241, 149.568, 149.533, 149.775, 149.847, 149.313	0.10		

Average: The average of 30 values in each position.  
Temperature stability: One-half of the greatest maximum difference of measured temperature at any one sensor UUC: Unit Under Calibration

Note: The reported uncertainty of measurement was included stability and reduced uncertainty.

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

... End ...



Cert. No.: 24CH044  
Page: 1 of 3

## Certificate of Calibration

Equipment: Spectrophotometer

Manufacturer: Hach

Model: DR 3000

Serial No.: 1807945

ID No.: 601-CL0038

Condition As-Received:

Received Date: 24 January 2024

Calibration Date: 24 January 2024

Reference: 2401-06ASOC-2

Submitted by: A.S. Laboratory Group (Thailand) Co., Ltd. Songkhro Branch,  
114/1 Moo 8, Kampanwong Rd.,  
Bangnae, Hatyai,  
Songkhro 90250, Thailand

Calibration Place: Chemistry Room

Ambient Temperature: (26.4 ± 2.6) °C (On-Site)

Relative Humidity: (81.5 ± 5.1) % (On-Site)

Calibration Procedure: CP-0044 based on ASTM E 275-01

Calibrated by: Kanchit Promrat

Approved by:

( ) Saitip Meangmal  
( ) Uppakorn Lamsupakul  
( ) Pongpan Pichon

Issue Date: 26 January 2024

The uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services & Equipment Calibration and Testing Services

REVIEW BY:   
APPROVED BY:   
NEXT CAL DATE: 24/01/25

A 0062930



Cert. No.: 24CH044  
Page: 2 of 3

### Condition of calibration result

#### 1. Reference Standard Material:

Material	Serial No.	Certificate No.	Due Date
1. Absorbance Standard set	8331	105619	28 Sep 2024
2. Wavelength Standard set	28829	114509	11 Sep 2025
3. Wavelength Standard set	28829	114510	11 Sep 2025

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. Spread 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	
479.88	480	0.59	2.00	
513.75	514	0.59	2.00	
537.00	537	0.59	2.00	
638.00	638	0.59	2.00	
684.70	685	0.59	2.00	
747.61	748	0.59	2.00	
807.04	807	0.59	2.00	



Cert. No.: 24CH044  
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
	0.0712	0.072	0.0031	2.00
	0.7518	0.752	0.0032	2.00
	1.0893	1.092	0.0033	2.00
440.0	Zero	0.000	0.0028	2.00
	0.5007	0.500	0.0030	2.00
	0.7230	0.723	0.0030	2.00
	1.0638	1.063	0.0031	2.00
485.0	Zero	0.000	0.0028	2.00
	0.5111	0.514	0.0030	2.00
	0.6763	0.679	0.0029	2.00
	0.8602	0.865	0.0029	2.00
540.1	Zero	0.000	0.0028	2.00
	0.5224	0.522	0.0029	2.00
	0.6850	0.684	0.0029	2.00
	0.9327	0.933	0.0029	2.00
590.0	Zero	0.000	0.0028	2.00
	0.5542	0.551	0.0028	2.00
	0.7155	0.712	0.0028	2.00
	1.0386	1.033	0.0028	2.00
635.0	Zero	0.000	0.0028	2.00
	0.5387	0.538	0.0028	2.00
	0.6832	0.680	0.0028	2.00
	0.8868	0.888	0.0028	2.00

#### Remarks:

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer  
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

-000-

a 1195642

a 1195641



Cert. No.: 24CH043  
Page: 1 of 4

## Certificate of Calibration

Equipment: UV-VIS Spectrophotometer

Manufacturer: Agilent

Model: Cary 50 UV-VIS

Serial No.: MY1651028

ID No.: SGC-CL0040

Condition As-Received:

Received Date: 24 January 2024

Calibration Date: 25 January 2024

Reference: 2401-06ASOC-1

Submitted by: A.S. Laboratory Group (Thailand) Co., Ltd. Songkhro Branch,  
114/1 Moo 8, Kampanwong Rd.,  
Bangnae, Hatyai,  
Songkhro 90250, Thailand

Calibration Place: Chemistry Room

Ambient Temperature: (26.8 ± 2.2) °C (On-Site)

Relative Humidity: (82.3 ± 4.5) % (On-Site)

Calibration Procedure: In-house method  
CP-0044 based on ASTM E 275-01

Calibrated by: Kanchit Promrat

Approved by:

( ) Saitip Meangmal  
( ) Uppakorn Lamsupakul  
( ) Pongpan Pichon

Issue Date: 29 January 2024

The uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services & Equipment Calibration and Testing Services

REVIEW BY:   
APPROVED BY:   
NEXT CAL DATE: 25/01/25

A 0062928



Cert. No.: 24CH043  
Page: 2 of 4

### Condition of calibration result

#### 1. Reference Standard Material:

Material	Serial No.	Certificate No.	Due Date
1. Absorbance Standard set	32588	103225	08 Jul 2024
2. Absorbance Standard set	32592	104225	04 Aug 2024
3. Absorbance Standard set	8331	105930	28 Sep 2024
4. Wavelength Standard set	28829	114509	11 Sep 2025
5. Wavelength Standard set	28829	114510	11 Sep 2025

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: 1.5 nm  
Scan Speed: 20 nm/min

#### Calibration Results: without adjustment

Wavelength Accuracy	Certified Values of Reference Material (nm)	UUC Reading (nm)	Uncertainty of Measurement (± nm)	Coverage Factor k
241.72	241.0	0.15	2.05	
334.06	333.4	0.13	2.00	
418.59	418.2	0.13	2.00	
673.17	673.3	0.18	2.09	
879.29	879.1	0.16	2.05	



Cert. No.: 24CH043  
Page: 3 of 4

### 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	0.0000	0.0028	2.00
	0.5712	0.5717	0.0030	2.00
	0.7510	0.7505	0.0031	2.00
	1.0833	1.0869	0.0032	2.00
440.0	Zero	0.0000	0.0028	2.00
	0.5007	0.5015	0.0029	2.00
	0.7236	0.7285	0.0029	2.00
	1.0639	1.0689	0.0030	2.00
495.0	Zero	0.0001	0.0028	2.00
	0.5111	0.5119	0.0029	2.00
	0.6788	0.6823	0.0029	2.00
	0.8602	0.8701	0.0029	2.00
546.1	Zero	0.0001	0.0028	2.00
	0.5224	0.5225	0.0028	2.00
	0.6858	0.6882	0.0028	2.00
	0.9327	0.9308	0.0028	2.00
580.0	Zero	0.0001	0.0028	2.00
	0.5542	0.5536	0.0028	2.00
	0.7155	0.7158	0.0028	2.00
	1.0386	1.0384	0.0028	2.00
635.0	Zero	0.0000	0.0028	2.00
	0.5387	0.5386	0.0028	2.00
	0.6832	0.6844	0.0028	2.00
	0.8868	0.8848	0.0028	2.00

#### Remarks:

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

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Cert. No.: 24CH045  
Page: 4 of 4

### Calibration Results: without adjustment

#### Photometric Accuracy

Wavelength (nm)	Certified Values of Reference Material (Abs)	UUC Reading (Abs)	Uncertainty of Measurement (± Abs)	Coverage Factor k
225.0	Zero	0.0000	0.0046	2.00
	0.4840	0.4916	0.0049	2.00
	Zero	0.0000	0.0050	2.00
	0.7367	0.7370	0.0068	2.00
257.0	Zero	0.0000	0.0046	2.00
	0.5700	0.5696	0.0048	2.00
	Zero	0.0000	0.0050	2.00
	0.8582	0.8588	0.0059	2.00
313.0	Zero	0.0000	0.0046	2.00
	0.1814	0.1918	0.0047	2.00
	Zero	0.0000	0.0050	2.00
	0.2651	0.2658	0.0058	2.00
350.0	Zero	0.0000	0.0046	2.00
	0.4253	0.4234	0.0061	2.00
	Zero	0.0000	0.0050	2.00
	0.6389	0.6379	0.0056	2.00

#### Remarks:

- The Potassium Dichromate filter cells are measured against a Pyrochro acid blank.

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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Southern Calibration Service Co., Ltd.  
669/25 Kampanwong Rd., Bangna, Hatyai, Songkhro 90250 Thailand  
Tel: 09-099-0107 Fax: 0-7438-510 Email: info@southern-cal.com

## CALIBRATION CERTIFICATE

Issued Date: 4-Jul-2024

Cert. No.: 24TH027  
CSR No.: A1502473  
Page: 1 of 3

Customer: A.S. Laboratory Group (Thailand) Co., Ltd.  
114/1 Moo 8, Kampanwong Rd., Bangna, Hatyai,  
Amphoe Hat Yai, Songkhro 90250

Calibration Place: Chemistry Laboratory  
Instrument Name: Gold Room  
Manufacturer: Dierlow  
Model: N/A  
Serial No.: 0306-CL0065  
Resolution: 0.1 °C  
Received Date: 1-Jul-2024  
Calibrated Date: 1-Jul-2024  
Ambient Temperature: (26 ± 1) °C  
Relative Humidity: (50 ± 3) %

Calibration Method Used: This instrument was calibrated using the Calibrator In-house method SCAL.V1.012 based on GUM-20  
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement: This Certificate is traceable to the International and National standards which realize the units of measurement according to the International System of Units (SI) through:  
- NIST - National Institute of Standards and Technology Research

Calibrated by: Ibrahim Saleem Approved by:   
Ibrahim Saleem / Technical Manager

Calibration Method Used: This instrument was calibrated using the Calibrator In-house method SCAL.V1.012 based on GUM-20  
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement: This Certificate is traceable to the International and National standards which realize the units of measurement according to the International System of Units (SI) through:  
- NIST - National Institute of Standards and Technology Research

Calibrated by: Ibrahim Saleem Approved by:   
Ibrahim Saleem / Technical Manager

Calibration Method Used: This instrument was calibrated using the Calibrator In-house method SCAL.V1.012 based on GUM-20  
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement: This Certificate is traceable to the International and National standards which realize the units of measurement according to the International System of Units (SI) through:  
- NIST - National Institute of Standards and Technology Research

Calibrated by: Ibrahim Saleem Approved by:   
Ibrahim Saleem / Technical Manager

Calibration Method Used: This instrument was calibrated using the Calibrator In-house method SCAL.V1.012 based on GUM-20  
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Calibrated by: Ibrahim Saleem Approved by:   
Ibrahim Saleem / Technical Manager

Calibration Method Used: This instrument was calibrated using the Calibrator In-house method SCAL.V1.012 based on GUM-20  
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Ibrahim Saleem / Technical Manager

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Ibrahim Saleem / Technical Manager

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The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement: This Certificate is traceable to the International and National standards which realize the units of measurement according to the International System of Units (SI) through:  
- NIST - National Institute of Standards and Technology Research

**Southern Calibration Service Co., Ltd.**  
669/35 Kamjanwanit Rd., Bangru, Hanoi, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 2474257  
CSR No.: A1502473  
Page: 1 of 3

**Result of Calibration:**  
2. Temperature Measurement Accuracy Test  
The measurement results of the Cold Room and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	Uncertainty (± °C)
4	3.94	4.24	3.72	3.78	3.88	3.78	3.55	3.43	3.34	0.35

3. Performance Result  
The performance of the Cold Room are reported as shown below

Cal point (°C)	UUC Reading (°C)	UUC Reading (°C)	Temperature Stability (± °C)	Temperature Uniformity (°C)	Overall Variation (°C)
4	4.0	4.0	0.10	0.75	0.75

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W08 based on direct measurement by using certified reference liquid (CRL)

The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- O-Pharm, O-Pharm Ltd  
- VIK, VIK Electric Co., Ltd  
- SCSL, Southern Calibration Service Co., Ltd.

Calibrated by: Atsana Nis  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**Southern Calibration Service Co., Ltd.**  
669/35 Kamjanwanit Rd., Bangru, Hanoi, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 2474255  
CSR No.: A1503812  
Page: 1 of 2

**Result of Calibration:**  
1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	1001	0101071	104701	25-Oct-2025
Standard Solution	7986	6191864	105096	25-Oct-2025
Standard Solution	1011	6191864	104702	25-Oct-2025
Temperature/Electrical Calibrator	AC2 TE	14687	W02 105-295-223	31-May-2025
Digital Thermocouple With Sensor	DP-17	1308886	240201-005	7-Aug-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.  
3. This certificate is not certified any commercial transaction.  
4. Condition of item: normal condition, no indication for any damage or malfunction

**Result of Calibration:**  
1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV)	Correction (mV)	Uncertainty (± mV)
107.42	107.5	4.02	0.17
0.00	0.0	7.00	0.13
-107.48	-107.5	10.00	0.17

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.007	3.99	178.1	0.0002
6.876	7.02	1.7	-0.044
12.020	9.90	-189.0	0.049

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.007	3.99	177.7	0.0002
6.876	7.01	3.7	-0.034
12.020	10.00	-189.0	0.009

4. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
25	25.01	25.0	0.02	0.06

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

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W08 based on direct measurement by using certified reference liquid (CRL)

The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- O-Pharm, O-Pharm Ltd  
- VIK, VIK Electric Co., Ltd  
- SCSL, Southern Calibration Service Co., Ltd.

Calibrated by: Atsana Nis  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**Southern Calibration Service Co., Ltd.**  
669/35 Kamjanwanit Rd., Bangru, Hanoi, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 2474256  
CSR No.: A1503813  
Page: 2 of 2

**Result of Calibration:**  
2. Temperature Measurement Accuracy Test  
The measurement results of the Cold Room and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	Uncertainty (± °C)
4	3.94	4.24	3.72	3.78	3.88	3.78	3.55	3.43	3.34	0.35

3. Performance Result  
The performance of the Cold Room are reported as shown below

Cal point (°C)	UUC Reading (°C)	UUC Reading (°C)	Temperature Stability (± °C)	Temperature Uniformity (°C)	Overall Variation (°C)
4	4.0	4.0	0.10	0.75	0.75

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W08 based on direct measurement by using certified reference liquid (CRL)

The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- O-Pharm, O-Pharm Ltd  
- VIK, VIK Electric Co., Ltd  
- SCSL, Southern Calibration Service Co., Ltd.

Calibrated by: Atsana Nis  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**Southern Calibration Service Co., Ltd.**  
669/35 Kamjanwanit Rd., Bangru, Hanoi, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 24840199  
CSR No.: A12305123  
Page: 1 of 3

**Result of Calibration:**  
1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Weight Set	2 mg - 1 kg	1111851401	23095001	4-Jul-2024

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.  
3. This certificate is not certified any commercial transaction.  
4. Condition of item: normal condition, no indication for any damage or malfunction

**Result of Calibration:**  
1. Weights

Nominal Value (g)	Standard Deviation (g)
20	0.0000
200	0.0000

2. Effect of force

Nominal Value (g)	Standard Value (g)	Balance Reading (g)	Correction (g)
20	20.0000	20.0000	0.0000
40	40.0001	40.0000	0.0001
60	60.0000	60.0001	-0.0001
80	80.0001	80.0001	-0.0001
100	100.0000	100.0000	0.0000

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%  
... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W01 based on UKAS LAB 94:2015  
The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- SCSL, Southern Calibration Service Co., Ltd.

Calibrated by: Haborine Dattavee  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**Southern Calibration Service Co., Ltd.**  
669/35 Kamjanwanit Rd., Bangru, Hanoi, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 24840196  
CSR No.: A12305113  
Page: 2 of 3

**Result of Calibration:**  
2. Discrepancy from nominal value

Nominal Value (g)	Standard Value (g)	UUC Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor (k)
0	0.0000	0.0000	0.0000	0.00008	2.0
0.01	0.0100	0.0100	0.0000	0.00008	2.0
0.1	0.1000	0.1000	0.0000	0.00008	2.0
0.5	0.5000	0.5000	0.0000	0.00008	2.0
1	1.0000	1.0000	0.0000	0.00008	2.0
2	2.0000	2.0000	0.0000	0.00008	2.0
5	5.0000	5.0000	0.0000	0.00009	2.0
10	10.0000	10.0000	0.0000	0.00009	2.0
20	20.0000	20.0000	0.0000	0.00009	2.0
50	50.0000	50.0000	0.0000	0.00011	2.0
100	100.0000	100.0000	0.0000	0.00016	2.0
120	120.0000	120.0000	0.0000	0.00024	2.0
140	140.0001	140.0000	0.0001	0.00024	2.0
160	160.0000	160.0000	0.0000	0.00026	2.0
180	180.0000	180.0000	0.0000	0.00029	2.0
200	200.0000	200.0000	0.0000	0.00030	2.0

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%  
... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W01 based on UKAS LAB 94:2015  
The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- SCSL, Southern Calibration Service Co., Ltd.

Calibrated by: Haborine Dattavee  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 2474255  
CSR No.: A1503813  
Page: 3 of 3

**Result of Calibration:**  
2. Temperature Measurement Accuracy Test  
The measurement results of the Cold Room and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	Uncertainty (± °C)
40	40.36	40.45	40.51	40.43	40.26	40.29	40.14	39.75	39.75	0.36
70	70.27	70.36	70.43	70.34	70.24	70.23	70.30	69.85	69.85	0.36
100	102.94	102.90	102.95	102.96	102.92	102.94	102.91	102.84	102.84	0.36
124	124.04	123.99	123.99	124.00	124.00	124.00	124.00	124.00	124.00	0.36
125	125.04	125.00	125.05	125.07	125.01	125.01	125.00	125.00	125.00	0.36
150	149.19	149.83	149.82	149.13	149.27	149.68	149.12	149.12	149.12	0.41

3. Performance Result  
The performance of the Hot Air Oven are reported as shown below

Cal point (°C)	UUC Reading (°C)	UUC Reading (°C)	Temperature Stability (± °C)	Temperature Uniformity (°C)	Overall Variation (°C)
40	43.0	43.0	0.20	0.84	0.84
70	73.0	73.0	0.10	0.59	0.59
100	103.0	103.0	0.20	0.73	0.74
124	124.0	124.0	0.20	0.47	0.56
125	125.0	125.0	0.20	0.44	0.46
150	150.0	150.0	0.50	0.86	1.11

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%  
... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W01 based on UKAS LAB 94:2015  
The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- TSTR, Thailand Institute of Standards and Technological Research

Calibrated by: Iron Ratanayum / Technical Manager  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**Southern Calibration Service Co., Ltd.**  
669/35 Kamjanwanit Rd., Bangru, Hanoi, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 7480 533 Email: ssc@sscsm.com www.sscsm.com

**CARIBRATION CERTIFICATE**

Certificate No.: 2474256  
CSR No.: A1503813  
Page: 1 of 3

**Result of Calibration:**  
1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/With Unit	2479DA	MY9805812	PSL-TD/T1-167	25-May-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.  
3. This certificate is not certified any commercial transaction.  
4. Condition of item: normal condition, no indication for any damage or malfunction

**Result of Calibration:**  
1. Sensor Installation Diagrams

1. Sensor Installation Diagrams

2. Dimension of the chamber

3. Sensor Installation Details

4. Dimension of the chamber

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%  
... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W01 based on UKAS LAB 94:2015  
The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- TSTR, Thailand Institute of Standards and Technological Research

Calibrated by: Iron Ratanayum / Technical Manager  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**CARIBRATION CERTIFICATE**

Certificate No.: 2474255  
CSR No.: A1503813  
Page: 2 of 3

**Result of Calibration:**  
2. Temperature Measurement Accuracy Test  
The measurement results of the Cold Room and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	Uncertainty (± °C)
40	40.36	40.45	40.51	40.43	40.26	40.29	40.14	39.75	39.75	0.36
70	70.27	70.36	70.43	70.34	70.24	70.23	70.30	69.85	69.85	0.36
100	102.94	102.90	102.95	102.96	102.92	102.94	102.91	102.84	102.84	0.36
124	124.04	123.99	123.99	124.00	124.00	124.00	124.00	124.00	124.00	0.36
125	125.04	125.00	125.05	125.07	125.01	125.01	125.00	125.00	125.00	0.36
150	149.19	149.83	149.82	149.13	149.27	149.68	149.12	149.12	149.12	0.41

3. Performance Result  
The performance of the Hot Air Oven are reported as shown below

Cal point (°C)	UUC Reading (°C)	UUC Reading (°C)	Temperature Stability (± °C)	Temperature Uniformity (°C)	Overall Variation (°C)
40	43.0	43.0	0.20	0.84	0.84
70	73.0	73.0	0.10	0.59	0.59
100	103.0	103.0	0.20	0.73	0.74
124	124.0	124.0	0.20	0.47	0.56
125	125.0	125.0	0.20	0.44	0.46
150	150.0	150.0	0.50	0.86	1.11

UUC = Unit Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%  
... End ...

Calibration Method Used:  
This instrument was calibrated using the Calibration In-house method: SCAL-W01 based on UKAS LAB 94:2015  
The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement:  
This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through:  
- TSTR, Thailand Institute of Standards and Technological Research

Calibrated by: Iron Ratanayum / Technical Manager  
Approved by: Iron Ratanayum / Technical Manager

The uncertainties are for a confidence probability of approximately 95%  
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**CARIBRATION CERTIFICATE**

Certificate No.: 2474256  
CSR No.: A1503813  
Page: 3 of 3

**Result of Calibration:**  
2. Temperature Measurement Accuracy Test  
The measurement results of the Cold Room and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	Uncertainty (± °C)
40	40.36	40.45	40.51	40.43	40.26	40.29	40.14	39.75	39.75	0.36
70	70.27	70.36	70.43	70.34	70.24	70.23	70.30	69.85	69.85	0.36
100	102.94	102.90	102.95	102.96	102.92	102.94	102.91	102.84	102.84	0.36
124	124.04	123.99	123.99	124.00	124.00	124.00	124.00	124.00	124.00	0.36
125	125.04	125.00	125.05	125.07	125.01	125.01	125.00	125.00	125.00	0.36
150	149.19	149.83	149.82	149.13	149.27	149.68	149.12	149.12	149.12	0.41

3. Performance Result  
The performance of the Hot Air Oven are reported as shown below

Cal point (°C)	UUC Reading
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Tel. 08 1999 0017 Fax. 0 2040 5111 Email: calibration@scs.co.th, scs@scs.co.th

**CALIBRATION CERTIFICATE**

Issued Date : 19-Jul-2023 Certificate No. : ZTH0307  
CSR No. : A0550473 Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
1147 Moo 8, Kamphaengwattana Rd., Bangpoo, Bangpoo, Songkhla 90250 Thailand

Calibration Place : Chemical Laboratory  
Instrument Name : Water Bath  
Manufacturer : Memmert  
Model : WH29  
Serial No. : WH2908  
ID No. : SQ-CL0032  
Resolution : 0.1 °C  
Received Date : 13-Jul-2023  
Calibrated Date : 13-Jul-2023  
Ambient Temperature : (20 ± 10) °C  
Relative Humidity : (50 ± 30) %

REVIEW BY : *Ananta B.*  
APPROVED BY : *Kamila B.*  
NEXT CAL DATE : 10/11/25

Calibration Method Used :  
The instrument was calibrated using the Calibration In-house method. SCAL No. 014 based on ASTM E 715 : 1990 (approved 2001)  
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017  
Traceability of measurement :  
This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Units (SI) through :  
- SCG, Southern Calibration Service Co., Ltd.  
Calibrated by : *Brookh. Saeam* Approved by : *Imron Ratanayum / Technical Manager*

The uncertainties are for a confidence probability of approximately 95%  
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**SCAL**

Certificate No. : ZTH0307  
CSR No. : A0550473  
Page : 2 of 3

**Details of Calibration**

1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Control Unit	34370A	4750000813	2302A7004	23-May-2024

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and any no implication regarding the long-term stability of instrument.  
3. The certificate is not valid for any commercial transaction.  
4. Condition of item : normal condition, no indication for any damage or malfunction.

**Result of Calibration** : (✓) Without Adjustment ( ) After Adjustment

5. Sensor Installation Diagram

Sensor Installation Details :  
a = 5 cm  
b = 5 cm  
c = 5 cm

Dimension of the chamber :  
W = 45 cm  
H = 30 cm  
D = 35 cm

**SCAL**

Certificate No. : ZTH0307  
CSR No. : A0550473  
Page : 3 of 3

**Result of Calibration**

2. Temperature Measurement Accuracy Test

The measurement results of the Water Bath and associated are reported in the manner as shown below

Cal point (°C)	#1	#2	#3	#4	#5	Uncertainty (°C)
20	75.57	79.47	79.43	79.25	79.36	0.14

3. Performance Result

The performance of the Water Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20	80.0	80.0	0.24	0.38	0.38

UUC = 10% Under Calibration  
The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

... End ...

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
3344 PATTANAKARN ROAD 501/18, SUKOLUANG, SUKOLUANG BANGKOK 10250  
TEL. 0-2717-3000-25 FAX. 0-2718-3404

**Certificate of Calibration**

Cert.No.: 24CH541  
Page: 1 of 2

Equipment : Conductivity Meter  
Manufacturer : Mettler Toledo  
Model : SevenCompact S230  
Serial No. : B608134488  
ID No. : SQ-CL0032  
Condition As-Received : Used Item  
Received Date : 29 April 2024  
Calibration Date : 06 May 2024  
Reference : 2404-0708DSC-2  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd., Songkhla Branch, 1147 Moo 8 Kamphaengwattana Rd., Bangpoo, Bangpoo, Songkhla 90250 Thailand

Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In-house method :  
- CP-CH2 by direct measurement with certified reference material (CRM)

Calibrated by : *Worakorn Lampragatkul*  
Approved by : *Suttip*  
Approved Signature :  
( ) Unchecked/Handwritten  
( ) Papan Papan  
(✓) Sa-Ship Meangmai  
Issue Date : 08 May 2024

The Uncertainties are for a confidence probability of approximately 95%  
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**SCAL**

Cert.No.: 24CH541  
Page: 2 of 2

**Condition of this result of calibration**

1. Reference Standard Instrument :  
Instrument : Serial No. : ID No. : Certificate No. : Due date :  
1) Thermometer : B608134488 : 130RC085 : 2311051 : 05 Sep 2024  
- This Calibration is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :  
- Conductivity calibration solution, CPA Chem Ltd., The measurement results are traceable to SI through CPA Chem Ltd., ANSASQ National Accreditation Board, Accredited No. AN-1835

Conductivity Solution	Manufacturer	Lot No.	Exp. date
84.00 µS/cm	CPA Chem	931854	01 Oct 2024
1413.0 µS/cm	CPA Chem	940111	02 Nov 2024
12,890 mS/cm	CPA Chem	936625	19 Oct 2024

- Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) °C  
3. This certificate is valid only to the item calibrated on date and place of calibration.

**Calibration results**  
Function : Conductivity Measurement  
(\*) Without Adjustment  
Conductivity Electrode Serial No.: 8420128321

Standard Conductivity Solution	UUC Reading	Uncertainty of Measurement (±)	Coverage factor k
84.00 µS/cm	84.4 µS/cm	0.62 µS/cm	2.00
1413.0 µS/cm	1433 µS/cm	9.2 µS/cm	2.00
12,890 mS/cm	12.88 mS/cm	0.086 mS/cm	2.00

Remark : - UUC = 10% Under Calibration  
- Cell constant = 0.574487 cm<sup>-1</sup>

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

... End ...

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TEL. 0-2717-3000-25 FAX. 0-2718-3404

**Certificate of Calibration**

Cert.No.: 24CH542  
Page: 1 of 2

Equipment : Conductivity Meter  
Manufacturer : Mettler Toledo  
Model : SevenCompact S230  
Serial No. : B608134488  
ID No. : SQ-CL0032  
Condition As-Received : Used Item  
Received Date : 29 April 2024  
Calibration Date : 08 May 2024  
Reference : 2404-0708DSC-3  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd., Songkhla Branch, 1147 Moo 8 Kamphaengwattana Rd., Bangpoo, Bangpoo, Songkhla 90250 Thailand

Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In-house method :  
- CP-CH2 by direct measurement with certified reference material (CRM)

Calibrated by : *Worakorn Lampragatkul*  
Approved by : *Suttip*  
Approved Signature :  
( ) Unchecked/Handwritten  
( ) Papan Papan  
(✓) Sa-Ship Meangmai  
Issue Date : 08 May 2024

The Uncertainties are for a confidence probability of approximately 95%  
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**SCAL**

Cert.No.: 24CH542  
Page: 2 of 2

**Condition of this result of calibration**

1. Reference Standard Instrument :  
Instrument : Serial No. : ID No. : Certificate No. : Due date :  
1) Thermometer : B608134488 : 130RC085 : 2311051 : 05 Sep 2024  
- This Calibration is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :  
- Conductivity calibration solution, CPA Chem Ltd., The measurement results are traceable to SI through CPA Chem Ltd., ANSASQ National Accreditation Board, Accredited No. AN-1835

Conductivity Solution	Manufacturer	Lot No.	Exp. date
84.00 µS/cm	CPA Chem	931854	01 Oct 2024

- Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) °C  
3. This certificate is valid only to the item calibrated on date and place of calibration.

**Calibration results**  
Function : Conductivity Measurement  
(\*) After Adjustment at 84.39 µS/cm  
Conductivity Electrode Serial No.: 8412401554

Standard Conductivity Solution	Before Adjustment UUC Reading	After Adjustment UUC Reading	Uncertainty of Measurement (±)	Coverage factor k
84.00 µS/cm	85.6 µS/cm	84.6 µS/cm	0.62 µS/cm	2.00

Remark : - UUC = 10% Under Calibration  
- Cell constant = 0.897760 cm<sup>-1</sup>

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

... End ...

**Southern Calibration Service Co., Ltd.**  
669/35 Kamphaengwattana Rd., Bangpoo, Bangpoo, Songkhla 90250 Thailand  
Tel. 08 1999 0017 Fax. 0 2040 5111 Email: calibration@scs.co.th, scs@scs.co.th

**CALIBRATION CERTIFICATE**

Issued Date : 4-Jul-2024 Certificate No. : 24TH2700  
CSR No. : A1550473 Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
1147 Moo 8, Kamphaengwattana Rd., Bangpoo, Bangpoo, Songkhla 90250 Thailand

Calibration Place : Microbiological Laboratory  
Instrument Name : Autoclave  
Manufacturer : TCM  
Model : SX-700  
Serial No. : 51234079  
ID No. : SQ-CL0001  
Resolution : 1 °C  
Received Date : 1-Jul-2024  
Calibrated Date : 1-Jul-2024  
Ambient Temperature : (20 ± 10) °C  
Relative Humidity : (50 ± 30) %

REVIEW BY : *Nichol B.*  
APPROVED BY : *Kamila B.*  
NEXT CAL DATE : 1/1/25

Calibration Method Used :  
The instrument was calibrated using the Calibration In-house method. SCAL No. 013 based on ISO 9001 : 1983 (part 1)  
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017  
Traceability of measurement :  
The Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Units (SI) through :  
- SCG, Southern Calibration Service Co., Ltd.  
Calibrated by : *Brookh. Saeam* Approved by : *Imron Ratanayum / Technical Manager*

The uncertainties are for a confidence probability of approximately 95%  
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**SCAL**

Certificate No. : 24TH2700  
CSR No. : A1550473  
Page : 2 of 3

**Details of Calibration**

1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Logger With Sensor	GL240	C10432223	2450A7005	2-May-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.  
3. The certificate is not valid for any commercial transaction.  
4. Condition of item : normal condition, no indication for any damage or malfunction.

**Result of Calibration** : (✓) Without Adjustment ( ) After Adjustment

5. Sensor Installation Diagram

Chamber Diameter (D): 30 cm  
Chamber Height (H): 70 cm

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Tel: 08 1999 0417 Fax: 0 1480 3123 Email: ssc@sscal.com www.sscal.com

Certificate No. : 24TH0780  
CSR No. : A15007473  
Page : 3 of 3

**Result of Calibration**

2. Temperature Measurement Accuracy Test

The measurement results of the Airborne and associated are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)	Pressure Reading	Uncertainty (±°C)
115	118.3	118.4	0.07 MPa
118	119.2	119.2	0.09 MPa
121	121.8	121.5	0.11 MPa

3. Performance Result

The performance of the Airborne are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
115	115	115	0.10	0.17	0.17
118	118	118	0.10	0.10	0.13
121	121	121	0.10	0.00	0.04

UUC = Unit Under Calibration

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

... End ...

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Tel: 08 1999 0417 Fax: 0 1480 3123 Email: ssc@sscal.com www.sscal.com

Certificate No. : 24TH0186  
CSR No. : A12506123  
Page : 1 of 3

**CALIBRATION CERTIFICATE**

Issued Date : 18-Jan-2024

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
1141 Moo 8, Kamjanewasri Rd., Tambon, Ban Phru, Amphoe Hat Yai, Songkhro, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : Incubator

Manufacturer : Memmert

Model : UCT750

Serial No. : FB18.0061

ID No. : SGC\_AL0103

Resolution : 0.1 °C

Received Date : 15-Jan-2024

Calibrated Date : 15-Jan-2024

Ambient Temperature : (20 ± 1) °C

Relative Humidity : (50 ± 20) %

Calibration Method Used : This instrument was calibrated using the Calibration In-house method: SGCALM012 based on GUM:2008

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement : This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Units (SI) through :  
- SGC, Southern Calibration Service Co., Ltd.

Calibrated by : Siran Subanah

Approved by : Jirun Ratnayakorn / Technical Manager

REVIEW BY: Wichai B.  
APPROVED BY: Kanika H.  
NEXT CAL DATE: 15-Jan-25

The uncertainties are for a confidence probability of approximately 95%

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Tel: 08 1999 0417 Fax: 0 1480 3123 Email: ssc@sscal.com www.sscal.com

Certificate No. : 24TH0186  
CSR No. : A12506123  
Page : 2 of 3

**Details of Calibration**

1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Control Unit	34370A	MY5000813	255047804	23-May-2024

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction.

4. Condition of item: normal condition, no indication for any damage or malfunction.

**Result of Calibration** (✓) Without Adjustment ( ) After Adjustment

1. Sensor Installation Diagram

Sensor Installation Details

Dimension of the chamber

a = 5.0 cm W = 104.0 cm  
b = 5.0 cm H = 120.0 cm  
c = 5.0 cm D = 90.0 cm

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Tel: 08 1999 0417 Fax: 0 1480 3123 Email: ssc@sscal.com www.sscal.com

Certificate No. : 24TH0186  
CSR No. : A12506123  
Page : 3 of 3

**Result of Calibration**

2. Temperature Measurement Accuracy Test

The measurement results of the Airborne and associated are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)	Uncertainty (±°C)
35	35.4	0.38

3. Performance Result

The performance of the Airborne are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35	35.0	35.0	0.10	0.33	0.35

UUC = Unit Under Calibration

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

... End ...

**Southern Calibration Service Co., Ltd.**  
669/75 Kamjanewasri Rd., Bangpra, Hatyai, Songkhro 90250 Thailand  
Tel: 08 1999 0417 Fax: 0 1480 3123 Email: ssc@sscal.com www.sscal.com

Certificate No. : 24CH0342  
CSR No. : A15007473  
Page : 1 of 2

**CALIBRATION CERTIFICATE**

Issued Date : 5-Jul-2024

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
1141 Moo 8, Kamjanewasri Rd., Tambon, Ban Phru, Amphoe Hat Yai, Songkhro, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : pH meter

Manufacturer : Sartorius

Model : PB-10

Serial No. : C0118005

ID No. : SGC\_M0015

Electrode No. : P2097003

Received Date : 2-Jul-2024

Calibrated Date : 2-Jul-2024

Ambient Temperature : (25 ± 1) °C

Relative Humidity : (55 ± 15) %

Calibration Method Used : This instrument was calibrated using the Calibration In-house method: SGCALM008 based on direct measurement by using certified reference material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement : This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Units (SI) through :  
- OPAchem: OPAchem Ltd  
- HK: HK Metro Co., Ltd

Calibrated by : Aitana Ma

Approved by : Jirun Ratnayakorn / Technical Manager

REVIEW BY: Wichai B.  
APPROVED BY: Kanika H.  
NEXT CAL DATE: 5-Jul-25

The uncertainties are for a confidence probability of approximately 95%

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**Southern Calibration Service Co., Ltd.**  
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Tel: 08 1999 0417 Fax: 0 1480 3123 Email: ssc@sscal.com www.sscal.com

Certificate No. : 24CH0342  
CSR No. : A15007473  
Page : 2 of 2

**Details of Calibration**

1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.000	6127446	88239	10-May-2025
Standard Solution	7.000	6128146	88241	10-May-2025
Standard Solution	10.01	6128732	88243	10-May-2025

Temperature/Electrical Calibrator : MC2-TE 14887 WNC130-299-223 24-May-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction.

4. Condition of item: normal condition, no indication for any damage or malfunction.

**Result of Calibration**

1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV)	Correction (pH)	Uncertainty (± pH)
177.48	177.6	3.80	-0.02
0.30	0.0	6.00	0.00
-177.48	-177.5	12.20	0.02

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.008	4.02	16.4	-0.02
6.895	7.02	-7.1	-0.02
10.010	10.03	-18.1	-0.02

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.008	4.02	16.4	-0.02
6.895	7.00	-6.9	-0.01
10.010	10.01	-17.2	0.00

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

... End ...

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Certificate No. : 24TH0782  
CSR No. : A15007474  
Page : 1 of 3

**CALIBRATION CERTIFICATE**

Issued Date : 4-Jul-2024

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
1141 Moo 8, Kamjanewasri Rd., Tambon, Ban Phru, Amphoe Hat Yai, Songkhro, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : Liquid Bath

Manufacturer : Memmert

Model : WP65

Serial No. : L715.0058

ID No. : SGC\_AL0021

Resolution : 0.1 °C

Received Date : 1-Jul-2024

Calibrated Date : 1-Jul-2024

Ambient Temperature : (20 ± 1) °C

Relative Humidity : (50 ± 20) %

Calibration Method Used : This instrument was calibrated using the Calibration In-house method: SGCALM014 based on ASTM E 715 - 1989 (reapproved 2019)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement : This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Units (SI) through :  
- ISTR: Thai Institute of Scientific and Technological Research

Calibrated by : Siran Subanah

Approved by : Jirun Ratnayakorn / Technical Manager

REVIEW BY: Wichai B.  
APPROVED BY: Kanika H.  
NEXT CAL DATE: 1-Jul-25

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 Southern Calibration Service Co., Ltd.

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Certificate No. : 24TH0782  
CSR No. : A15007474  
Page : 2 of 3

**Details of Calibration**

1. Reference Standard Equipment Used

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Control Unit	34370A	MY5000813	PSL-10707-187	20-May-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction.

4. Condition of item: normal condition, no indication for any damage or malfunction.

**Result of Calibration** (✓) Without Adjustment ( ) After Adjustment

1. Sensor Installation Diagram

Sensor Installation Details

Dimension of the chamber

a = 6 cm W = 45 cm  
b = 6 cm H = 30 cm  
c = 6 cm D = 25 cm

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**Result of Calibration**

2. Temperature Measurement Accuracy Test

The measurement results of the Liquid Bath and associated are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)	Uncertainty (±°C)
44.5	44.5	0.14

3. Performance Result

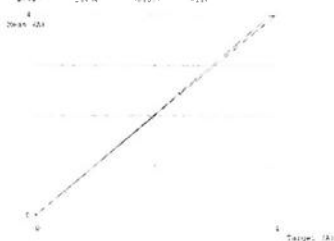
The performance of the Liquid Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.5	44.5	44.5	0.10	0.14	0.25

UUC = Unit Under Calibration

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

... End ...



## ภาคผนวก จ

สำเนาหนังสือรับรองห้องปฏิบัติการวิเคราะห์เอกชน



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๑๑๕) นายอนันต์ชัย...

เอกสารแนบท้ายหนังสือรับแจ้งข้อหาขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกสาร  
บริษัท เอแอลแอล แอสโซซิเอตส์ จำกัด เลขทะเบียน ๒-๒๐๔  
ที่ ๑๐๓๑๐(๑)/ ๑๖ ๑๖ ๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๙ รายการ

น้ำเสีย จำนวน 60 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method <sup>(1)</sup>
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method <sup>(1)</sup>
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method <sup>(1)</sup>
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(2)</sup>
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(2)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(2)</sup>
6	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(2)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(2)</sup>
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(2)</sup>
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(2)</sup>
9	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(2)</sup>
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(2)</sup>
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>(2)</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>(2)</sup>
12	Carbaryl	High-Performance Liquid Chromatographic Method <sup>(2)</sup>
13	Carbofuran	High-Performance Liquid Chromatographic Method <sup>(2)</sup>
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(2)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(2)</sup>
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method <sup>(1)</sup> 2) Closed Reflux, Titrimetric Method <sup>(1)</sup>
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(2)</sup>
17	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(2)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(2)</sup>
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method <sup>(2)</sup>

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

40 Manganese...

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

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น้ำดื่ม จำนวน 126 รายการ

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

18 Bis(2-ethylhexyl)phthalate...

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

36 Chrysene...

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

56 1,3-Dichloropropene...

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

76 γ-HCH...

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

94 N-Nitrosodiphenylamine...

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

110 TPH (C<sub>8</sub>-C<sub>16</sub>)...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
110	TPH (C <sub>10</sub> -C <sub>16</sub> )	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(9,22)</sup>
111	TPH (C <sub>10</sub> -C <sub>30</sub> )	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(9,22)</sup>
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>(6)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(6)</sup>
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
126	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(6)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(6)</sup>

อากาศเสีย...

#### อากาศเสีย (ไม่รวมรวม) จำนวน 28 รายการ

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

15 Lead...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(5)</sup>
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
19	Opacity	Ringelmann's Method <sup>(2)</sup>
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method <sup>(5)</sup> 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method <sup>(5)</sup> 3) Instrumental Analyzer Method <sup>(5)</sup>
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup> 2) Instrumental Analyzer Method <sup>(5)</sup>
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup>
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method <sup>(5)</sup> 2) Paired Train, Isokinetic Sampling, Gravimetric Method <sup>(5)</sup>

27 Vanadium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
28	Xylene	Absorption Sampling, Gas Chromatographic Method <sup>(5)</sup>

#### สิ่งปฏิกูลหรือวัสดุที่ไม่ได้จัด จำนวน 35 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,2,24)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(6,28)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,26)</sup>
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>

5 Beryllium...



ลำดับที่	สารเคมี	วิธีการตรวจ
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',5,6'-Heptachlorobiphenyl - 2,2',3,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,6'-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,3,24)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> Electrometric Method <sup>(23,24)</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 5) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 6) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 7) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
29	pH	
30	Selenium	

31 Silver...

ลำดับที่	สารเคมี	วิธีการตรวจ
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>

ดิน

## ดิน จำนวน 125 รายการ

ลำดับที่	สารเคมี	วิธีการตรวจ
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
2	Acetone	1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup> 2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(13)</sup>
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup>

11 Benzo(b)fluoranthene

ลำดับที่	สารเคมี	วิธีการตรวจ
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup>
20	Bromofom	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup>
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(13,25)</sup>
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>

23 Cadmium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,13)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,16,19)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,17,19)</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>(8,19)</sup>

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
37	Cyanide	Extraction, Distillation, Colorimetric Method <sup>(27,28,29)</sup>
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>

49 1,2-Dichloroethane...

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

63 Di-n-Octyl Phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(13)</sup>

73 n-Hexane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
75	β-HCH	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
77	Hexachlorocyclopentadiene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
79	Indeno(1,2,3-cd)pyrene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
81	Lead	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup>
83	Mercury	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
85	Methoxychlor	2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
86	Methyl Bromide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
87	Methylene Chloride	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
88	2-methylphenol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
89	2-Methylnaphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
90	Methyl tert-Butyl Ether	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
91	Naphthalene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
92	Nickel	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
93	Nitrobenzene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
94	N-Nitrosodiphenylamine	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup>
95	N-Nitrosodi-n-propylamine	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>

96 Polychlorinated biphenyls (PCBs)

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

99 Phenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
100	Pyrene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
101	Selenium	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
102	Silver	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
103	Styrene	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup>
104	1,1,2,2-Tetrachloroethane	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
105	Tetrachloroethylene	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup>
106	Toluene	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
107	Toxaphene	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup>
108	TPH (C <sub>5</sub> -C <sub>9</sub> )	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
109	TPH (C <sub>10</sub> -C <sub>14</sub> )	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup>
110	TPH (C <sub>15</sub> -C <sub>33</sub> )	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
111	1,2,4-Trichlorobenzene	1) Automate Extraction, Gas Chromatographic Method <sup>(11,22)</sup>
112	1,1,1-Trichloroethane	2) Solvent Extraction, Gas Chromatographic Method <sup>(12,22)</sup>
113	1,1,2-Trichloroethane	3) Ultrasonic Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
114	Trichloroethylene	1) Automate Extraction, Gas Chromatographic Method <sup>(11,22)</sup>

115 2,4,5-Trichlorophenol...

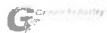


๒๐  
อนึ่ง หนังสือฉบับนี้จะมีผลต่ออายุหรือหมดอายุของใบอนุญาตประกอบกิจการวิเคราะห์เอกชน  
ในวันที่ ๒ กันยายน ๒๕๖๔  
จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นายพรบศ ก้านทอง)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน  
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ  
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕  
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๑๔  
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ ๒๓ ๐๓๑๐(๑)/๒๒๓๖ ๘ ๑

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ ธันวาคม ๒๕๖๓

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒ ธันวาคม ๒๕๖๓

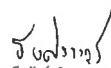
ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ  
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔-๙-๑๐๔๔ ขอยกเลิกบุคลากร ๔๐ คนพัฒนาการ แว่งพัฒนาการ  
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ออกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์  
จำนวน ๔ ราย ได้แก่

๑) นายประพนธ์ วรรณชูชัย	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๖๐
๒) นายจิรณัฐ ขาวละออ	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๗๒
๓) นายพิรพัฒน์ คำคำ	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๘๘
๔) นางสาวอรุณ คำคำ	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๘๔
๕) นายกิตติพงศ์ แซ่ลี	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๘๔
๖) นายจิรเมธ ประเสริฐศิริพงษ์	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๖๐
๗) นายภัทรพงษ์ มณฑาทอง	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๖๗
๘) นางสาวอารวรรณ กระจำพันธุ์	ทะเบียนเลขที่ ๖-๒๐๔-๙-๑๐๘๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นายธีรทัศน์ อิศรางกูร ณ อยุธยา)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๑๔

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๑๒๖/๑๓๖๕๔



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๕ ก.ย. ๒๕๖๖

เรื่อง คออาณัติขอรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียนห้องปฏิบัติการ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๙ กรกฎาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับค่ออาณัติขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๓ แผ่น

ตามที่หนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอค่ออาณัติ  
ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๖๗ สถานที่ตั้ง เลขที่ ๑๑๔/๑ หมู่ที่ ๘  
ถนนกาญจนาภิเษก ตำบลบ้านพุ อำเภอหาดใหญ่ จังหวัดสงขลา ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)  
จำกัด ค่ออาณัติขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

นางสาวกัญญา เหมประสาทร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวอินทิรา คงประยูร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๒

๒) นางสาวอมรรัตน์ เพชรประดับ

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๓

๓) นายทักษิณ อินโคตร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๔

๔) นางสาวณัฏฐา บุญเพชร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๕

๕) นางสาวสุวิภา ทัพย์รัตน์

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๖

๖) นางสาววันวิสา มณีมิตร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๗

๗) นายวุฒิชัย หว่องเจริญ

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๘

๘) นายอภิวัฒน์ วัชร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๐๙

๙) นายอภิวัฒน์ วัชร

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๐

๑๐) นายศิริชัย เสงี่ยมเกิด

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๑

๑๑) นายสมศักดิ์ จันทวงศ์

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๒

๑๒) นางสาวทิชา คุกรานนท์

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๓

๑๓) นายณัฐภา เกียรติพิทักษ์

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๔

๑๔) นางสาวกณิศา รอดทองอ่อน

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๕

๑๕) นางสาวจุฑามาศ สุขสวัสดิ์

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๖

๑๖) นางสาวจินตนา คงทน

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๗

๑๗) นางสาวกุลวดี เรืองประพันธ์

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๘

๑๘) นางสาวอาทิตย์า เมืองแก้ว

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๑๙

๑๙) นางสาววันณา คุ้มบ่อ

ทะเบียนเลขที่ ๖-๒๖๗-ก-๐๐๒๐

ค. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนวิเคราะห์เป็นน้ำเสียและอากาศเสีย ตามสิ่งที่ส่งมาด้วย

หนังสือแนบมา



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



-๒-

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๖ สิงหาคม ๒๕๖๗ หากประสงค์จะต่ออายุหนังสือรับขึ้น  
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม  
ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอ  
ผ่านระบบอิเล็กทรอนิกส์ได้ที่เว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

ท/า

(นายณรงค์ ศรีรงค์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคใต้  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคใต้

โทร. ๐ ๗๕๓๒ ๕๐๒๗, ๐ ๗๕๔๔ ๐๖๓๔ ต่อ ๕๒๐๑

ไปรษณีย์อิเล็กทรอนิกส์ siru@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับค่ออาณัติขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๖๗

ที่ อก ๐๑๒๖/๑๓๖๕๔

ลงวันที่ ๒๕ ก.ย. ๒๕๖๖

ขอขยายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗ รายการ  
วันเสีย จำนวน 25 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Arsenic	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
2	Barium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
3	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method <sup>[1]</sup>
4	Cadmium	5-Day BOD Test, Membrane Electrode Method <sup>[1]</sup>
5	Chemical Oxygen Demand	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
6	Chromium	Closed Reflux, Colorimetric Method <sup>[1]</sup>
7	Color	Closed Reflux, Titrimetric Method <sup>[1]</sup>
8	Copper	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
9	Formaldehyde	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
10	Free Chlorine	Distillation, Colorimetric Method <sup>[2]</sup>
11	Hexavalent Chromium	DIP Ferrous Titrimetric Method <sup>[3]</sup>
12	Lead	Filtration, Colorimetric Method <sup>[1]</sup>
13	Manganese	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
14	Mercury	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
15	Nickel	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
16	Oil & Grease	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
17	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method <sup>[1]</sup>

ศูนย์ วิจัยและเตือนภัย  
(นางสาวจุฬารัตน์ วัฒนสุภา)  
นักวิทยาศาสตร์ชำนาญการ

17 pH

ลำดับที่	สารเคมี	วิธีวิเคราะห์
17	pH	Electrometric Method <sup>[1]</sup>
18	Phenol	Distillation, Direct Photometric Method <sup>[1]</sup>
19	Selenium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
20	Sulfide	ZnS Precipitation, Iodometric Method <sup>[1]</sup>
21	Temperature	Laboratory and Field Methods <sup>[1]</sup>
22	Total Dissolved Solids	Dried at 180 °C <sup>[1]</sup>
23	Total Suspended Solids	Dried at 103-105 °C <sup>[1]</sup>
24	Trivalent Chromium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
25	Zinc	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>

ขอขยายจำนวน 12 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
3	Carbon Monoxide	Sampling Bag Non-Dispersive Infrared Method <sup>[1]</sup>
4	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
5	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory <sup>[1]</sup>
6	Hydrogen Sulfide	Absorption, Iodometric Method <sup>[1]</sup>
7	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1]</sup>
8	Opacity	Ringelmann's Method <sup>[1]</sup>
9	Oxides of Nitrogen	Absorption Sampling, Phenoldisulfonic acid Method <sup>[1]</sup>
10	Sulfur Dioxide	Absorption Sampling, Barium-Iodine Titrimetric Method <sup>[1]</sup>
11	Sulfuric acid	Isokinetic Sampling, Barium-Thorium Titrimetric Method <sup>[1]</sup>
12	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>[1]</sup>

ศูนย์ วิจัยและเตือนภัย  
(นางสาวจุฬารัตน์ วัฒนสุภา)  
นักวิทยาศาสตร์ชำนาญการ

เอกสารอ้างอิง

เอกสารอ้างอิง

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right partner.



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