

ภาคผนวก ง
เอกสารสอบเทียบเครื่องมือ



รายการเครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์คุณภาพสิ่งแวดล้อม

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือสำหรับวิเคราะห์คุณภาพอากาศ									
1	Analytical Balance (Repeatability 0.1 mg)	ฝุ่นละอองรวม	Mettler-Toledo	AB204-S / 1128312528	Mettler-Toledo (Thailand) Ltd.	TH2058-097-040722 ACC-TH	7 Apr 22	6 Apr 23	-
2	Analytical Balance (Repeatability 0.1 mg)		Mettler-Toledo	AB204-S/FACT / B108115858	Mettler-Toledo (Thailand) Ltd.	TH2058-098-040722 ACC-TH	7 Apr 22	6 Apr 23	-
3	Analytical Balance (Repeatability 0.001 mg)		Mettler-Toledo	XP6 / B322373893	Mettler-Toledo (Thailand) Ltd.	TH2058-099-040722 ACC-TH	7 Apr 22	6 Apr 23	-
เครื่องมือสำหรับวิเคราะห์คุณภาพน้ำ									
1	pH Meter	ความเป็นกรดและด่าง	Mettler-Toledo	Seven Easy S20 / 1231155210	National Food Institute, Ministry of Industry, Thailand	2201793-001-01	1 Mar 22	28 Feb 23	-
2	pH Meter		Mettler-Toledo	Seven Easy S20 / 1230525212	National Food Institute, Ministry of Industry, Thailand	2202093-001-01	16 Mar 22	15 Mar 23	-
3	BOD Incubator	บีโอดี	Arco	UC4-1320 / (UAE.WAO.015/2561)	Technology Promotion Association (Thailand-Japan)	22TM90	17 Feb 22	16 Feb 23	-
4	BOD Incubator		Arco	UR-1320 / (UAE.WAO.018/2551)	Technology Promotion Association (Thailand-Japan)	22TM305	7 Apr 22	6 Apr 23	-
5	Analytical Balance (Repeatability 0.01 mg)	สารแขวนลอย	Mettler-Toledo	XSR205DU / C009071872	Technology Promotion Association (Thailand-Japan)	22MM210	26 Apr 22	25 Apr 23	-
6	Hot Air Oven		Memmert	UF-55 / B216.1666	Technology Promotion Association (Thailand-Japan)	21TM1876	29 Oct 21	28 Oct 22	-

รายการเครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์สำหรับตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
7	Hot Air Oven	สารแขวนลอย	Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	22TM304	7 Apr 22	6 Apr 23	-
8	Analytical Balance (Readability 0.1 mg)	น้ำมันและไขมัน	Mettler-Toledo	XSR204 / C117635043	National Food Institute, Ministry of Industry, Thailand	2202934-001-01	13 May 22	12 May 23	-
9	UV-VIS Spectrophotometer	ในเครื่อง คำนวณเป็นไมโครเจน	Agilent Technologies	Cary60 G6860A / MY15410009	DOE Services Co.,Ltd.	SP22-016	31 May 22	30 May 23	-
10	UV-VIS Spectrophotometer		Hitachi	U-1900 / 2021-064	DOE Services Co.,Ltd.	SP22-007	20 Jan 22	19 Jan 23	-

Due Date of Calibration* : Schedule the program once a year at least once a year.

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP)	Thermo Scientific	TE-5025A 1270	Tisch Environmental, Inc.	438320	15 May 21	14 May 22	-
2	U-Tube Manometer	Total Suspended Particulate (TSP)	Dwyer	1221-36-W/M	Technology Promotion Association (Thailand-Japan)	22P111	19 Feb 22	18 Feb 23	-
3	Aneroid Barometer	Total Suspended Particulate (TSP)	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	21P2502	21 Jul 21	20 Jul 22	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP)	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	22H401	6 Feb 22	5 Feb 23	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Workplace									
1	Flow Meter	Calibrate personal pump	TSL Inc	4146 41461813030	Innovative Instrument Co., Ltd.	21-AFM-073	23 Jul 21	22 Jul 22	-
2	Aneroid Barometer	Total Dust	TSL Inc	4146 41461922007	Innovative Instrument Co., Ltd.	21-AFM-052	8 Jun 21	7 Jun 22	-
3	Digital Thermo - Hygrometer	Total Dust	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	21P2500	21 Jul 21	20 Jul 22	-

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Water									
1	pH Meter	pH Meter	YSI	pH100A JC03345	Technology Promotion Association (Thailand-Japan)	21CH1136	1 Sep 21	31 Aug 22	-

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Accuracy Calibration Certificate

Customer

Company: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udon Suk 41, Sukhumvit Rd., Bang Chak
City: Phra Khanong Contact: Suret Chotnok
Zip / Postal: 10262
State / Province: Bangkok
Order Number:

Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument
Model: AB204-S Asset Number: UAE-AIR 016/2550
Serial No.: 1175312528 Terminal Model: N/A
Building: N/A Terminal Serial No.: N/A
Floor: 2 Terminal Asset No.: N/A
Room: Balance Room 2 (08)
Range: Max Capacity: 220 g Readability: 0.0001 g

Procedure

Calibration Guideline: EURAMET cp-16 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CPM002/26
This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.
The sensitivity factor of the weighing instrument was adjusted before calibration with a built-in weight.
In accordance with EURAMET cp-16 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

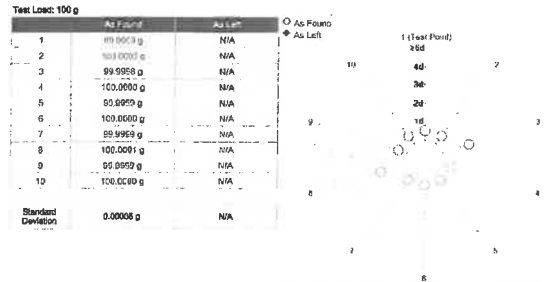
	Temperature	Humidity
As Found	Start: 27.5 °C End: 27.4 °C Start: 56.1 % End: 63.2 %	

As Found Calibration Date: 07-Apr-2022 Calibration:
As Left Calibration Date: N/A
Issue Date: 08-Apr-2022 Approved Signature:

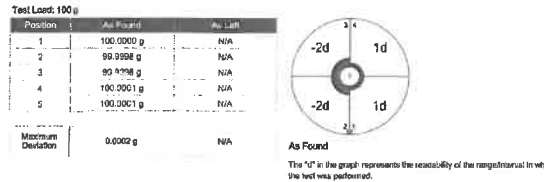
Siravit Chundham
Kessakorn Tassanachaisakul
Sond Siriyom
Surasinee Silakote

Measurement Results

Repeatability

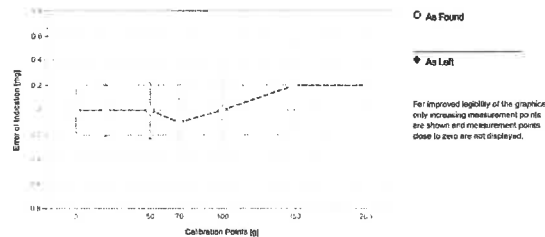


Eccentricity



Error of Indication

As Found	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.18 mg	2
2	0.1000 g	0.1000 g	0.0000 g	0.19 mg	2
3	1.0000 g	0.9999 g	-0.0001 g	0.19 mg	2
4	5.0000 g	5.0000 g	0.0000 g	0.19 mg	2
5	10.0000 g	9.9999 g	-0.0001 g	0.23 mg	2
6	20.0000 g	20.0000 g	0.0000 g	0.23 mg	2
7	50.0000 g	50.0000 g	0.0000 g	0.23 mg	2
8	70.0001 g	70.0000 g	-0.0001 g	0.23 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.23 mg	2
10	150.0000 g	150.0000 g	0.0000 g	0.41 mg	2
11	200.0001 g	200.0000 g	-0.0001 g	0.46 mg	2



Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.: W580 Date of Issue: 23-Feb-2022
Certificate Number: C205581531 Calibration Due Date: 14-Aug-2023

Thermo Hygrometer

Equipment No.: H1161 Date of Issue: 14-Jun-2021
Certificate Number: 21111220 Calibration Due Date: 01-Jun-2022

Remarks

Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory
Test weight by Filter pan: 1 g = 0.9999 g, 3 g = 3.0000 g, 5 g = 5.0000 g
End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-4} / K$
Temperature range on site for the evaluation of the measurement uncertainty in use: $3 K$

Uncertainty of Uncertainty Equation

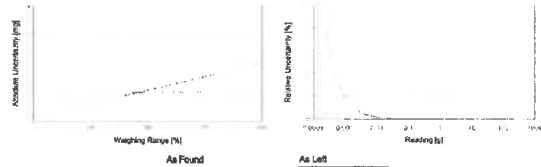
Range	As Found	As Left
0.0001 g	270 g	N/A

$$U_1 = 0.19 \text{ mg} + 0.00817 \text{ mg/g} \cdot R$$

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found	As Left
0.0001 g	0.19 mg	N/A
0.0005 g	0.19 mg	N/A
0.001 g	0.19 mg	N/A
0.005 g	0.19 mg	N/A
0.01 g	0.19 mg	N/A
0.05 g	0.19 mg	N/A
0.1 g	0.19 mg	N/A
0.5 g	0.19 mg	N/A
1 g	0.19 mg	N/A
5 g	0.19 mg	N/A
10 g	0.19 mg	N/A
50 g	0.19 mg	N/A
100 g	0.19 mg	N/A
500 g	0.19 mg	N/A
1000 g	0.19 mg	N/A
5000 g	0.19 mg	N/A
10000 g	0.19 mg	N/A



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Accuracy Calibration Certificate

Customer

Company: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom Suk 41, Sukhumvit Rd., Bang Chak
City: Phra Khanong
Contact: Suwit Chantanan
Zip / Postal: 10260
State / Province: Bangkok
Order Number: 10260

Weighing Device

Manufacturer: Mettler Toledo
Model: AB204-SFACT
Serial No.: 010111000
Building: N/A
Floor: 2
Room: Balance Room 2 (JUS)
Instrument Type: Weighing Instrument
Asset Number: 00000000000000000000
Terminal Model: N/A
Terminal Serial No.: N/A
Terminal Asset No.: N/A

Procedure

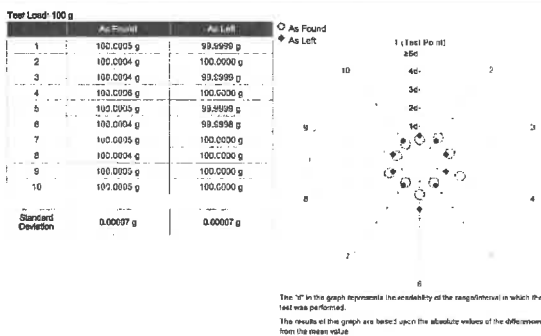
Calibration Guideline: EURAMET cg-18 v.4.0 (11/2015)
Mettler Toledo Work Instruction: CPM00220
This calibration certificate contains measurements for As Found and As Left calibrations.
The same division span of the weighing instrument was adjusted before As Found and As Left calibrations with a built-in weight.
In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature	Humidity
As Found	Start: 22.8 °C End: 22.1 °C	Start: 50.0 % End: 51.5 %
As Left	Start: 22.8 °C End: 22.4 °C	Start: 49.2 % End: 50.8 %

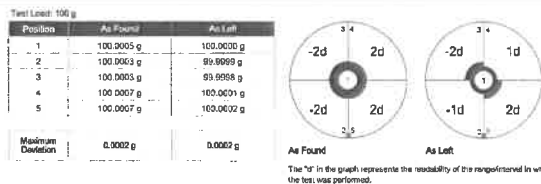
As Found Calibration Date: 07-Apr-2022
As Left Calibration Date: 07-Apr-2022
Issue Date: 06-Apr-2022
Calibrator:
Approved Signature:
☒ Kessakorn Tassanachaisakul
☐ Suwit Chantanan
☐ Surachet Sukkote

Measurement Results

Repeatability



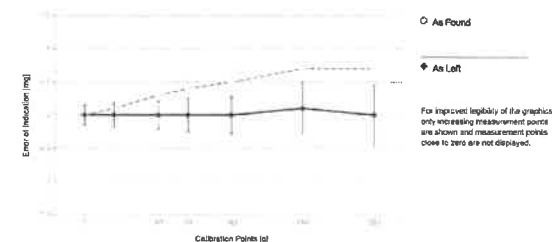
Eccentricity



Error of Indication

As Found	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.15 mg	2
2	0.1000 g	0.1001 g	0.0001 g	0.16 mg	2
3	1.0000 g	0.9999 g	-0.0001 g	0.16 mg	2
4	5.0000 g	5.0000 g	0.0000 g	0.16 mg	2
5	10.0000 g	10.0001 g	0.0001 g	0.17 mg	2
6	20.0000 g	20.0001 g	0.0001 g	0.18 mg	2
7	50.0000 g	50.0002 g	0.0002 g	0.20 mg	2
8	70.0001 g	70.0005 g	0.0004 g	0.20 mg	2
9	100.0000 g	100.0005 g	0.0005 g	0.22 mg	2
10	150.0000 g	150.0007 g	0.0007 g	0.38 mg	2
11	200.0001 g	200.0008 g	0.0007 g	0.44 mg	2

As Left	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.15 mg	2
2	0.1000 g	0.1000 g	0.0000 g	0.16 mg	2
3	1.0000 g	0.9999 g	-0.0001 g	0.17 mg	2
4	5.0000 g	5.0000 g	0.0000 g	0.17 mg	2
5	10.0000 g	10.0000 g	0.0000 g	0.17 mg	2
6	20.0000 g	20.0000 g	0.0000 g	0.18 mg	2
7	50.0000 g	50.0000 g	0.0000 g	0.21 mg	2
8	70.0001 g	70.0001 g	0.0000 g	0.26 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.28 mg	2
10	150.0000 g	150.0001 g	0.0001 g	0.39 mg	2
11	200.0001 g	200.0001 g	0.0000 g	0.45 mg	2



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k - which can be larger than 2 according to EURAMET cg-18. The value of the measurement lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.: W590 Date of Issue: 23-Feb-2022
Certificate Number: C705581631 Calibration Due Date: 14-Aug-2023

Thermo Hygrometer

Equipment No.: H1111 Date of Issue: 14-Jun-2021
Certificate Number: 21H1220 Calibration Due Date: 01-Jun-2022

Remarks

FACT adjustment functionality activated
Value of the built-in weight adjusted
Equipment condition: Good
Next calibration according to customer's procedure
Calibration date not depends by calibration laboratory
Test weight by Filterpan: 1 g = 1.0030 g, 2 g = 3.0000 g, 5 g = 5.0000 g

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $2.5 \cdot 10^{-6} / K$
Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

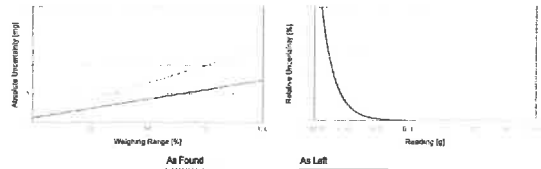
Uncertainty of Uncertainty Equation

Range	Min	As Found	As Left
1	0.0001 g	220 g	

$U_1 = 0.16 \text{ mg} + 0.0111 \text{ mg/g} \cdot R$ $U_1 = 0.16 \text{ mg} + 0.00982 \text{ mg/g} \cdot R$
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a total load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found	As Left
0.0220 g	0.16 mg	0.73%
0.2200 g	0.16 mg	0.074%
2.2000 g	0.16 mg	0.0084%
22.0000 g	0.40 mg	0.0018%
220.0000 g	2.6 mg	0.0012%



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Accuracy Calibration Certificate

Customer

Company: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Jitson Suk 41, Sukhumvit Rd., Bang Chak
City: Phra Khanong Contact: Suwit Chetnok
Zip / Postal: 10260
State / Province: Bangkok
Order Number: 2022031001

Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument
Model: XPe Asset Number: UAE.AIR.0192556
Serial No.: B322373593 Terminal Model: PAT
Building: N/A Terminal Serial No.: B322373593
Floor: 2 Terminal Asset No.: N/A
Room: Balance Room 2 (E08)

Range	Max Capacity	Repeatability 1s
1	6.1 g	0.00001 g

Procedure

Calibration Guideline: EURAMET cg-14 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CPW002/00

This calibration certificate contains measurements for As Found and As Left calibrations.

The sensitivity of the weighing instrument was adjusted before As Found and As Left calibrations with a built-in weight. In accordance with EURAMET cg-14 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

Temperature		Humidity	
As Found	Start: 22.7 °C End: 22.8 °C	Start: 54.2 % End: 53.0 %	
As Left	Start: 22.6 °C End: 22.9 °C	Start: 52.9 % End: 50.5 %	

As Found Calibration Date: 07-Apr-2022 Calibration:
As Left Calibration Date: 07-Apr-2022
Issue Date: 08-Apr-2022

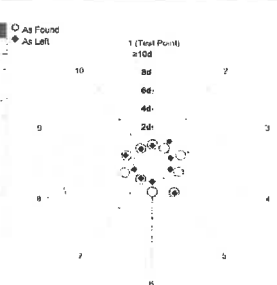
Approved Signatory:

Suwit Chetnok
Suwit Chetnok
Kasaporn Tassanachaisorn
Sant Jirvijorn
Sureshet Sukkale

Measurement Results

Repeatability

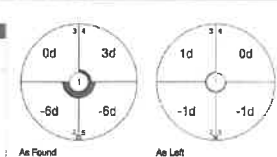
Test Load: 2 g	As Found	As Left
1	2.000007 g	2.000008 g
2	2.000007 g	2.000009 g
3	2.000008 g	2.000008 g
4	2.000008 g	2.000008 g
5	2.000008 g	2.000008 g
6	2.000008 g	2.000008 g
7	2.000007 g	2.000008 g
8	2.000008 g	2.000008 g
9	2.000008 g	2.000009 g
10	2.000007 g	2.000008 g
Standard Deviation	0.0000010 g	0.0000003 g



The '1s' in the graph represents the repeatability of the range interval in which the test was performed.
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 2 g	As Found	As Left
1	2.000108 g	2.000008 g
2	2.000025 g	2.000007 g
3	2.000008 g	2.000008 g
4	2.000011 g	2.000008 g
5	2.000002 g	2.000007 g
Maximum Deviation	0.000006 g	0.000001 g



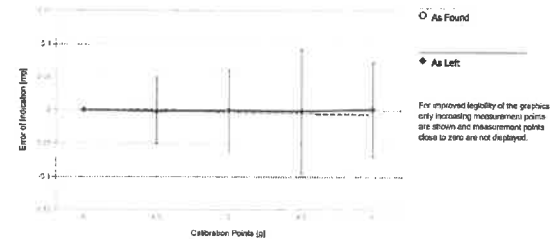
The '1s' in the graph represents the repeatability of the range interval in which the test was performed.

Error of Indication

As Found	Reference Value	Indication	Error of indication	Expanded Uncertainty	k
1*	0.000000 g	0.000000 g	0.000000 g	0.0054 mg	2
2	0.010004 g	0.010005 g	0.000001 g	0.0074 mg	2
3*	0.050005 g	0.050003 g	-0.000002 g	0.011 mg	2
4*	0.100007 g	0.100007 g	0.000000 g	0.015 mg	2
5	0.150012 g	0.150011 g	-0.000001 g	0.025 mg	2
6	0.170013 g	0.170011 g	-0.000002 g	0.034 mg	2
7*	0.200011 g	0.200009 g	-0.000002 g	0.048 mg	2
8	1.500023 g	1.500025 g	0.000002 g	0.049 mg	2
9	3.000021 g	3.000017 g	-0.000004 g	0.062 mg	2
10	4.500031 g	4.500028 g	-0.000003 g	0.094 mg	2
11	6.000026 g	6.000029 g	0.000003 g	0.072 mg	2

As Left	Reference Value	Indication	Error of indication	Expanded Uncertainty	k
1*	0.000000 g	0.000000 g	0.000000 g	0.0054 mg	2
2	0.010004 g	0.010005 g	0.000001 g	0.0074 mg	2
3*	0.050005 g	0.050003 g	-0.000002 g	0.011 mg	2
4*	0.100007 g	0.100007 g	0.000000 g	0.015 mg	2
5	0.150012 g	0.150011 g	-0.000001 g	0.025 mg	2
6	0.170013 g	0.170011 g	-0.000002 g	0.034 mg	2
7*	0.200011 g	0.200009 g	-0.000002 g	0.048 mg	2
8	1.500023 g	1.500025 g	0.000002 g	0.049 mg	2
9	3.000021 g	3.000017 g	-0.000004 g	0.062 mg	2
10	4.500031 g	4.500028 g	-0.000003 g	0.094 mg	2
11	6.000026 g	6.000029 g	0.000003 g	0.072 mg	2

The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capability) value because the calculated uncertainty was smaller than the CMC value.



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor $k=2$, which can be larger than 2 according to EURAMET cg-16. The value of the measurand lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

เอกสารไม่ควบคุม

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	W540	Date of Issue:	23-Feb-2022
Certificate Number:	C206581631	Calibration Due Date:	14-Aug-2023
Thermo Hygrometer:			
Equipment No.:	81161	Date of Issue:	14-Jun-2021
Certificate Number:	21H1220	Calibration Due Date:	01-Jun-2022

Remarks

FACT adjustment functionality activated

Value of the built-in weight adjusted

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

Test weight by filter: 0.050005 g = 0.050004 g 0.150012 g = 0.150011 g

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration

เอกสารไม่ควบคุม

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.2 \cdot 10^{-6} / K$
Temperature range on site for the evaluation of the measurement uncertainty in use: $3 K$

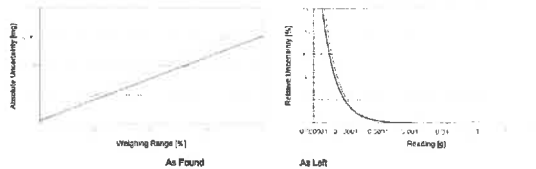
Uncertainty of Uncertainty Equation

Range	g	Max	As Found	As Left
1	0.000001 g	0.1 g	$U_1 = 0.0021 \text{ mg} \pm 0.0113 \text{ mg/g}$	$U_1 = 0.0018 \text{ mg} \pm 0.0096 \text{ mg/g}$

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found	As Left
0.000001 g	0.0021 mg	0.0018 mg
0.000100 g	0.2022 mg	0.0019 mg
0.001000 g	0.0026 mg	0.0024 mg
0.010000 g	0.0036 mg	0.0077 mg
0.100000 g	0.071 mg	0.061 mg



เอกสารไม่ควบคุม



THAI LABORATORY ACCREDITATION SCHEME (TLAS) 2017



Calibration Certificate

Certificate No.: 2201783-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Sol Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10280

Equipment: pH Meter
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1231188210
ID No.: UAE.WAT.010/2553
Order No.: 2201783
Operation No.: 2201783-001
Date of Receipt: 21 February 2022
Date of Calibration: 1 March 2022

Calibrated by: Mr. Phetaphat Tuanjit
Scientist
Approved by: (Signature)
(Mr. Nittapong Niyomchart)
Specialist, Division of Calibration Laboratory
Responsible for the Technical Management Team

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

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

เอกสารไม่ควบคุม



Calibration Report

nfi

Calibration Report

Certificate No.: 2201793-001-01
Equipment: pH Meter
Resolution: 0.01 pH : 1 mV
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1231155210
Type: Bench top
ID No.: UAE.WAT.0102553

Date of Calibration: 1 March 2022 Page 2 of 5

Location: Chemical Calibration Laboratory, NATIONAL FOOD INSTITUTE
Environment Condition: Ambient Temperature: (23.5 ± 1.5) °C Relative Humidity: (53 ± 5) %
Condition of Equipment: Good Condition

Condition of this results of Calibration

1. Calibration Method: In house method: W-CG-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

2. Reference Standards / Certified Reference Material

Material	Serial No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fluke	SCL-217-6587	24 June 2022
2.2 Digital Thermometer	2709007	Fluke	DC-640596-01	30 October 2022
2.3 Thermo-Hygro Meter	NFI-DT-H04918	PONPE	QR22-0195	27 January 2023

Certified Reference Material	Lot No.	Manufacturer	Ref. No.	Expiry Date
2.4 pH buffer 4.005 (Primary pH buffer Solution)	741339	CPAchem	PH41E.L5	18 April 2023
2.5 pH buffer 6.865 (Primary pH buffer Solution)	741340	CPAchem	PH217.L5	18 April 2023
2.6 pH buffer 10.01 (Primary pH buffer Solution)	741342	CPAchem	PH226.L5	18 April 2023
2.7 pH buffer 7.00 (Standard pH buffer Solution)	735836	CPAchem	PH107.L5	18 March 2022

3. The calibration is traceable to The International System of Unit (SI Unit)

3.1 Instruments No. 3.1	through	NSO-TIS-16 17625 Laboratory Accreditation of Calibration No.0075
3.2 Instruments No. 3.2	through	NSO-TIS-16 17625 Laboratory Accreditation of Calibration No.0061
3.3 Instruments No. 3.3	through	NSO-TIS-16 17625 Laboratory Accreditation of Calibration No.0292
3.4 Certified Reference Material No. 2.4 to 2.6	traceable to	Primary measurement method: Homed cell using calibrated thermometer, thermometer, and reference material. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
3.5 Certified Reference Material No. 2.7	traceable to	BSM Ref H-07 Lot# 30.04.2020; BSM Ref H-8 Lot# 28.05.2020; BSM Ref H-9 Lot# 30.04.2020; BSM Ref H-10 Lot# 28.05.2020; The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

4. This certificate was certified only for the instrument we calibrated.

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

P. Jungsantit
1 March 2022

เอกสารไม่ควบคุม

F-CS-012 Revision: 00 Date: 14-12-61



Calibration Report

nfi

Calibration Report

Certificate No.: 2201793-001-01
Equipment: pH Meter
Resolution: 0.01 pH : 1 mV
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1231155210
Type: Bench top
ID No.: UAE.WAT.0102553

Date of Calibration: 1 March 2022 Page 3 of 5

Calibration Results:
1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (± mV)	Coverage Factor (k)
		mV	pH		
0.00	414.117	414	0.00	0.58	2.00
3.20	295.811	296	3.00	0.58	2.00
4.00	177.482	176	4.00	0.58	2.00
6.00	66.169	65	6.00	0.58	2.00
7.00	-0.001	0	7.00	0.58	2.00
8.00	-53.153	-53	8.00	0.58	2.00
10.00	-177.463	-177	10.00	0.58	2.00
12.00	-295.512	-296	12.00	0.58	2.00
14.00	-414.119	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment:	pH Electrode	Type:	Combined Electrode
Manufacturer:	METTLER TOLEDO	Model:	IndLabSolid
Serial No.:	1156582	ID No.:	N/A

Performance of Electrode system (Three-Point Calibration at pH 4, pH 7 and pH 10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.006	4.00	180	96.25	0.0079	2.00
6.866	6.88	16	96.13	0.0079	2.00
10.012	10.01	-162	96.13	0.0094	2.00
6.866	7.00	9	96.13	0.0097	2.00

P. Jungsantit
1 March 2022

เอกสารไม่ควบคุม

F-CS-012 Revision: 00 Date: 14-12-61



Calibration Report

nfi

Calibration Report

Certificate No.: 2201793-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C
Model: SevenEasy pH
Serial No.: 1231155210
ID No.: UAE.WAT.0102553
Manufacturer: METTLER TOLEDO
Date of Calibration: 1 March 2022 Page 4 of 5

Location: Chemical Calibration Laboratory, NATIONAL FOOD INSTITUTE

Environment Condition: Ambient Temperature: 24 °C ± 1 °C
Relative Humidity: 53 % ± 2 %

Condition of this results of Calibration:

- Calibration Method:
 - In house method: W-TS-025 by comparison with standard thermometer.
 - The Calibration is determined by comparing with a known temperature from a standard resistance thermometer.
 - The temperature scale in use at this laboratory is the International Temperature scale of 1990 (ITS-90).

2. Reference Standard Instrument:

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1523	2116154	PSL-T 065164	03-Jun-22	TEST
Platinum Resistance Thermometer (PRT)	6427A	877332			

Support Equipment: - Low Temperature Bath (ISOCAL-8), Model: Europa-8 Plus Basic, SN: 34156222

3. This certificate is traceable to International System of Units (SI Units).

4. The certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

6. Condition of Calibrated Item: Good

7. Result of Calibration: ☒ Without adjustment ☐ After adjustment

P. Jungsantit
1 March 2022

เอกสารไม่ควบคุม

F-CS-012 Revision: 00 Date: 14-12-61



Calibration Report

nfi

Calibration Report

Certificate No.: 2201793-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C
Model: SevenEasy pH
Serial No.: 1231155210
ID No.: UAE.WAT.0102553
Manufacturer: METTLER TOLEDO
Date of Calibration: 1 March 2022 Page 5 of 5

Calibration points: 15.0, 25.0 and 35.0 °C

Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 100 mm.
- Description of probe, model: N/A SN: N/A
- Dimension of probe: Diameter 4 mm. Length 100 mm.
- Sheath material: Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.1	15.008	-0.1	0.099
25.1	25.004	-0.1	0.099
35.1	35.003	-0.1	0.099

P. Jungsantit
1 March 2022

Note

- UUC* : Unit Under Calibration

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

----- End -----

เอกสารไม่ควบคุม

F-CS-012 Revision: 00 Date: 14-12-61



National Institute of Standards and Technology (NIST)



Calibration Report

Certificate No.: 220609-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1230325212 ID No.: UAE.WAS.DC3/2553
Manufacturer: METTLER TOLEDO
Date of Calibration: 18 March 2022 Page 8 of 8

Calibration point: 15.0, 20.0 and 35.0 °C
Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 120 mm.

- Description of probe, model: N/A SN: N/A

Dimension of probe: Diameter 3.5 mm, Length 135 mm

Sheath material: Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.2	15.004	-0.2	0.009
20.2	20.002	-0.2	0.009
35.2	35.002	-0.2	0.009

UUC* - Unit Under Calibration

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

— End —

PC-012 Revision: 00 Date: 14-02-61

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/1 PATTAKARN ROAD 501 18, SUANLUANG, SUANLUANG BANGKOK 10259
TEL: 0-2117-3400-77 FAX: 0-2119-9484



Certificate of Calibration

Cert. No.: 22TM90
Page: 1 of 3

Equipment: BOD Incubator
Manufacturer: Arco
Model: UC4-1320
Serial No.: 13URC4S013201
ID No.: UAE.WAO.015/2561
Submitted by: United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location: Lab Floor 2
Received Order: 17 February 2022
Calibration Date: 17 February 2022
Ambient Temperature: (26 ± 10) °C
Relative Humidity: (50 ± 30) %
Calibrated by: Kunchit Promprat

Approved by:
() Ponthipha Tameyakul
(x) Malee Bultuea
() Suwit Imjai
Approved Signatory

Issue Date: 22 February 2022

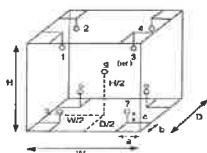
The Uncertainties are for a confidence probability of approximately 95 %

This certificate may not be reproduced without prior written permission
Approval of this report of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม
A 0038099



Equipment: BOD Incubator
Condition As-Received: Used Item
Reference: 2202-0446OC-1
Procedure Used :-
Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.
Condition of this result of calibration
1. Reference standard instrument:-
Instrument Model Serial No. Cert. No. Due Date
1) Data Acquisition 34870A MY44035217 21LM30 23 Dec 2022
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.
Result of Calibration :- (°) Without Adjustment
Function of UUC*: Temperature Source
Fresh air setting: Not Available



Probe Installation Details: Dimension of Chamber:
a = 10 cm D = 0.62 m
b = 10 cm W = 1.2 m
c = 10 cm H = 1.2 m
Capacity = 0.89 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	66	75
AC Supply (Volt)	225	225

Position:	Ref. Std. ID No.:
1	18-10RTD-01
2	18-10RTD-02
3	18-10RTD-03
4	18-10RTD-04
5	18-10RTD-05
6	22-10RTD-10
7	18-10RTD-07
8	18-10RTD-08
9 (ref.)	18-10RTD-09



Equipment: BOD Incubator
Condition As-Received: Used Item
Reference: 2202-0446OC-1
Result of Calibration :- (°) Without Adjustment
Function of UUC*: Temperature Source
Fresh air setting: Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor
20.0	19.5	19.4	0.30	0.58	1.0	0.85	2

Measured Temperature (°C)									
Calibration Point (°C)	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.154	20.013	20.356	19.939	19.834	19.761	19.817	19.824	19.922

Average*: The average of 30 values in each position.
Temperature stability: One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity: The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation: The Difference of the maximum and minimum measured temperatures throughout observation.
UUC*: Unit Under Calibration
Note: The reported uncertainty of measurement was included stability and excluded uniformity.

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

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เอกสารไม่ควบคุม
A 1096042

เอกสารไม่ควบคุม
A 1096041



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX 0-2719-4854



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : Z204-00150C-2
Procedure Used :-

Cert. No.: 22TM305
Page.: 2 of 3

Cert. No.: 22TM305
Page.: 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : ARCO
Model : UR-1320
Serial No. :
ID No. : UAE.WAO.018/2551
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2
Received Order : 7 April 2022
Calibration Date : 7 April 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Man Pattanapongpalboon
Approved by :
() Ponthipha Tameyakul
(x) Malee Butkruea
() Suwit Imjai
Issue Date : 18 April 2022

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34870A	MY41021843	22LM4	10 Jan 2023

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

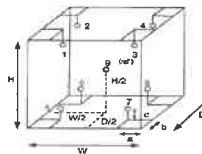
3. This certificate is traceable to the International System of Unit.

Result of Calibration :- () Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	56	59
AC Supply (Volt)	222	221



Probe Installation Details : Dimension of Chamber :
a = 10 cm D = 0.62 m
b = 10 cm W = 1.2 m
c = 10 cm H = 1.2 m
Capacity = 0.89 m³

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

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

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เอกสารไม่ควบคุม
A 0040246

เอกสารไม่ควบคุม
A 1104314



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : Z204-00150C-2
Result of Calibration :- () Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 22TM305
Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	20.0	20.0	0.50	0.44	1.1	0.64	2

Calibration Point (°C)	Measured Temperature (°C)								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.080	20.056	19.868	19.828	19.655	19.656	19.819	19.979	19.839

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม
A 1104313



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX 0-2719-4854



Cert.No.: 22MM210
Page.: 1 of 3

Certificate of Calibration

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : XSR205
Serial No. : C009071872
ID No. : UAE.WAO.012/2583
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Balance Room
Received order : 26 April 2022
Calibration Date : 26 April 2022
Ambient Temperature : 16 °C to 40 °C
Relative Humidity : 30 % to 90 %
Calibrated by : Kunchit Promprat
Approved by :
() Ponthipha Tameyakul
(x) Malee Butkruea
() Suwit Imjai
Issue Date : 28 April 2022

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

This certificate may only be reproduced other than in full, except with the prior written approval of the head of Corporate Services & Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2204-05420C-1
Procedure used :-

Cert.No.: 22MM210
Page: 2 of 3

Calibration were conducted using In-house calibration procedure CP-OB01 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

Instruments Model Serial No. ID No. Test report No. Due date
1) Standard Weight Set (E2) 15884 - 70RC138 MM-0039-21 3 Feb 2023

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment () After Adjustment by Internal Calibration

Range capacity : 0 g to 81 g Resolution 0.0001 g
81 g to 220 g Resolution 0.0001 g

Before Adjustment :

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
80	80.00004	-0.00004	0.15	2.00
200	199.9999	+0.0001	0.35	2.00

After Adjustment :

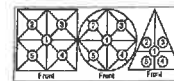
1. Determination of the standard deviation of weighing machine (n = 10)

Applied Weight (g)	Standard Deviation of Reading (g)
80	0.000008
200	0.00005



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2204-05420C-1
Result of calibration

Cert.No.: 22MM210
Page: 3 of 3



2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table

Position 1 (g)	Position 2 (g)	Position 3 (g)	Position 4 (g)	Position 5 (g)	Maximum difference between off-center and central loading (g)
-0.0002	-0.0001	0.0000	-0.0002	-0.0002	0.0002

3. Departure from nominal value

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
Unload	0.00000	0.00000	0.016	2.13
0.05	0.05001	-0.00001	0.016	2.13
0.1	0.10001	-0.00001	0.017	2.11
1	1.00002	-0.00002	0.019	2.05
5	5.00003	-0.00003	0.026	2.00
20	20.00008	-0.00008	0.049	2.00
50	50.00010	-0.00010	0.080	2.00
80	80.00014	-0.00014	0.15	2.00
100	100.0001	-0.0001	0.21	2.00
150	150.0001	-0.0001	0.29	2.00
200	200.0001	-0.0001	0.35	2.00

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3930-21 FAX: 0-2719-6484



Cert. No.: 21TM1876
Page: 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UF 55

Serial No. : B216.1666

ID No. : UAE.WAO.027/2559

Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10250

Location : Lab Floor 2

Received Order : 29 October 2021

Calibration Date : 29 October 2021

Ambient Temperature : (28 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Kunchit Promprat

Approved by :

() Pornthipha Tameyukul
() Malee Buksua
() Suwit Imjai

Issue Date : 4 November 2021

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.



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2110-07010C-1
Procedure Used :-

Cert. No.: 21TM1876
Page: 2 of 3

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Model Serial No. Cert. No. Due Date
1) Data Acquisition 34870A MY44087817 21LM10 20 Jul 2022

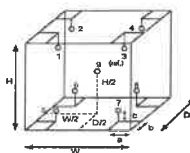
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- () Without Adjustment

Function of UUC : Temperature Source

Fresh air setting : Close



Probe Installation Details : Dimension of Chamber :
a = 5.0 cm D = 0.33 m
b = 5.0 cm W = 0.40 m
c = 5.0 cm H = 0.40 m
Capacity = 0.053 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	56	65
AC Supply (Volt)	230	230

Ref. Std. ID No. : @ Calibration Point		
Position : (140, 180) °C	(164) °C	
1	21-15TC-01	15RTD2/11
2	21-15TC-02	15RTD2/12
3	21-15TC-03	15RTD2/13
4	21-15TC-04	15RTD2/14
5	21-15TC-05	15RTD2/15
6	21-15TC-06	15RTD2/16
7	21-15TC-07	15RTD2/17
8	21-15TC-08	15RTD2/18
9 (ref.)	21-15TC-09	15RTD2/19

เอกสารไม่ควบคุม

เอกสารไม่ควบคุม



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2110-0701OC-1
 Result of Calibration :- (') Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 21TM1876
 Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
104.0	104.0	104.0	0.11	0.52	0.72	0.42	2
140.0	140.0	140.0	0.25	1.1	1.4	1.1	2
180.0	180.0	180.0	0.18	0.87	1.2	1.1	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	103.852	103.978	104.382	104.323	103.776	104.015	104.312	104.196	103.907
140.0	140.309	140.730	140.426	140.270	139.531	139.686	140.067	139.895	139.750
180.0	180.598	180.339	180.755	180.619	179.716	179.829	180.204	180.365	179.975

Average* : The average of 30 values in each position.
 Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
 Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
 Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
 UUC* : Unit Under Calibration
 Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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Tha.

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
 CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
 53/41 TITANALAY ROAD SU 1E, SUANLUANG, SUANLUANG BANGKOK 10250
 TEL. 0-2311-3000-21 FAX. 0-2319-9454



Cert. No.: 22TM304
 Page.: 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven
 Manufacturer : Memmert
 Model : UF 55
 Serial No. : B212.0411
 ID No. : UAE.WAO.005/2556
 Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Soi Udomsak 41, Sukhumvit Road,
 Bangkok, Phrakhanong,
 Bangkok 10260
 Location : Lab Floor 2
 Received Order : 7 April 2022
 Calibration Date : 7 April 2022
 Ambient Temperature : (28 ± 10) °C
 Relative Humidity : (50 ± 30) %
 Calibrated by : Man Patanapongpaiboon

Approved by :
 Approved Signatory

() Ponthippa Tameyskul
 (/) Malee Bulkrusee
 () Sunvit Imjai

Issue Date : 18 April 2022

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

A 0040245



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2204-00150C-1
 Procedure Used :-

Cert. No.: 22TM304
 Page.: 2 of 3

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.
 Condition of this result of calibration

1. Reference standard Instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY41021843	22LM4	10 Jan 2023

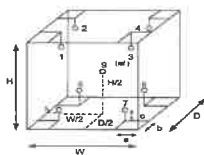
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (') Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details : Dimension of Chamber :
 a = 5.0 cm D = 0.50 m
 b = 5.0 cm W = 0.80 m
 c = 5.0 cm H = 0.75 m
 Capacity = 0.30 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	28
REL Humid. (%)	55	55
AC Supply (Volt)	221	224

Ref. Std. ID No. : @ Calibration Point (°C)		
Position	(120 , 189)	(104)
1	21-04TC-01	18-04RTD-01
2	21-04TC-02	18-04RTD-02
3	21-04TC-03	18-04RTD-03
4	21-04TC-04	18-04RTD-04
5	21-04TC-05	18-04RTD-05
6	21-04TC-06	18-04RTD-06
7	21-04TC-07	18-04RTD-07
8	21-04TC-08	18-04RTD-08
9 (ref.)	21-04TC-09	18-04RTD-09

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เอกสารไม่ควบคุม
 a 1104316



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2204-00150C-1
 Result of Calibration :- (') Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 22TM304
 Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
104.0	104.0	104.0	0.040	0.57	0.60	0.42	2
120.0	120.0	120.0	0.11	0.82	1.1	1.1	2
180.0	180.0	180.0	0.12	1.4	2.0	1.1	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	104.403	104.220	104.517	104.474	103.778	103.869	104.292	104.357	104.319
120.0	120.183	119.878	120.238	120.356	119.476	119.455	120.048	120.173	120.199
180.0	180.502	179.829	180.655	180.797	179.012	179.044	180.043	180.305	180.340

Average* : The average of 30 values in each position.
 Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor
 Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
 Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
 UUC* : Unit Under Calibration
 Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

Tha.

เอกสารไม่ควบคุม
 a 1104315

DQE Services Co.,Ltd.
DQE Services 32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No. : SP22-016 Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong,
 Bangkok 10260

Location of calibration : Laboratory 315

Equipment : UV-Vis Spectrophotometer

Manufacturer : Agilent Technologies

Model : Cary 60

Serial No. : MY15410009

ID No. : N/A

Received Date : 23 May 2022

Calibration Date : 23 May 2022

Issue Date : 26 May 2022

Condition instrument : Good

Calibrated by : ปัทมา Approved by : จุฬจิษฐ์
 (Mr. Tanawat Ritsidach) (Ms. Chouthicha Sangsarn)
 Technical Manager Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its responsibility to recognized national standards and in the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the DQE Services Co., Ltd.

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 PM-708-02 R01 1/1/2021

DQE Services Co.,Ltd.
DQE Services 32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-016 Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	95935	22 October 2023
Absorbance Standard set	25757	95929	22 October 2023
Wavelength Standard set	25806	95916	22 October 2023
Wavelength Standard set	25758	95915	22 October 2023

Traceability This certification is traceable to the International System of Unit maintained at National -
 Institute of Standards and Technology (NIST) through Sarna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 90 nm/min

Scan Interval of UUC : 0.15 nm.

Resolution of UUC : Photometric 0.0001 Abs.

Wavelength 0.1 nm.

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 PM-708-02 R01 1/1/2021

DQE Services Co.,Ltd.
DQE Services 32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-016 Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.0000	0.0000	0.0028	2.00
	0.5787	0.5755	0.0032	0.0031	2.00
	1.0490	1.0436	0.0054	0.0029	2.00
	2.1900	2.1847	0.0053	0.0075	2.00
440	0.0000	0.0000	0.0000	0.0028	2.00
	0.5607	0.5588	0.0019	0.0034	2.00
	1.0247	1.0232	0.0015	0.0035	2.00
	2.1229	2.1211	0.0018	0.0082	2.00
465	0.0000	0.0000	0.0000	0.0028	2.00
	0.5236	0.5197	0.0039	0.0029	2.00
	0.9634	0.9625	0.0009	0.0028	2.00
	1.9763	1.9752	0.0011	0.0070	2.00
546.1	0.0000	-0.0001	0.0001	0.0028	2.00
	0.5191	0.5171	0.0020	0.0031	2.00
	1.0003	0.9984	0.0019	0.0033	2.00
	1.9987	1.9946	0.0041	0.0084	2.00
590	0.0000	0.0000	0.0000	0.0028	2.00
	0.5523	0.5509	0.0014	0.0030	2.00
	1.0809	1.0799	0.0010	0.0029	2.00
	2.0391	2.0329	0.0062	0.0080	2.00
635	0.0000	0.0000	0.0000	0.0028	2.00
	0.5601	0.5584	0.0017	0.0031	2.00
	1.0512	1.0498	0.0014	0.0029	2.00
	1.9294	1.9265	0.0029	0.0082	2.00

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 PM-708-02 R01 1/1/2021

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 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-016 Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.0001	-0.0001	0.0050	2.00
	0.7478	0.7421	0.0057	0.0056	2.00
257	0.0000	0.0000	0.0000	0.0050	2.00
	0.8686	0.8619	0.0067	0.0059	2.00
313	0.0000	0.0000	0.0000	0.0050	2.00
	0.2912	0.2896	0.0016	0.0051	2.00
350	0.0000	0.0000	0.0000	0.0050	2.00
	0.6448	0.6403	0.0045	0.0055	2.00

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Phone : +66 (0)2 538 2054, Email : dqeserviceinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-016 Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.72	242.0	-0.28	0.18	2.00
279.45	279.5	-0.05	0.18	2.00
287.81	287.5	0.31	0.18	2.00
334.06	333.5	0.56	0.18	2.00
360.93	360.5	0.43	0.18	2.00
418.59	418.0	0.59	0.18	2.00
445.94	445.4	0.54	0.18	2.00
453.66	453.2	0.46	0.18	2.00
460.02	459.7	0.32	0.18	2.00
536.59	536.2	0.39	0.18	2.00
637.98	638.3	-0.32	0.18	2.00
431.38	431.0	0.38	0.18	2.00
472.50	472.5	0.00	0.18	2.00
513.47	513.5	-0.03	0.18	2.00
528.88	528.5	0.38	0.18	2.00
573.17	573.0	0.17	0.18	2.00
585.35	585.0	0.35	0.20	2.00
684.40	684.7	-0.30	0.18	2.00
740.72	740.8	-0.08	0.20	2.00
748.55	748.5	0.05	0.18	2.00
807.03	807.5	-0.27	0.18	2.00
879.28	879.0	0.28	0.18	2.00

Remark : - UUC - Unit Under Calibration

- NA = Not Available

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k,

which for a normal distribution corresponds to a coverage probability of approximately 95%

- * Indicates ISO 15531 accredited

- End of Certificate -

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FM-708-02 R01 1/1/2021

DQE Services Co., Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeserviceinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No. : SP22-007 Page 1 of 5

Customer : United Analyst and Engineering Consultant Co., Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong,
Bangkok 10260

Location of calibration : Laboratory 315

Equipment : UV-Vis Spectrophotometer

Manufacturer : Hitachi

Model : U-1900

Serial No. : 2021-064


ID No. : UAE.WAS.006/2552


Received Date : 20 January 2022

Calibration Date : 20 January 2022

Issue Date : 24 January 2022

Condition Instrument : Good

Calibrated by : 
(Mr. Tanawat Rindach)
Technical Manager

Approved by : 
(Ms. Chonhicha Suegnera)
Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the DQE Services Co., Ltd.

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Phone : +66 (0)2 538 2054, Email : dqeserviceinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-007 Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	95935	22 October 2023
Absorbance Standard set	25757	95929	22 October 2023
Wavelength Standard set	25806	95916	22 October 2023
Wavelength Standard set	25758	95915	22 October 2023

Traceability This certification is traceable to the International System of Unit maintained at National -
Institute of Standards and Technology (NIST) through Starva Scientific Limited

Spectral Band Width of UUC : 4.0 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

FM-708-02 R01 1/1/2021

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DQE Services Co., Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeserviceinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-007 Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5787	0.577	0.0017	0.0031	2.00
	1.0490	1.050	-0.0010	0.0029	2.00
	2.1900	2.183	0.0070	0.0080	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5607	0.560	0.0007	0.0034	2.00
	1.0247	1.023	0.0017	0.0035	2.00
	2.1229	2.118	0.0049	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5236	0.521	0.0026	0.0030	2.00
	0.9634	0.963	0.0004	0.0029	2.00
	1.9763	1.974	0.0023	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5191	0.518	0.0011	0.0031	2.00
	1.0003	1.000	0.0003	0.0033	2.00
	1.9987	1.996	0.0027	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5523	0.552	0.0003	0.0030	2.00
	1.0809	1.082	-0.0011	0.0030	2.00
	2.0391	2.033	0.0061	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5601	0.562	-0.0019	0.0031	2.00
	1.0512	1.052	-0.0008	0.0030	2.00
	1.9294	1.925	0.0044	0.0079	2.00

FM-708-02 R01 1/1/2021

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DQE Services Co., Ltd.
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REPORT OF CALIBRATION

Certificate No.: SP22-007 Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7478	0.746	0.0018	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8686	0.861	0.0076	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2912	0.291	0.0002	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6448	0.638	0.0068	0.0055	2.00

DQE Services Co., Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No.: SP22-007 Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.54	240.8	0.74	0.18	2.00
279.40	278.5	0.90	0.18	2.00
288.70	288.0	0.70	0.18	2.00
334.22	333.5	0.72	0.18	2.00
361.26	360.5	0.76	0.18	2.00
418.48	418.0	0.48	0.18	2.00
445.70	446.0	0.70	0.18	2.00
453.20	453.0	0.20	0.18	2.00
460.06	459.5	0.56	0.18	2.00
536.90	536.0	0.90	0.18	2.00
637.94	637.2	0.74	0.18	2.00
440.74	440.0	0.74	0.18	2.00
472.22	471.6	0.62	0.18	2.00
513.70	513.0	0.70	0.18	2.00
528.72	528.0	0.72	0.18	2.00
574.60	573.8	0.80	0.18	2.00
585.48	584.6	0.88	0.20	2.00
684.63	684.0	0.63	0.18	2.00
740.27	739.8	0.47	0.20	2.00
748.28	747.8	0.48	0.18	2.00
807.16	806.4	0.76	0.18	2.00
879.70	878.8	0.90	0.18	2.00

Remark : - UUC = Unit Under Calibration

- NA = Not Available

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a normal distribution corresponds to a coverage probability of approximately 95%

- * Indicates TSI accredited

- End of Certificate -

FM-708-02 R01 1/11/2021

FM-708-02 R01 1/11/2021

เอกสารไม่ควบคุม

เอกสารไม่ควบคุม

TISCH Environmental

RECALIBRATION DUE DATE: May 15, 2021

Certificate of Calibration

Cal. Date: May 15, 2020 Rootmeter S/N: 438320 Ta: 296 °K
Operator: Jim Tisch Pa: 750.5 mm Hg
Calibration Model #: TE-S025A Calibrator S/N: 1270

Run	Vol. Inlet (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3700	3.2	2.00
2	3	4	1	0.9740	6.4	4.00
3	5	6	1	0.8670	7.9	5.00
4	7	8	1	0.8280	8.8	5.50
5	9	10	1	0.6840	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\Delta H \left(\frac{Pa}{Pstd} \times \frac{Tstd}{Ta} \right)$ (y-axis)	Va (x-axis)	Qa (x-axis)	$\Delta H (Ta/Pa)$ (y-axis)
0.9900	0.7226	1.4102	0.9957	0.7268	0.8881
0.9858	1.0121	1.9943	0.9915	1.0179	1.2560
0.9838	1.1347	2.2296	0.9895	1.1413	1.4042
0.9826	1.1867	2.3385	0.9883	1.1936	1.4728
0.9774	1.4250	2.8202	0.9831	1.4373	1.7752
Qstd	m=	1.99455	QA	m=	1.24896
	r=	-0.92954		r=	-0.01860
	r=	0.99998		r=	0.99998

Calculations

$Vstd = \Delta Vol (Pa \cdot \Delta P) / (Pstd \cdot \Delta Tstd / Ta)$ $Va = \Delta Vol (Pa \cdot \Delta P) / Pa$
 $Qstd = Vstd / \Delta Time$ $Qa = Va / \Delta Time$

For subsequent flow rate calculations:

$Qstd = 1/m \left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \times \frac{Tstd}{Ta} \right)} \right) \cdot b$ $Qa = 1/m \left(\sqrt{\Delta H (Ta/Pa)} \right) \cdot b$

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

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Fax: 1-313-467-9009

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
3344 PATTANAKARN ROAD SOI 18, SUKHUMVIT, BANGKOK 10255
TEL: 0-2719-3005-24 FAX: 0-2719-8444

Certificate of Calibration Certificate No.: 22P111 Page: 1 of 2

Equipment: U Tube Manometer
Manufacturer: Dwyer
Model: 1221-35-WiM
Serial No.:
ID No.: UAE EFM 17812561

Condition As-Received: Used Item
Received Date: 09 February 2022
Calibration Date: 19 February 2022

Reference: 2102-0083VSC Submitted by: United Analyst and Engineering Consultants Co., Ltd.
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1012 mbar

81 Soi Udonsook 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10280

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P04, using " GKD-R 6-1: Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1. Reference standards Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MF-0113-21	10 Jul 2022

2. This result of calibration was made on requested at the point specified by customer.
3. Scale and conversion factor is 1 kPa = 4.01463293 inH2O
4. This instrument was used clean air as pressure media.
5. This instrument was installed in vertical orientation and center of connector was used as the reference level.
6. The certificate is valid only to the item calibrated on date and place of calibration.
7. This Certification is traceable to the International System of Unit maintained at:-
- National Institute of Metrology Thailand (NIMT)

Calibrated by: Noppol Phangam
Issue Date: 21 February 2022

Approved Signatory: Atsara P.
[] Phalinee Pratsaporn
[] Sun Suwananart
[] Atsara Panurach

เอกสารไม่ควบคุม
R 0250404



Cert.No.: 22P111
Page: 2 of 2

Result of calibration - Without adjustment
Function: Pressure Measurement
Increasing Pressure

Range: 0 inH₂O to 36 inH₂O
Scale Interval: 0.1 inH₂O (The Fifth Estimate)

UUC Indication				
Applied Pressure (inH ₂ O)	High-port side (inH ₂ O)	Low-port side (inH ₂ O)	ΔP (inH ₂ O)	Error (inH ₂ O)
0.00	0.00	0.00	0.00	0.00
2.00	0.98	-0.94	1.92	-0.08
4.00	2.02	-1.96	3.98	-0.02
6.00	3.02	-2.96	5.98	-0.02
8.00	4.02	-3.96	7.98	-0.02
10.00	5.02	-4.96	9.98	-0.02
12.00	6.02	-5.96	11.98	-0.02
14.00	7.06	-7.00	14.06	0.06
16.00	8.06	-7.98	16.04	0.04
18.00	9.06	-8.96	18.04	0.04
20.00	10.06	-9.98	20.04	0.04
22.00	11.06	-10.98	22.04	0.04
24.00	12.06	-11.98	24.04	0.04
26.00	13.08	-13.02	26.10	0.10
28.00	14.08	-14.02	28.10	0.10
30.00	15.08	-15.02	30.10	0.10
32.00	16.08	-16.04	32.12	0.12
34.00	17.10	-17.04	34.14	0.14
35.80	17.90	-17.84	35.74	-0.06

The uncertainty of measurement was ± 0.11 inH₂O
* UUC = Unit Under Calibration
* ΔP = High-port side - Low-port side
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

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Atitapol P.
เอกสารไม่ควบคุม
a 1037941



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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5343 PATTANAKARN ROAD SOI 18, SUKHUMVIT, SUKHUMVIT, BANGKOK 10250
TEL: 0-2715-3000-24 FAX: 0-2715-9484



Certificate of Calibration

Certificate No.: 21P2502
Page: 1 of 2

Equipment: Aneroid Barometer

Manufacturer: Barigo

Model:

Serial No.:

ID No.: UAEANV.151/2550

Condition As-Received: Used Item

Received Date: 20 July 2021

Calibration Date: 21 July 2021

Reference: 2107-0570WSC

Submitted by: United Analyst and Engineering Consultant Co., Ltd.

Ambient Temperature: (23 \pm 2) °C

Relative Humidity: (50 \pm 15) %

Atmospheric Pressure: 1009 mbar

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

81 Soi Udomsuk 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P10, using "DKD-R 6-1: Calibration of Pressure Gauges, Edition 03/2014" as a guidelines.

Condition of this result of calibration

1. Reference standards: Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard Barometer	DPI142	1422505046	MP-0053-21	08 Apr 2022

2. This instrument was installed in vertical orientation and center of the dial was used as the reference level.

3. This result of calibration was made on request at the point specified by customer.

4. This instrument was used clean air as pressure media.

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

6. This Certificate is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by: Suwit Aussanee
Issue Date: 22 July 2021

Approved Signatory: Atitapol P.
| J Phairote Praetapal
| J Sure Suwanmasri
| Atitapol Panurach

เอกสารไม่ควบคุม
a 0264465



Cert.No.: 21P2502
Page: 2 of 2

Result of calibration - Without adjustment
Function: Absolute Pressure Measurement

Range: 950 hPa to 1030 hPa
Scale Interval: 1 hPa (The Fifth Estimate)

Increasing Pressure	955.18	970.39	980.57	990.77	1000.79	1010.71	1020.54	1030.39
Applied Pressure (hPa)	950.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
UUC Indication (hPa)	950.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	0.82	-0.39	-0.57	-0.77	-0.79	-0.71	-0.54	-0.39

Decreasing Pressure	1030.46	1020.42	1010.54	1000.67	990.54	980.74	970.54	959.30
Applied Pressure (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
UUC Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-0.46	-0.42	-0.54	-0.67	-0.64	-0.74	-0.54	0.61

The uncertainty of measurement was ± 0.30 hPa
* UUC = Unit Under Calibration
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

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เอกสารไม่ควบคุม
a 1062241



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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5343 PATTANAKARN ROAD SOI 18, SUKHUMVIT, SUKHUMVIT, BANGKOK 10250
TEL: 0-2715-3000-24 FAX: 0-2715-9484



Certificate of Calibration

Certificate No.: 22H401
Page: 1 of 2

Equipment: Dial Thermo-Hygrometer

Manufacturer: Barigo

Model:

Serial No.:

ID No.: UAEANV.132/2550

Condition As-Received: Used Item

Received Date: 03 February 2022

Calibration Date: 06 February 2022

Reference: 2002-0051WSC

Ambient Temperature: (25 \pm 3) °C

Relative Humidity: (50 \pm 20) %

Submitted by: United Analyst and Engineering Consultant Co., Ltd.

81 Soi Udomsuk 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260

Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1. Reference standards: Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Handheld Thermometer With Sensor	4521	ASA339	11867	17 Jul 2022
2) Chilled Mirror Hygrometer	Dew Master	44730	17017	07 Mar 2022

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

3. This Certificate is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

-National Institute of Standards and Technology (NIST), The United States of America

Calibrated by: Sarat Phansudhol
Issue Date: 20 February 2022

Approved Signatory: Chakrit Weewajus
| J Ponthipha Tanayakul
| J Plak Sitrongkol

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a 0224631



Cert. No.: 22/401
Page: 2 of 2

Result of Calibration:-

Function:

Humidity measurement, Before Adjustment				
Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC ¹ Reading (%R.H.)	Error (%R.H.)	Uncertainty of Measurement (%R.H.)
25.0	40.1	48	8.8	1.7
25.0	60.0	63	3.0	1.8
25.0	80.0	77	-3.0	2.0

Result of Calibration:-

Function:

Humidity measurement, After Adjustment				
Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC ¹ Reading (%R.H.)	Error (%R.H.)	Uncertainty of Measurement (%R.H.)
25.0	40.1	43	2.9	1.7
25.0	60.0	60	0.0	1.9
25.0	80.0	74	-6.0	2.0

Result of Calibration:-

Function:

Before Adjustment				
Temperature measurement.				
Standard	UUC ¹			Uncertainty
<u>Temperature</u>	<u>Reading</u>	<u>Error</u>		<u>of Measurement</u>
(°C)	(°C)	(°C)		(°C)
20.008	21.0	0.994		0.72
24.891	25.5	0.509		0.72
30.046	30.6	0.464		0.72
34.988	35.0	0.012		0.72
39.988	40.0	0.012		0.72

Result of Calibration:-

Function:

After Adjustment				
Temperature measurement.				
Standard	UUC ^a			Uncertainty
<u>Temperature</u>	<u>Reading</u>	<u>Error</u>		<u>of Measurement</u>
(°C)	(°C)	(°C)		(°C)
20.041	20.0	-0.041		0.72
25.002	25.0	-0.002		0.72
30.011	29.5	-0.511		0.72
35.033	34.0	-1.033		0.72
39.989	35.0	-0.989		0.72

UUC¹ : Unit Under Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2.00$, providing confidence level approximately 95%.

-0.00-

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INNOVATIVE INSTRUMENT CALIBRATION LAB
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AMPHUR BANG PHU SAKUNT PRAKARN PROVINCE 10540 THAILAND
TEL: 0660-2116-1660-1 FAX: 0660-2116-7140



Certificate No.: 21-AFM-073
Request No.: Req 2021-0791

Result of Calibration:

Flow Setting	STD Flow Reading	UUC Flow Reading	Correction Flow	Uncertainty
LPM	LPM	LPM	LPM	LPM
0.02	0.01919	0.022	-0.00207	0.00086
0.05	0.02084	0.051	-0.00216	0.00093
0.10	0.01947	0.102	0.0027	0.0019
0.20	0.2013	0.197	0.0043	0.0036
0.5	0.5020	0.493	0.0093	0.0073
1.0	1.008	1.002	0.006	0.017
1.7	1.699	1.679	0.020	0.024
2.0	2.006	1.999	0.007	0.031

Note

STD : Standard

UUC : Unit Under Calibration

* Indicates non accredited

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-728 AFM-03 Rev.00 issue date 01/07/19

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TEL: 0660-2116-1660-1 FAX: 0660-2116-7140



Certificate of Calibration

Customer

UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address : 81 Soi Udomsak 41, Sukhumvit Road, Bangkok, Prakanong, Bangkok 10260

Certificate No.: 21-AFM-073

Request No.: Req 2021-0791

Unit Under Calibration Details

Measurement Item : Air flow meter
Manufacturer : TSI
Model : 4146
Serial Number : 41451513030
ID : UAE-FM 102/2561

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 ± 3 °C
Humidity : 55 ± 10 %RH
Barometric Pressure : 1013 hPa \pm 10 hPa
Received Date : 22 June 2021
Calibration Date : 23 July 2021
Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Date Calibration
Air Flow Meter	Gillibrator 3 Low flow	1850101006	Sensidyne	21 May 2022
Air Flow Meter	Gillibrator 3 Standard flow	19011011093	Sensidyne	20 May 2022

Traceability:

This certificate provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI)

Note:

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Calibration By :

Mr. Nopadol Luangpan
Service Calibration Engineer

Approved By :

Mr. Pait Mithavorn
Calibration Engineer Supervisor

Issue Date : 23 July 2021

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-728 AFM-03 Rev.00 issue date 01/07/19

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TEL: 0660-2116-1660-1 FAX: 0660-2116-7140



Certificate of Calibration

Customer

UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address : 81 Soi Udomsak 41, Sukhumvit Road, Bangkok, Prakanong, Bangkok 10260

Certificate No.: 21-AFM-051

Request No.: Req 2021-522

Unit Under Calibration Details

Measurement Item : Mass flow meter
Manufacturer : TSI
Model : 4146
Serial Number : 41461922007
ID : UAE-FM 223/2562

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : (23 ± 3) °C
Humidity : (55 ± 10) %RH
Barometric Pressure : (1010 ± 10) hPa
Received Date : 27 April 2021
Calibration Date : 8 June 2021
Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Date Calibration
Air Flow Meter	Gillibrator 3 Standard flow	2151012015	Sensidyne	21 April 2022
Air Flow Meter	Gillibrator 3 High flow	18501012012	Sensidyne	21 April 2022

Traceability:

This certificate provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI)

Note:

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Calibration By :

Mr. Nopadol Luangpan
Service Calibration Engineer

Approved By :

Mr. Pait Mithavorn
Calibration Engineer Supervisor

Issue Date : 8 June 2021

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-728 AFM-03 Rev.00 issue date 01/07/19

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Certificate No : 21-APM-052
Request No : Req-2021-122

Result of Calibration :

Flow Setting	STD Flow Reading	UUC Flow Reading	Correction Flow	Uncertainty
LPM	LPM	LPM	LPM	LPM
0.02	0.0205	0.019	0.00105	0.00465
0.05	0.0506	0.047	0.00306	0.0092
0.1	0.1013	0.095	0.00633	0.019
0.2	0.2006	0.195	0.0056	0.0181
0.5	0.5015	0.501	-0.0005	0.005
1.0	1.002	0.998	0.004	0.015
1.7	1.702	1.692	0.010	0.025
2.0	2.003	1.991	0.012	0.029

Note

STD - Standard

UUC - Unit Under Calibration

End of Certificate



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000-21 FAX. 0-2719-9484



Certificate of Calibration

Certificate No : 21P2500
Page : 1 of 2

Equipment : Aneroid Barometer

Manufacturer : Barigo

Model : -

Serial No. : -

ID No. : UAEANV-123/2550

Condition As-Received : Used Item

Received Date : 20 July 2021

Calibration Date : 21 July 2021

Reference : 2107-0570WSC

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Atmospheric Pressure : 1009 mbar

Submitted by : United Analyst and Engineering Consultant Co., Ltd.

81 Soi Udomsuk 41, Sukhumvit Road, Bangkok,
Phrakhanong, Bangkok 10260

Procedure used : The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P10, using " GND-R 6-1 ; Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1. Reference standard instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard Barometer	DP142	1422505046	MP-0053-21	08 Apr 2022

2. This instrument was installed in vertical orientation and center of the dial was set as the reference level.

3. This result of calibration was made on requested at the point specified by customer.

4. This instrument was used clean air as pressure media.

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

6. This Certificate is traceable to the International System of Unit maintained at:-

- National Institute of Metrology Thailand (NIMT)

Calibrated by : Suwit Assamee
Issue Date : 22 July 2021

Approved Signatory : Attepai P.
[] Pholinee Prabpatip
[] Sure Suwanwatt
[x] Attepai Panuwach

This result is valid only to the item calibrated. The certificate shall not be reproduced except in full, without the prior approval of the issuing institution. (1 of 2)
PM-708-APM-01 Rev.00 Issue date 01/07/19

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B 0264463



Cert.No.: 21P2500
Page: 2 of 2

Result of calibration: Without adjustment
Function: Absolute Pressure Measurement

Range : 960 hPa to 1030 hPa
Scale Interval : 1 hPa (The Fifth Estimate)

Increasing Pressure

Applied Pressure (hPa)	966.36	969.61	979.40	980.51	1000.62	1010.72	1020.76	1031.19
UUC* Indication (hPa)	966.0	970.0	980.0	980.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	-3.64	-1.39	0.60	-0.51	-0.62	-0.72	-0.76	-1.19

Decreasing Pressure

Applied Pressure (hPa)	1031.28	1020.72	1010.67	1000.58	990.42	979.33	968.54	956.29
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-1.28	-0.72	-0.67	-0.58	-0.42	0.87	1.48	3.71

The uncertainty of measurement was ± 0.30 hPa

* UUC = Unit Under Calibration

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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Cert.No.: 21CH1136
Page: 1 of 3

Certificate of Calibration

Equipment : pH Meter

Manufacturer : YSI

Model : pH100A

Serial No. : JC03345

ID No. : UAE.EFM.058/2562(ENV.pH.07/61)

Condition As-Received : Used Item

Received Date : 30 August 2021

Calibration Date : 01 September 2021

Reference : 2108-0913WSC-2

Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangkok, Phrakhanong, Bangkok 10260

Ambient Temperature : (25 ± 2.5) °C

Relative Humidity : (60 ± 15) %

Calibration Procedure : In-house method :
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
- CP-CH6 by comparison with standard thermometer

Calibrated by : Watsorn Lamagtrakul

Approved by : Attepai P.
Approved Signatory

(x) Maes Butkua
() Sathip Meangmei
() Watsorn Lamagtrakul

Issue Date : 10 September 2021

The Uncertainties are for a confidence probability of approximately 95 %

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เอกสารไม่ควบคุม
A: Attepai P.
B 1062244

เอกสารไม่ควบคุม



Cert.No.: 21CH1136
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	43160056	130RC082	21E1223/1	27 Apr 2022
2) Ref. Standard Thermometer	4992054	110RC044	2011233	15 Oct 2021

This certification is traceable to the International System of Unit maintained at:-
- Traceable to National Institute of Metrology (Thailand), NIMT

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	754028	26 June 2023
pH 6.985	CPA chem	725927	12 Jan 2022
pH 10.015	CPA chem	761018	02 Aug 2022

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

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N: JC03345	4.00	177.48	177	4.01	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.01	0.58	2.00

เอกสารไม่ควบคุม

เอกสารไม่ควบคุม



Cert.No.: 21CH1136
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N: 210224SIA805377	4.008	4.01	164	0.0079	2.00
	6.985	7.00	-10	0.0090	2.00
	6.985	7.00	-10	0.0093	2.00
	10.015	10.01	-186	0.013	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model :

- Serial No. :

210224SIA805377

- Dimension of probe;

- Length :

108 mm.

- Diameter :

12 mm.

- Immersion Depth :

100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.003	25.0	-0.003	0.20	2.00
30.0	30.002	30.0	-0.002	0.20	2.00
35.0	30.000	30.0	0.000	0.20	2.00

Remark : - UUC* = Unit Under Calibration

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

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เอกสารไม่ควบคุม

ภาคผนวก จ
หนังสืออนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ กก ๐๓๑๐(๑)/ ๑๘๗ ๕



กรมโรงงานอุตสาหกรรม
ถนนพหลโยธินที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ กุมภาพันธ์ ๒๕๖๕

เรื่อง ค่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๗ ธันวาคม ๒๕๖๔

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม

ตามหนังสือที่อ้างถึง บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๕๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๕๑ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล หรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กุมภาพันธ์ ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางจินดา เดชชนานนท์)
ผู้อำนวยการกองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฎิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๔

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๑๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.go.th

-๒-

- ๑๖) นายศุภณัฐ คุ้มธนาบุญ
๑๗) นางสาวศิริพร เหมอินทร์
๑๘) นางกานต์ ขำนิล
๑๙) นางสาวพรนิกา ธีระจินดา
๔๐) นายนาเคนทร์ พันธุ์ชาติกุล

- ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๑๖
ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๑๗
ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๑๘
ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๑๙
ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๔๐

(นางจินดา เดชชนานนท์)
ผู้อำนวยการกองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฎิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕

ที่ กก ๐๓๑๐(๑)/

๑๘๗ ๕

ลงวันที่ ๑๘ กุมภาพันธ์ ๒๕๖๕

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

- ๑) นางสาวอุษรธรรม ภัทรวิธกุล
- ๒) นายบรรณ อิมพาลี
- ๓) นางสาวนันทา บุญไชย
- ๔) นางปิยะพัชร สุทธิมนัสวณิช
- ๕) นางมานิตา แก้วใบ
- ๖) นางสาวเบญจวรรณ วิริโยทัย
- ๗) นายพนรัตน์ วงศ์บุรุษชัย
- ๘) นางสาววิวรรณ บุญลา
- ๙) นายสุวิทย์ จอดนอก
- ๑๐) นางสาวโชติกา สมบูรณ์
- ๑๑) นางสาวบุษกร เลิศกาญจนา
- ๑๒) นางสาวโกลิกันย์ ศรีสุข
- ๑๓) นางสาวปวีณา จรัสโชติพิณ
- ๑๔) นายศิลา บรรจงเจริญ
- ๑๕) นายปฏิกรณ์ คณนา
- ๑๖) นายธีรวัฒน์ ขมมิ่ง
- ๑๗) นางสาวศิริพร ศรีประดิษฐ์
- ๑๘) นางสาวศิริวิจิตร ธีร
- ๑๙) นางสาวพวรรณ สุวาทิ
- ๒๐) นายภูงศ หานิชเสถียร
- ๒๑) นายณัฐวัฒน์ แดงสวัสดิ์
- ๒๒) นายเอกรัตน์ ปะคะนิมิต
- ๒๓) นางสาวนิศาพร ศรีสุกสิธวิโชค
- ๒๔) นางสาวเจตนาพร หะอาด
- ๒๕) นางสาววรรณ คงทอง
- ๒๖) นางสาววรากร พัดสอน
- ๒๗) นายวิรุฬห์ โมกแก้ว
- ๒๘) นายธีรพงษ์ เทพคนตรี
- ๒๙) นายอนุศาสน์ สยดี
- ๓๐) นายกรวิทย์ เขียวศรีสุ
- ๓๑) นางสาวอริกา รังศรีสวัสดิ์
- ๓๒) นางสาวณัฏฐพร คงชา
- ๓๓) นายสุทธิธรรมา อรุณจันทร์
- ๓๔) นางสาวศุภณัฐ อ่อนคำ
- ๓๕) นางสาวพริ้มพรรณ สมบุญธรรม

- ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๐๑
ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๐๒
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ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๓๕

(นางจินดา เดชชนานนท์)
ผู้อำนวยการกองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฎิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๓๖) นายศุภณัฐ...

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕

ที่ กก ๐๓๑๐(๑)/

๑๘๗ ๕

ลงวันที่ ๑๘ กุมภาพันธ์ ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย

- ๑) นายสุภณัฐ คุ้มธนาบุญ
- ๒) นางสุธรรมา แก้วอินนอก
- ๓) นายธีรวิทย์ เจริญผล
- ๔) นางสาวโกลิกันย์ ไกลสง
- ๕) นายสมชาติ อุทุมรัตน์
- ๖) นางสาวปณภรณ์ ทองแก้ว
- ๗) นางสาวกัญญา สมพงษ์
- ๘) นายอรรถพร เทพทอง
- ๙) นางสาวอรรณพ พุทธิ
- ๑๐) นางสาววรรณ สายบุญเรือน
- ๑๑) นายภูวนัย พันธ์
- ๑๒) นางสาวอานนท์ อ่อนคง
- ๑๓) นายกิตติศักดิ์ ทรงจำรัส
- ๑๔) นางสาวอริยาพร พูลคง
- ๑๕) นางสาวพรพิมล แก้วทอง
- ๑๖) นายวิญญู สุวรรณราช
- ๑๗) นายอภิวิชญ์ ห่วง
- ๑๘) นายณัฏฐ์ ปานใจดี
- ๑๙) นายทศพร ณะพิรุณ
- ๒๐) นางสาวกัญญาณี โยธา
- ๒๑) นางสาวณัฐ สุทธิ
- ๒๒) นางสาวชนันท์ อภิสิทธิ์
- ๒๓) นายศิริพร จงพูนเกียรติ
- ๒๔) นางสาวสุภาวดี อินาคร
- ๒๕) นายพงศ์เทพ เหล่าขจร
- ๒๖) นายชวิญชัย พันทุ
- ๒๗) นางสาวพัชรา ศิริพิศาล
- ๒๘) นางสาวเมธิกา เสือคำจันทร์
- ๒๙) นายกานต์ศักดิ์ บุญทอง
- ๓๐) นางสาวสุภาวดี เจริญชัยสมบัติ
- ๓๑) นายพนรัตน์ จะโต
- ๓๒) นายพิชิตพันธ์ บุญอุทิศ
- ๓๓) นายปรีดา ไชยภูมิ
- ๓๔) นายชัชวาลย์ เสือทอง
- ๓๕) นายปิยะพันธุ์ ศรีโรจน์

- ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๐๑
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ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๓๕

(นางจินดา เดชชนานนท์)
ผู้อำนวยการกองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฎิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๓๖) นายณัฏฐ์...

๓๖) นายณณกันธิ์ ธนธรรมรัตน์
๓๗) นายกันนิกร ไร่ไธ
๓๘) นายจักรพันธ์ ภุมรินทร์
๓๙) นายปริญญา กลมเกลียว
๔๐) นายธีรวัฒน์ นามศรีโพธิ์ศรี
๔๑) นายธีรเมธ สุขศรี
๔๒) นายบุญฤทธิ์ ก้อนสิน
๔๓) นายพรชัยภูมิ ไชยกุล
๔๔) นายอชิต แสงจันทร์
๔๕) นายณัฐพงศ์ เมืองชัย
๔๖) นายธนัท เลิศประเสริฐ
๔๗) นางสาวนิภาพร จันทเขตต์
๔๘) นายยุทธพงษ์ อิศระสุข
๔๙) นายรณภาพ ภูตระกูลพัฒนา
๕๐) นางสาวศิริวรรณ ชอนพา
๕๑) นายสมพงษ์ สกุลไทย
๕๒) นายสุริยัน นิธิจิตตวงค์
๕๓) นายอัฐภาณุ ยนศิริ
๕๔) นายเอกภูมิ แสนใจ
๕๕) นายสุชนันต์ บุญเลี้ยง
๕๖) นายอนันต์ ทวนเสนาะ
๕๗) นายพิพัฒน์ ต้นธนกุล
๕๘) นายอภิสิทธิ์ ศรีคงแก้ว
๕๙) นายภูวดล มงคลสูง
๖๐) นายอุทัย แก้วรากมู
๖๑) นางสาววารินทร์ สานนท์
๖๒) นายศุภกร รินวงศ์
๖๓) นายศักดิ์สิทธิ์ เกิดชัย
๖๔) นางสาวศิริพร อภิการรัตน์
๖๕) นางสาวจินตสุภา เปลี่ยนศรี
๖๖) นางสาวนันทนา กลมบุญ
๖๗) นางสาวอารียา พารมย์
๖๘) นายจิรวัฒน์ สุขเกษม
๖๙) นายกิตติพงษ์ สอนชัยภูมิ
๗๐) นายจุฬพล สอนพชร
๗๑) นางสาวพัชราภรณ์ แสงฟ้า
๗๒) นายรัตนชัย เหล่ามา

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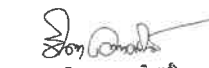

(นางจินดา เดษศรีนทร์)

ผู้อำนวยการศูนย์และศูนย์บริการวิชาการ
ปฏิบัติราชการแทนอธิการบดีมหาวิทยาลัยราชภัฏ

๗๓) นายอิทธิพงษ์...

๗๓) นายอิทธิพงษ์ ศรีเดช
๗๔) นางสาวกรรณิการ์ ลำลิทา
๗๕) นายฐานากรณ์ พิมพ์ศรี
๗๖) นายพรชัย คุ้มวง
๗๗) นางสาวทัศนีย์ ไชยพาร
๗๘) นายอิทธิพงษ์ ศรีคำแหง
๗๙) นางสาวณัฐชา พรหมศิริ
๘๐) นางสาวศันดาวัลย์ โพธิ์พันธ์
๘๑) นางสาวกมลวรรณ เจริญจันทร์
๘๒) นายพรัตน์ จันทร์คุณ
๘๓) นายปิยวัฒน์ ไหมชู
๘๔) นางสาวพรนัชชา กลิ่นนุ่น
๘๕) นายณภัทร ศรีพนธ์
๘๖) นางสาวลักขณา จันทร์สุข
๘๗) นายสมภารานต์ นาสีทอง
๘๘) นางสาวสาธิตา แซ่เตียว
๘๙) นายศักดิ์อนันต์ นุ่มนัม
๙๐) นายวรพงษ์ นนทจันทร์
๙๑) นางสาวชนาภา มาคะมาตร
๙๒) นางสาวธนธรรณ คุนมาพันธุ์ชัย
๙๓) นายวิระยุทธ สาระภักดิ์
๙๔) นางสาววิจิตา วีระพันธุ์วัฒน์
๙๕) นายภูทนต์ พงศ์สถาพร
๙๖) นายณัฐชัย พรหมอารักษ์
๙๗) นายชนันท์ พานแก้ว
๙๘) นายปรัชชาพล โสภาก
๙๙) นายวิรัตน์ แสนนาม
๑๐๐) นางสาวอนภรณ์ สาพรม
๑๐๑) นายอาทิตย์ อุดมผล
๑๐๒) นายปวร บุนนาค
๑๐๓) นายอิทธิเดช ใจบุญ
๑๐๔) นายคณินันท์ พงษ์อิศราพร
๑๐๕) นางสาวสุภาภรณ์ จันทร์ประทีพ
๑๐๖) นายเสกสรรค์ เอมกลิ่นบัว

ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๗๓
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ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๑๐๖


(นางจินดา เดษศรีนทร์)
ผู้อำนวยการศูนย์และศูนย์บริการวิชาการ
ปฏิบัติราชการแทนอธิการบดีมหาวิทยาลัยราชภัฏ

สิ่งที่ส่งมาด้วย ๓

เอกสารแนบท้ายหนังสือรับต่ออาชญากรรมทะเบียนห้องปฏิบัติการวิเคราะห์เอกสาร
บริษัท อยู่ในคดี แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕
ที่ ๒๐ ๐๓๑๐(๑)/ ๑ ๘ ๗ ๕ ลงวันที่ ๒ ๙ กุมภาพันธ์ ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๗ รายการ

แนบท้าย จำนวน ๔๖ รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(๑) 2) Digestion, Inductively Coupled Plasma Method ^(๑)
3	Barium	Digestion, Inductively Coupled Plasma Method ^(๑)
4	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
5	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
6	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
7	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^(๑) 2) 5-Day BOD Test, Membrane Electrode Method ^(๑)
9	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^(๑) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(๑) 3) Digestion, Inductively Coupled Plasma Method ^(๑)
10	Chemical Oxygen Demand	1) Closed Reflux, Titrimetric Method ^(๑) 2) Closed Reflux, Colorimetric Method ^(๑) 3) Open Reflux, Titrimetric Method ^(๑)
11	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^(๑) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(๑) 3) Digestion, Inductively Coupled Plasma Method ^(๑)
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^(๑)
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^(๑) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(๑) 3) Digestion, Inductively Coupled Plasma Method ^(๑)
15	Cyanide	1) Distillation, Colorimetric Method ^(๑) 2) Flow Injection Analysis Method ^(๑)

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
16	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
17	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
18	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
19	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
20	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
21	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
22	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
23	Endosulfan sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
25	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
26	Formaldehyde	Distillation, Colorimetric Method ^(๑)
27	Free Chlorine	1) Iodometric Method ^(๑) 2) DPD Ferrous Titrimetric Method ^(๑)
28	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
29	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
30	Hexavalent Chromium	1) Colorimetric Method ^(๑) 2) Extraction, Direct Air-Acetylene Flame Method ^(๑)
31	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^(๑) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(๑) 3) Digestion, Inductively Coupled Plasma Method ^(๑)
32	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^(๑) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(๑) 3) Digestion, Inductively Coupled Plasma Method ^(๑)
33	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(๑)
34	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^(๑)
35	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^(๑) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(๑) 3) Digestion, Inductively Coupled Plasma Method ^(๑)

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
36	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
37	pH	Electrometric Method ⁽⁴⁾
38	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
40	Sulfide	1) Iodometric Method ⁽⁴⁾ 2) Methylene Blue Method ⁽⁴⁾
41	Temperature	Laboratory and Field Methods ⁽⁴⁾
42	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
43	Total Kjeldahl Nitrogen	Semi-Micro-Kjeldahl Method ⁽⁴⁾
44	Total Suspended Solids	Dried at 103-105 °C ⁽⁴⁾
45	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
46	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

4 Anthracene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
4	Anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
5	Antimony	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
9	Benz(a)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

15 Benzo(g,h,i)perylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	Benzo(g,h,i)perylene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

30 Chlorodibromomethane...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	1) Colorimetric Method ⁽⁴⁾ 2) Extraction, Air-Acetylene Flame Method ⁽⁴⁾
36	Chrysene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

42 Dibenz(a,h)anthracene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
42	Dibenz(a,h)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

58 Diethyl phthalate...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
65	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

70 Heptachlor epoxide...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
76	γ-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

82 Manganese...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
98	pH	Electrometric Method ^[4]
99	Phenanthrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
100	Phenol	1) Distillation, Chloroform Extraction Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
101	Pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
103	Silver	Digestion, Inductively Coupled Plasma Method ^[4]
104	Styrene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
107	Toluene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]

108 Toxaphene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
108	Toxaphene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
109	TPH (C ₉ - C ₉)	1) Purge and Trap, Gas Chromatographic Method ^[11,21] 2) Purge and Trap, Gas Chromatographic/Mass spectrometric Method ^[11,21]
110	TPH (C _{9,8} - C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21]
111	TPH (C _{9,16} - C ₃₃)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21]
112	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
113	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
114	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
115	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
118	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
119	Vanadium	Digestion, Inductively Coupled Plasma Method ^[4]
120	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
121	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
122	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
123	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]

124 p-Xylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
124	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
125	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
126	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]

อวกาศเสีย (ปล่องระบาย) จำนวน 25 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Carbon Monoxide	Instrumental Analyzer Method ^[5]
5	Chlorine	Isokinetic Sampling, Ion Chromatographic Method ^[5]
6	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
7	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
8	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
9	Cresol	Absorption Sampling, Gas Chromatographic Method ^[5]

10 Dioxins/Furans...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
10	Dioxins/Furans	Isokinetic Sampling ^[5]
11	Hydrogen Chloride	Isokinetic Sampling, Ion Chromatographic Method ^[5]
12	Hydrogen Fluoride	Isokinetic Sampling, Ion Chromatographic Method ^[5]
13	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
14	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
15	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
17	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
18	Opacity	Ringelmann's Method ^[1]
19	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method ^[5] 2) Instrumental Analyzer Method ^[5]
20	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
21	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
22	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
23	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[5]
24	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
25	Xylene	1) Bag Sampling, Gas Chromatographic Method ^[5] 2) Adsorption Sampling, Gas Chromatographic Method ^[5]

สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
2	Antimony	Digestion, Inductively Coupled Plasma Method ^[7,13]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[2,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,13] 4) Digestion, Inductively Coupled Plasma Method ^[7,13]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 2) Digestion, Inductively Coupled Plasma Method ^[7,13]
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 2) Digestion, Inductively Coupled Plasma Method ^[7,13]
6	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[2,6,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,14] 4) Digestion, Inductively Coupled Plasma Method ^[7,13]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[2,6,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13]

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,14] 4) Digestion, Inductively Coupled Plasma Method ^[7,13] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^[2,6,14,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^[2,6,13,16] 3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,6,14,16] 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,13,16]
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^[2,16] 2) Alkaline Digestion, Colorimetric Method ^[8,16]
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 2) Digestion, Inductively Coupled Plasma Method ^[7,13]
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[2,6,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,14] 4) Digestion, Inductively Coupled Plasma Method ^[7,13]
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]

15 DDE...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[2,6,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,14] 4) Digestion, Inductively Coupled Plasma Method ^[7,13]
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[2,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13]

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[16] 4) Digestion, Inductively Coupled Plasma Method ^[7,13] 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^[13] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 2) Digestion, Inductively Coupled Plasma Method ^[7,13]
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[2,6,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,6,13] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,14] 4) Digestion, Inductively Coupled Plasma Method ^[7,13]
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 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	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[2,9,22] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[10,22]

- 2,2',4,5,5'...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
27	- 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',3,3',4,4',5,6-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(2,9,28) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) Electrometric Method ^(31,32)
28	pH	
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(2,6,20) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,20) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)

30 Silver...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
30	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
32	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
33	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(2,12,25) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
35	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)

ดิน จำนวน 125 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

3 Aldrin...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
4	Anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
5	Antimony	Digestion, Inductively Coupled Plasma Method ^(7,13)
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
8	Barium	Digestion, Inductively Coupled Plasma Method ^(7,13)
9	Benz(a)anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
11	Benzo(b)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
12	Benzo(k)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
14	Benzo(a)pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

15 Benzo(g,h,i)perylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	Benzo(g,h,i)perylene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^(7,13)
17	Bis(2-chloroethyl)ether	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
18	Bis(2-ethylhexyl)phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
21	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
22	Butyl benzyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
24	Carbazole	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
28	p-Chloroaniline	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

31 Chloroform...

ลำดับ	สารเคมี	วิธีวิเคราะห์
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
32	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14,16) 2) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,16)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,16)
36	Chrysene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(28,29,30)
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method ⁽²⁷⁾
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
42	Dibenz(a,h)anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

43 Di-n-butyl phthalate...

ลำดับ	สารเคมี	วิธีวิเคราะห์
43	Di-n-butyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
47	3,3'-Dichlorobenzidine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
54	1,2-Dichloropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
58	Diethyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

60 2,4-Dinitrophenol...

ลำดับ	สารเคมี	วิธีวิเคราะห์
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
61	2,4-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
62	2,6-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
63	Di-n-Octyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
67	Fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
68	Fluorene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

71 Hexachlorobenzene...

ลำดับ	สารเคมี	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
73	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
74	α-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
75	β-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
76	γ-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
77	Hexachlorocyclopentadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
78	Hexachloroethane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
79	Indeno(1,2,3-cd)pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
80	Isophorone	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)

83 Mercury...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾ 2) Digestion, Inductively Coupled Plasma Method ^(7,13) 3) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾
84	Methanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
91	Naphthalene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
93	Nitrobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
94	N-Nitrosodiphenylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
95	N-Nitrosodi-n-propylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 Polychlorinated Biphenyls - 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',4,4',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	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,23) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) Ultrasonic Extraction, Gas Chromatographic Method ^(10,23)

- 2,2',3,4',5,5',6...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
97	- 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
98	Phenanthrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
99	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
100	Pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,22) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
102	Silver	Digestion, Inductively Coupled Plasma Method ^(7,13)
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
107	Toxaphene	Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
108	TPH (C ₉ -C ₆)	1) Purge and Trap, Gas Chromatographic Method ^(12,21) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
109	TPH (C ₈ -C ₁₆)	Ultrasonic Extraction, Gas Chromatographic Method ^(10,21)
110	TPH (C ₁₅ -C ₃₅)	Ultrasonic Extraction, Gas Chromatographic Method ^(10,21)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

112 1,1,1-Trichloroethane...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
115	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
116	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
118	Vanadium	Digestion, Inductively Coupled Plasma Method ^(7,13)
119	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
120	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
125	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)

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