

ภาคผนวก ข
เอกสารสอบเทียบเครื่องมือ

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) Lead	Andersen Instruments, Inc.	G25A 1901	Tisch Environmental, Inc.	22062020	22 Jun 20	21 Jun 22	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Lead	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	22P800	12 Mar 22	11 Mar 23	-
3	Aneroid Barometer	Total Suspended Particulate (TSP) Lead	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	21P2503	21 Jul 21	20 Jul 22	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP) Lead	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	22H768	5 Apr 22	4 Apr 23	-
5	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo	42C 42C-0508011076	UAE Consultant Co., Ltd.	2110/2021	21 Oct 21	20 Oct 22	-
6	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Environmental Instrument	42C 42C-78933-390	UAE Consultant Co., Ltd.	19072021	19 Apr 21	18 Apr 22	-
7	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1180540062	UAE Consultant Co., Ltd.	19072021	19 Jul 21	18 Jul 22	-
8	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920008	UAE Consultant Co., Ltd.	09072021	9 Jul 21	8 Jul 22	-
9	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1191503038	UAE Consultant Co., Ltd.	04112021	4 Nov 21	3 Nov 22	-
10	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1201497725	UAE Consultant Co., Ltd.	10112021	10 Nov 21	9 Nov 22	-
11	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1201497726	UAE Consultant Co., Ltd.	17112021	17 Nov 21	16 Nov 22	-
12	Standard Gases (Mixture)	Nitrogen Dioxide	Airgas	EB0143262 2015PSIG	Airgas an Air Liquide company	E04N199E15A01D3	21 Jun 21	21 Jun 24	-

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									
13	Sulphur Dioxide Analyzer	Sulphur Dioxide	Thermo Scientific	43i 1200906875	UAE Consultant Co.,Ltd.	07122021	7 Dec 21	6 Dec 22	-
14	Sulphur Dioxide Analyzer	Sulphur Dioxide	Thermo Scientific	43i 1200906876	UAE Consultant Co.,Ltd.	07122021	7 Dec 21	6 Dec 22	-
15	Sulphur Dioxide Analyzer	Sulphur Dioxide	Thermo Scientific	43i 1201778112	UAE Consultant Co.,Ltd.	14062021	14 Jun 21	13 Jun 22	-
16	Sulphur Dioxide Analyzer	Sulphur Dioxide	Thermo Scientific	43i 1201778116	UAE Consultant Co.,Ltd.	09062021	9 Jun 21	8 Jun 22	-
17	Sulphur Dioxide Analyzer	Sulphur Dioxide	Thermo Scientific	43i 1182920012	UAE Consultant Co.,Ltd.	09112021	22 Nov 21	21 Nov 22	-
18	Sulphur Dioxide Analyzer	Sulphur Dioxide	Thermo Scientific	43i 1182920013	UAE Consultant Co.,Ltd.	09112021	22 Nov 21	21 Nov 22	-
19	Standard Gases (Mixture)	Sulphur Dioxide	Airgas	EB0143262 2015PSIG	Airgas an Air Liquide company	E04NJ99E15A01D3	21 Jun 21	21 Jun 24	-
20	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1180540068	UAE Consultant Co.,Ltd.	14102021	14 Oct 21	13 Oct 22	-
21	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i CM08140004	UAE Consultant Co.,Ltd.	14102021	14 Oct 21	13 Oct 22	-
22	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1200636464	UAE Consultant Co.,Ltd.	24112021	24 Nov 21	23 Nov 22	-
23	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1200636466	UAE Consultant Co.,Ltd.	24112021	24 Nov 21	23 Nov 22	-
24	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1200636467	UAE Consultant Co.,Ltd.	24112021	24 Nov 21	23 Nov 22	-

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									
25	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1200906880	UAE Consultant Co.,Ltd.	30112021	30 Nov 21	29 Nov 22	-
26	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497730	UAE Consultant Co.,Ltd.	30112021	30 Nov 21	29 Nov 22	-
27	Standard Gases (Mixture)	Carbon Monoxide	Airgas	EB0143262 2015PSIG	Airgas an Air Liquide company	E04NI99E15A01D3	21 Jun 21	21 Jun 24	-
28	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 VUPVTC21	UAE Consultant Co.,Ltd.	05062021	5 Jun 21	4 Jun 22	-
29	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 PDXEGXF7	UAE Consultant Co.,Ltd.	05062021	5 Jun 21	4 Jun 22	-
30	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 SSGEJYBJ	UAE Consultant Co.,Ltd.	07072021	7 Jul 21	6 Jul 22	-
31	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 VV2FY3R3	UAE Consultant Co.,Ltd.	07072021	7 Jul 21	6 Jul 22	-
32	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 HAMEHU5M	UAE Consultant Co.,Ltd.	12072021	12 Jul 21	11 Jul 22	-
33	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 RTHK2PDH	UAE Consultant Co.,Ltd.	02062021	2 Jun 21	1 Jun 22	-
34	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 93JN1MN9	UAE Consultant Co.,Ltd.	16072021	16 Jul 21	15 Jul 22	-
35	Standard Gas	Total Hydrocarbons	Linde	D824432	Linde	09042013	4 Aug 20	4 Aug 28	-

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	Ecosense	pH100A JC02743	Technology Promotion Association (Thailand-Japan)	21CH1339	30 Sep 21	29 Sep 22	-

รายการใบรับรองสอบเทียบ/ทวนสอบเครื่องมือประจำห้องปฏิบัติการสำหรับวิเคราะห์คุณภาพอากาศ

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์ สำหรับวิเคราะห์คุณภาพอากาศ									
1	Analytical Balance (Readability 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 (Readability 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	Atomic Absorption Spectrometer (AAS)	สารตะกั่ว	Agilent Technologies	System ID:G8432A AA240FS / MY13160001	Thailand Institute of Scientific and Technological Research (TISTR).	MTC.ACL. No. 486/65	7 Mar 22	6 Mar 23	-

Due Date of Calibration* : กำหนดตามแผนการสอบเทียบประจำปี อย่างน้อยปีละ 1 ครั้ง



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 22P800
Page : 1 of 2

Equipment : U-Tube Manometer
Manufacturer: Dwyer
Model : 1221-36-W/M
Serial No. :
ID No. : UAEFFM.022/2560
Condition As-Received: Used Item
Received Date: 03 March 2022
Calibration Date: 12 March 2022
Reference: 2203-013/WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1010 mbar

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

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

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P04, 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) Pressure Calibrator	PC106P	1189	MP-0110-21	09 Aug 2022
2) This result of calibration was made on requested at the point specified by customer.				

3. Scale and conversion factor is 1 kPa = 4.0146293 inH₂O

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

5. This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.

6. This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.

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

8. This Certification is traceable to the International System of Unit maintained at-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Suwit Aussanee
Issue Date : 14 March 2022

Approved Signatory : Attapee P.
[] Phallinee Pratsapal
[] Sura Suwanmasri
[x] Attapee Panurach

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B 0282413



RECALIBRATION
DUE DATE:
June 22, 2021

Certificate of Calibration

Calibration Certification Information

Cal. Date: June 22, 2020
Operator: Jim Tisch
Calibration Model #: G25A
Roots-meter S/N: 438320
Ta: 296
Pa: 748.0
mm Hg
Calibrator S/N: 1901

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H ₂ O)
1	1	2	1	1.3620	3.2	2.00
2	3	4	1	0.9580	6.4	4.00
3	5	6	1	0.8590	7.9	5.00
4	7	8	1	0.8160	8.8	5.50
5	9	10	1	0.6750	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9867	0.7244	1.4078	0.9957	0.7311	0.8896
0.9824	1.0255	1.9909	0.9914	1.0349	1.2581
0.9804	1.1414	2.2259	0.9894	1.1518	1.4066
0.9792	1.2001	2.3345	0.9882	1.2111	1.4753
0.9739	1.4429	2.8155	0.9829	1.4561	1.7792
QSTD	m= 1.95981 b= -0.01429 r= 0.99998		QA	m= 1.22720 b= -0.00903 r= 0.99998	

Calculations

Vstd= ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	Va= ΔVol((Pa-ΔP)/Pa)
Qstd= Vstd/ΔTime	Qa= Va/ΔTime
For subsequent flow rate calculations:	
Qstd= $\frac{1}{m} \left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} - b \right)$	Qa= $\frac{1}{m} \left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} - b \right)$

Standard Conditions

Tstd: 298.15 °K
Pstd: 760 mm Hg
Key
ΔH: calibrator manometer reading (in H ₂ O)
ΔP: roots-meter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recomin ends 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

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

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5344 PATTANAKARN ROAD SOI 18, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No. : 21P2503
Page : 1 of 2

Equipment : Aneroid Barometer
Manufacturer : Barigo
Model : -
Serial No. : -
ID No. : UAE.ANV.152/2550
Condition As-Received: Used Item
Received Date: 20 July 2021
Calibration Date: 21 July 2021

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except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

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

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

Reference: 2107-0570WSC

Ambient Temperature: (23 ± 2) °C

Relative Humidity: (50 ± 15) %

Atmospheric Pressure: 1009 mbar

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments
Standard according to in-house calibration procedure CP-P10, using * DKO-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 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 Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Suwit Aussarree
Issue Date : 22 July 2021

Approved Signatory : Attapol P.
[] Phalinee Prabpaipal
[] Sura Suwannasri
[x] Attapol Panurach

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Cert.No.: 22P800
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)

Applied Pressure (inH ₂ O)	UUC Indication		Error (inH ₂ O)
	High-port side (inH ₂ O)	Low-port side (inH ₂ O)	
0.00	0.00	0.00	0.00
2.00	1.00	-1.00	0.00
4.00	2.00	-2.00	0.00
6.00	3.00	-3.00	0.00
8.00	4.00	-4.00	0.00
10.00	5.00	-5.02	0.02
12.00	6.00	-6.02	0.02
14.00	7.00	-7.04	0.04
16.00	8.00	-8.04	0.04
18.00	9.00	-9.04	0.04
20.00	10.00	-10.04	0.04
22.00	11.00	-11.02	0.02
24.00	12.00	-12.02	0.02
26.00	13.00	-13.02	0.02
28.00	14.00	-14.04	0.04
30.00	15.00	-15.04	0.04
32.00	16.00	-16.04	0.04
34.00	16.98	-17.06	0.04
35.80	17.98	-18.00	0.18

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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MSC-TS-7517025
CALIBRATION 0008

Certificate of Calibration

Certificate No. : 22H768
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.130/2550
Condition As-Received: Used Item
Received Date: 30 March 2022
Calibration Date: 01 April 2022
Reference: to 05 April 2022
2203-1124WSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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Corporate Services 3: Equipment Calibration and Testing Services.

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

81 Soi Udomsuk 41, Sukhumvit Road, Bangchak,
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) Standard Chilled Mirror Hygrometer Sensor	Daw Prime II	31853	19714	17 Sep 2022
2) Standard Humidity/Temperature Meter	400	10203027	TH-0063-21	01 Jul 2022

2. The 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 maintained at:-

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

Calibrated by : Somchai Dumwor
Issue Date : 08 April 2022

Approved Signatory :

☒ Chakrit Waewanjua
☐ Pornthippa Tameyakul
☐ Viporn Tantiyawutti

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Cert.No.: 21P2503
Page: 2 of 2

Result of calibration:- Without adjustment
Function:- Absolute Pressure Measurement
Scale Interval: 1 hPa(The Fifth Estimate)
Range: 960 hPa to 1030 hPa

Applied Pressure (hPa)	958.39	969.71	980.19	990.71	1000.75	1010.81	1021.01	1031.32
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	1.61	0.29	-0.19	-0.71	-0.75	-0.81	-1.01	-1.32

Decreasing Pressure

Applied Pressure (hPa)	1031.46	1021.08	1010.87	1000.80	990.74	980.29	969.83	958.49
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-1.46	-1.08	-0.87	-0.80	-0.74	-0.29	0.17	1.51

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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a 1062240

MULTI-POINT GAS TEST REPORT

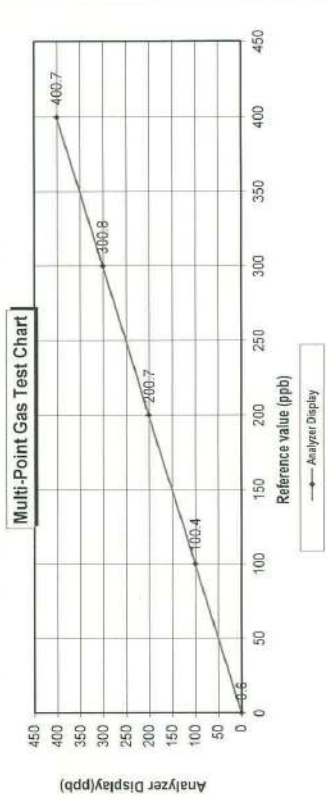
Test Date : Apr 19, 2022

Equipment : Gas Analyzer (NO₂)
Manufacturer : Thermo Environmental Instruments
Model : 42C
Serial Number : 42C-78933-390

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Thermo Scientific
Nitric Oxide (NO) 45.35 PPM 1461
Methane (CH₄) - PPM 1180540071
Carbon Monoxide (CO) 1007
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1 Zero 0.0	0.6	0.60	0.60	0.60
Level 2 20.00%	100.4	0.40	0.40	0.40
Level 3 40.00%	200.7	0.70	0.35	0.35
Level 4 60.00%	300.8	0.80	0.27	0.27
Level 5 80.00%	400.7	0.70	0.17	0.17
Remark : Measuring Range 500.0 ppb				
: Acceptable Limit \pm 5%				
Average Difference (%) 0.36				



Calculate by
S. Srichai
19 Apr 2022

Approve by
S. Srichai
20 Apr 2022

MULTI-POINT GAS TEST REPORT

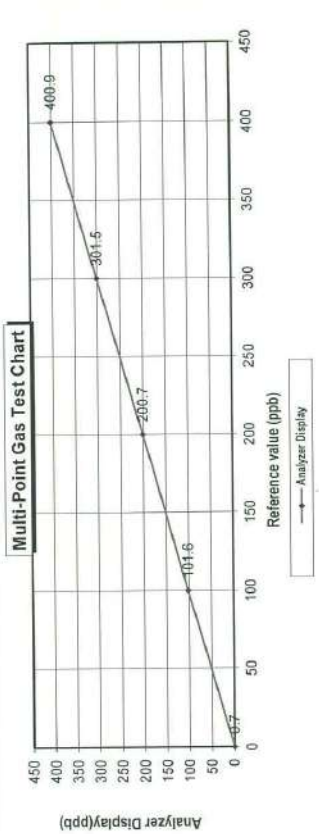
Test Date : Oct 21, 2021

Equipment : Gas Analyzer (NO₂)
Manufacturer : Thermo Electron Corporation
Model : 42C
Serial Number : 42C-0508011076

Standard Gas Concentration
Sulphur Dioxide (SO₂) 45.75 PPM Thermo Scientific
Nitric Oxide (NO) 45.35 PPM 1461
Methane (CH₄) - PPM 1180540071
Carbon Monoxide (CO) 1007
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1 Zero 0.0	0.7	0.70	0.70	0.70
Level 2 20.00%	101.6	1.60	1.57	1.57
Level 3 40.00%	200.7	0.70	0.35	0.35
Level 4 60.00%	301.5	1.50	0.50	0.50
Level 5 80.00%	400.9	0.90	0.22	0.22
Remark : Measuring Range 500.0 ppb				
: Acceptable Limit \pm 5%				
Average Difference (%) 0.67				



Calculate by
S. Srichai
21/10/21

Approve by
S. Srichai
22 Oct 2021

MULTI-POINT GAS TEST REPORT

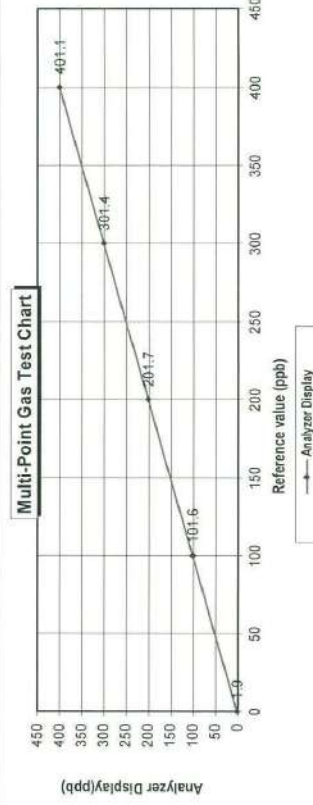
Test Date : July 9, 2021

Equipment : Gas Analyzer (NO₂) Model : 421
 Manufacturer : Thermo Scientific Serial Number : 1182920008

Standard Gas Concentration		Dilutor Detail	
Sulphur Dioxide (SO ₂)	44.75	PPM	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	1461
Methane (CH ₄)	-	PPM	1180540071
Carbon Monoxide (CO)	1007		
Cylinder No. :	CC159599		
Expiration Date :	Jul 30, 2022		

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	% Error
Level 1 Zero	0.0	1.9	1.90	1.90
Level 2 20.00%	100.0	101.6	1.60	1.57
Level 3 40.00%	200.0	201.7	1.70	0.84
Level 4 60.00%	300.0	301.4	1.40	0.46
Level 5 80.00%	400.0	401.1	1.10	0.27
Remark : Measuring Range 500.0 ppb		Average Difference (%)		1.01
		Acceptable Limit \pm 5%		



Calculate by Sprickler 7
 9 July 2021

Approve by P. K. N. U.
 16 July 2021

MULTI-POINT GAS TEST REPORT

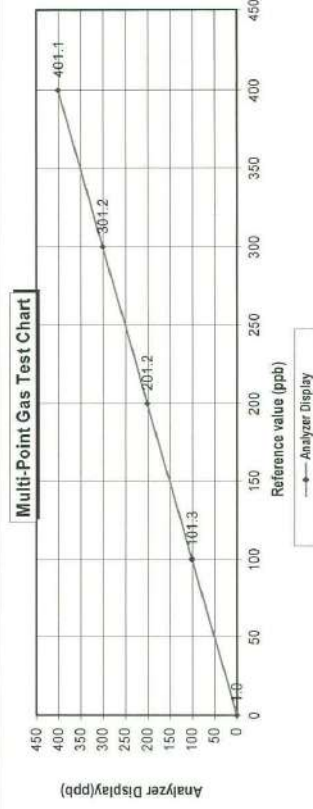
Test Date : July 19, 2021

Equipment : Gas Analyzer (NO₂) Model : 421
 Manufacturer : Thermo Scientific Serial Number : 1180540062

Standard Gas Concentration		Dilutor Detail	
Sulphur Dioxide (SO ₂)	44.75	PPM	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	1461
Methane (CH ₄)	-	PPM	1180540071
Carbon Monoxide (CO)	1007		
Cylinder No. :	CC159599		
Expiration Date :	Jul 30, 2022		

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	% Error
Level 1 Zero	0.0	1.0	1.00	1.00
Level 2 20.00%	100.0	101.3	1.30	1.28
Level 3 40.00%	200.0	201.2	1.20	0.60
Level 4 60.00%	300.0	301.2	1.20	0.40
Level 5 80.00%	400.0	401.1	1.10	0.27
Remark : Measuring Range 500.0 ppb		Average Difference (%)		0.71
		Acceptable Limit \pm 5%		



Calculate by Sprickler 4
 19 July 2021

Approve by P. K. N. U.
 19 July 2021

MULTI-POINT GAS TEST REPORT

Test Date : Nov 10, 2021

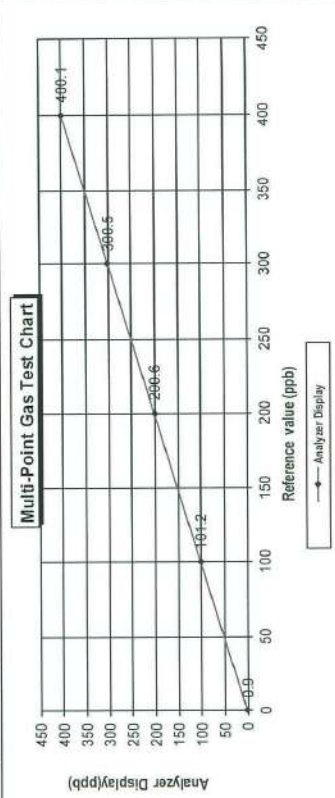
Equipment : Gas Analyzer (NO₂) Model : 42i
Manufacturer : Thermo Scientific Serial Number : 1201497725

Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	% Error
Level 1 Zero	0.0	0.90	0.90	0.90
Level 2 20.00%	101.2	1.20	1.19	1.19
Level 3 40.00%	200.6	0.60	0.30	0.30
Level 4 60.00%	300.5	0.50	0.17	0.17
Level 5 80.00%	400.1	0.10	0.02	0.02
Remark : Measuring Range	500.0 ppb	Average Difference (%)		0.52
:Acceptable Limit $\pm 5\%$				



Calculate by
Srichai y.
10 / 11 / 21

Approve by
Pichai a.
10 / 11 / 21

MULTI-POINT GAS TEST REPORT

Test Date : Nov 4, 2021

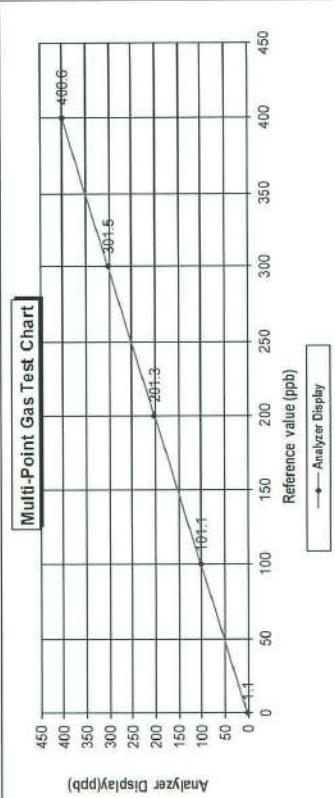
Equipment : Gas Analyzer (NO₂) Model : 42i
Manufacturer : Thermo Scientific Serial Number : 1191503038

Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	% Error
Level 1 Zero	0.0	1.10	1.10	1.10
Level 2 20.00%	101.1	1.10	1.09	1.09
Level 3 40.00%	201.3	1.30	0.65	0.65
Level 4 60.00%	301.5	1.50	0.50	0.50
Level 5 80.00%	400.6	0.60	0.15	0.15
Remark : Measuring Range	500.0 ppb	Average Difference (%)		0.70
:Acceptable Limit $\pm 5\%$				



Calculate by
Srichai y.
10 / 11 / 21

Approve by
Pichai a.
10 / 11 / 21

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E15A01D3
Cylinder Number: EB0143262
Laboratory: 124 - Durham (SAP) - NC
PGVP Number: B22021
Gas Code: CO,NO,NOX,SO2,BALN
Reference Number: 122-402135167-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 680
Certification Date: Jun 21, 2021
Expiration Date: Jun 21, 2024

Certification performed in accordance with EPA Testability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA 800/R-12/031, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Assay Dates
NOX	45.00 PPM	45.98 PPM	G1	06/14/2021, 06/21/2021
NITRIC OXIDE	45.00 PPM	45.94 PPM	G1	06/14/2021, 06/21/2021
SULFUR DIOXIDE	45.00 PPM	44.88 PPM	G1	06/14/2021, 06/21/2021
CARBON MONOXIDE	1000 PPM	984.8 PPM	G1	06/14/2021, 06/21/2021
NITROGEN	Balance			06/14/2021

CALIBRATION STANDARDS			
Type	Lot ID	Cylinder No	Expiration Date
NTRM	20081120	CC708068	Feb 02, 2025
PRM	12386	D685025	Feb 20, 2020
GNIS	401423838102	CC505581	Feb 18, 2023
NTRM	16011043	CC473277	Jun 17, 2022
NTRM	14060119	CC434277	Nov 15, 2025
The SRM, PRM or RGM noted above is only in reference to the GMS used in the assay and not part of the analysis.			

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR801333 CO	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 NO	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 NO2	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 SO2	FTIR	Jun 03, 2021

Triad Data Available Upon Request

NOTES: PO #5221002807
GROSS WT: 28.40kg
NET WT: 4.73kg



CERT 3082.01

เอกสารไม่ควบคุม

The analytical test results reported on this certificate relate only to the cylinder number specified above. This concludes the test report.

Approved for Release

MULTI-POINT GAS TEST REPORT

Test Date : Nov 17, 2021

Equipment : Gas Analyzer (NO₂) Model : 42i
Manufacturer : Thermo Scientific Serial Number : 1201497726

Standard Gas Concentration

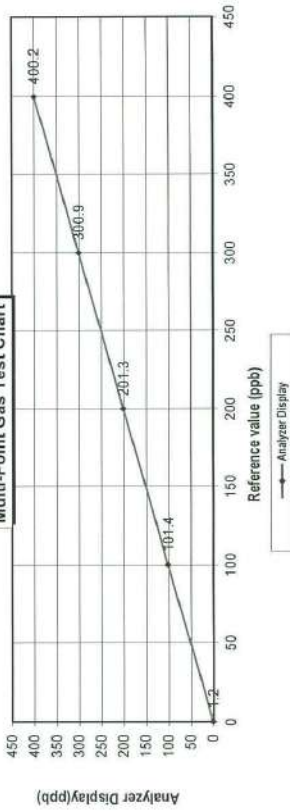
Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Level	Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	% Error]
Level 1	Zero	0.0	1.2	1.20	1.20
Level 2	20.00%	100.0	101.4	1.38	1.38
Level 3	40.00%	200.0	201.3	0.65	0.65
Level 4	60.00%	300.0	300.9	0.30	0.30
Level 5	80.00%	400.0	400.2	0.05	0.05

Remark : Measuring Range 500.0 ppb
Acceptable Limit $\pm 5\%$
Average Difference (%) 0.72

Multi-Point Gas Test Chart



Calculate by
Smichay
12/11/14

Approve by
Schnay
12/11/14

MULTI-POINT GAS TEST REPORT

Test Date : Dec 7, 2021

Equipment : Gas Analyzer (SO₂) Model : 43i
Manufacturer : Thermo Scientific Serial Number : 1200906876

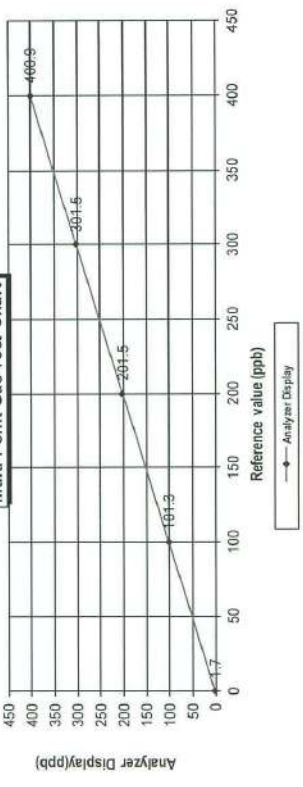
Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo SCIENTIFIC
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	1.7	1.70	1.70
Level 2 20.00%	100.0	101.3	1.30	1.28
Level 3 40.00%	200.0	201.5	1.50	0.74
Level 4 60.00%	300.0	301.5	1.50	0.50
Level 5 80.00%	400.0	400.9	0.90	0.22
Remark : Measuring Range		500.0 ppb	Average Difference (%)	
			:Acceptable Limit \pm 5%	
			0.89	

Multi-Point Gas Test Chart



Calculate by
Srinaiy
7 Dec 14

Approve by
Pichan u
7 Dec 2021

MULTI-POINT GAS TEST REPORT

Test Date : Dec 7, 2021

Equipment : Gas Analyzer (SO₂) Model : 43i
Manufacturer : Thermo Scientific Serial Number : 1200906875

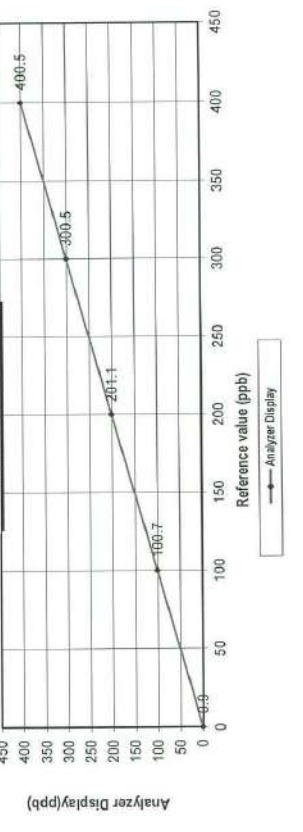
Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo SCIENTIFIC
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	0.9	0.90	0.90
Level 2 20.00%	100.0	100.7	0.70	0.70
Level 3 40.00%	200.0	201.1	1.10	0.55
Level 4 60.00%	300.0	300.5	0.50	0.17
Level 5 80.00%	400.0	400.5	0.50	0.12
Remark : Measuring Range		500.0 ppb	Average Difference (%)	
			:Acceptable Limit \pm 5%	
			0.49	

Multi-Point Gas Test Chart



Calculate by
Srinaiy
7 Dec 14

Approve by
Pichan u
7 Dec 2021

Multi-Point Gas Test Report

Test Date : June 9, 2021

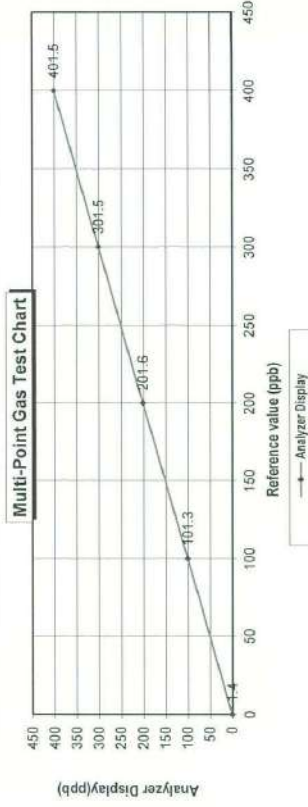
Equipment : Gas Analyzer (SO₂) Model : 43i
Manufacturer : Thermo SCIENTIFIC Serial Number : 1201778116

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Manufacturer : Thermo SCIENTIFIC
Nitric Oxide (NO) 45.35 PPM Model : 146i
Methane (CH₄) - PPM Serial Number : 1201778116
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Dilutor Detail
Manufacturer :
Model :
Serial Number :

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Zero	0.0	1.4	1.40	1.40
Level 1	100.0	101.3	1.30	1.28
Level 2	200.0	201.6	1.60	0.79
Level 3	300.0	301.5	1.50	0.50
Level 4	400.0	401.5	1.50	0.37
Level 5	500.0	500.0	0.00	0.00
Remark : Measuring Range 500.0 ppb				
Acceptable Limit $\pm 5\%$				
Average Difference (%) 0.87				



Calculate by
Srichon Y.
10 June 2021

Approve by
Srichon Y.
10 June 2021

Multi-Point Gas Test Report

Test Date : June 14, 2021

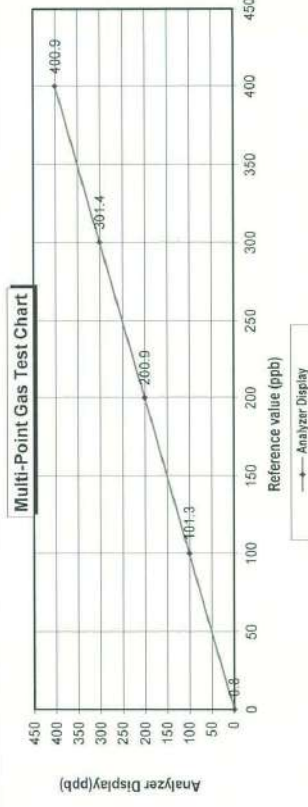
Equipment : Gas Analyzer (SO₂) Model : 43i
Manufacturer : Thermo SCIENTIFIC Serial Number : 1201778112

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Manufacturer : Thermo SCIENTIFIC
Nitric Oxide (NO) 45.35 PPM Model : 146i
Methane (CH₄) - PPM Serial Number : 1180540071
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Dilutor Detail
Manufacturer :
Model :
Serial Number :

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Zero	0.0	0.8	0.80	0.80
Level 1	100.0	101.3	1.30	1.28
Level 2	200.0	200.9	0.90	0.45
Level 3	300.0	301.4	1.40	0.46
Level 4	400.0	400.9	0.90	0.22
Level 5	500.0	500.0	0.00	0.00
Remark : Measuring Range 500.0 ppb				
Acceptable Limit $\pm 5\%$				
Average Difference (%) 0.64				



Calculate by
Srichon Y.
14 June 2021

Approve by
Srichon Y.
14 June 2021

MULTI-POINT GAS TEST REPORT

Test Date : Nov 22, 2021

Equipment : Gas Analyzer (SO₂) Model : 43i
Manufacturer : Thermo SCIENTIFIC Serial Number : 1182920013

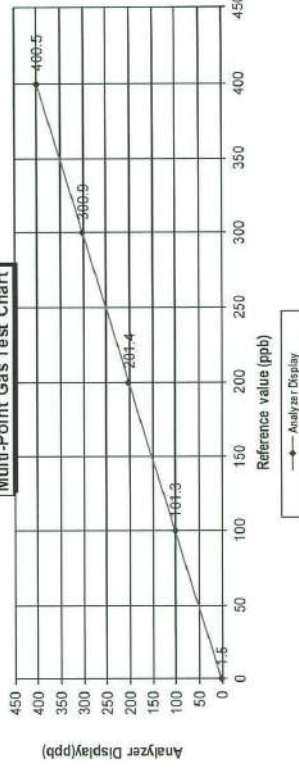
Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo SCIENTIFIC
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	1.50	1.50	1.50
Level 2 20.00%	100.0	1.30	1.28	1.28
Level 3 40.00%	201.4	1.40	0.70	0.70
Level 4 60.00%	300.9	0.90	0.30	0.30
Level 5 80.00%	400.5	0.50	0.12	0.12
Remark : Measuring Range 500.0 ppb		Average Difference (%)		
:Acceptable Limit \pm 5%		0.78		

Multi-Point Gas Test Chart



Calculate by
Srichai Y.
22/11/2021

Approve by
Srichai Y.
22/11/2021

MULTI-POINT GAS TEST REPORT

Test Date : Nov 22, 2021

Equipment : Gas Analyzer (SO₂) Model : 43i
Manufacturer : Thermo SCIENTIFIC Serial Number : 1182920012

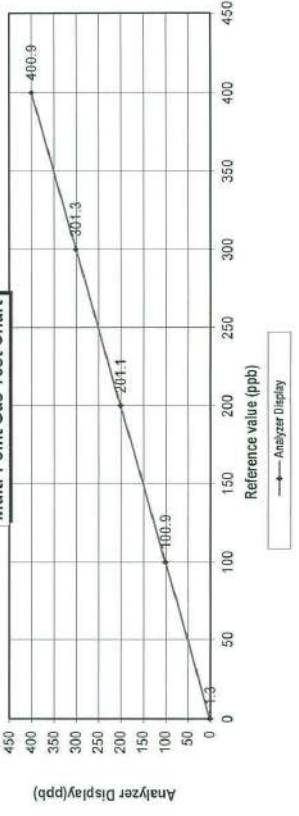
Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Manufacturer :	Thermo SCIENTIFIC
Nitric Oxide (NO)	45.35	PPM	Model :	146i
Methane (CH ₄)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	1007			
Cylinder No. :	CC159599			
Expiration Date :	Jul 30, 2022			

Multi-point gas test data

Reference Value (ppb)	Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	1.30	1.30	1.30
Level 2 20.00%	100.0	0.90	0.89	0.89
Level 3 40.00%	201.1	1.10	0.55	0.55
Level 4 60.00%	301.3	1.30	0.43	0.43
Level 5 80.00%	400.9	0.90	0.22	0.22
Remark : Measuring Range 500.0 ppb		Average Difference (%)		
:Acceptable Limit \pm 5%		0.68		

Multi-Point Gas Test Chart



Calculate by
Srichai Y.
22/11/2021

Approve by
Srichai Y.
22/11/2021

MULTI-POINT GAS TEST REPORT

Test Date : Oct 14, 2021

Equipment : Gas Analyzer (CO) **Model** : 48i
Manufacturer : Thermo Scientific **Serial Number** : 1180540068

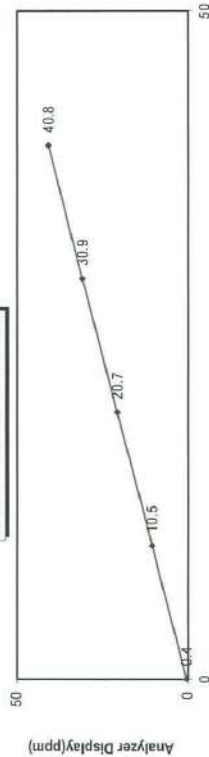
Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM
Nitric Oxide (NO) 45.35 PPM
Methane (CH₄) - PPM
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Level	Reference Value (ppm)	Analyzer Display (ppm)	Difference Error (ppm)	Percent Error (%)	[% Error]
Level 1	Zero	0.0	0.4	0.4	0.4
Level 2	20.00%	10.0	0.5	4.8	4.8
Level 3	40.00%	20.7	0.7	3.4	3.4
Level 4	60.00%	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	0.8	2.0	2.0
Average Difference (%)					2.68

Remark : Measuring Range 50.0 ppm
Acceptable Limit \pm 5%

Multi-Point Gas Test Chart



Calculate by
Shirachai Y.
14, Oct 2021

Approve by
Shirachai Y.
14, Oct 2021

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number: E04NI99E15A01D3
Cylinder Number: EB0143262
Laboratory: 124 - Durham (SAP) - NC
PGVP Number: B22021
Gas Code: CO,NO,NOX,SO₂,BALN
Reference Number: 122-402135167-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 680
Certification Date: Jun 21, 2021
Expiration Date: Jun 21, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/031, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Assay Dates
NOX	45.00 PPM	45.98 PPM	G1	06/14/2021, 06/21/2021
NITRIC OXIDE	45.00 PPM	45.94 PPM	G1	06/14/2021, 06/21/2021
SULFUR DIOXIDE	45.00 PPM	44.88 PPM	G1	06/14/2021, 06/21/2021
CARBON MONOXIDE	1000 PPM	984.8 PPM	G1	06/14/2021, 06/21/2021
NITROGEN	Balance			05/14/2021

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	20081120	CC708068	49.82 PPM NITRIC OXIDE/NITROGEN	\pm 1.0%	Feb 02, 2025
PRM	12386	D685025	9.91 PPM NITROGEN DIOXIDE/AIR	\pm 2.0%	Feb 20, 2020
GMS	401423838102	CC505581	4.348 PPM NITROGEN DIOXIDE/NITROGEN	\pm 2.1	Feb 18, 2023
NTRM	16011043	CC473277	49.02 PPM SULFUR DIOXIDE/NITROGEN	\pm 0.8%	Jun 17, 2022
NTRM	14060119	CC434277	990.9 PPM CARBON MONOXIDE/NITROGEN	\pm 0.8%	Nov 15, 2025

The SRM, PRM or RGM noted above is only in reference to the GMS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR801333 CO	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 NO	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 NO2	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 SO2	FTIR	Jun 03, 2021

Triad Data Available Upon Request

NOTES: PO #5221002807

GROSS WT: 28.40kg

NET WT: 4.73kg



CERT 3082.01

เอกสารไม่ควบคุม

The analytical test results reported on this certificate relate only to the cylinder number specified above. This concludes the test report.

APD

Approved for Release

MULTI-POINT GAS TEST REPORT

Test Date : Nov 24, 2021

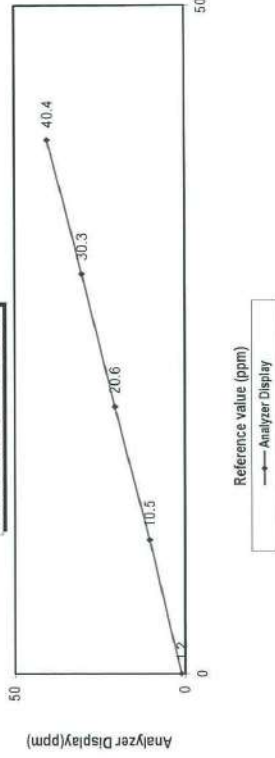
Equipment : Gas Analyzer (CO) Model : 48i
Manufacturer : Thermo Scientific Serial Number : 1200636464

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Thermo Scientific
Nitric Oxide (NO) 45.35 PPM 146i
Methane (CH₄) - PPM 1180540071
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	1.2	1.2	1.2
Level 2	20.00%	10.0	0.5	4.8	4.8
Level 3	40.00%	20.0	0.6	2.9	2.9
Level 4	60.00%	30.3	0.3	1.0	1.0
Level 5	80.00%	40.4	0.4	1.0	1.0
Remark : Measuring Range		50.0 ppm	Average Difference (%)		2.17

Multi-Point Gas Test Chart



Calculate by
Sriechan Y.
24/11/21

Approve by
P. J. J.
24/11/21

MULTI-POINT GAS TEST REPORT

Test Date : Oct 14, 2021

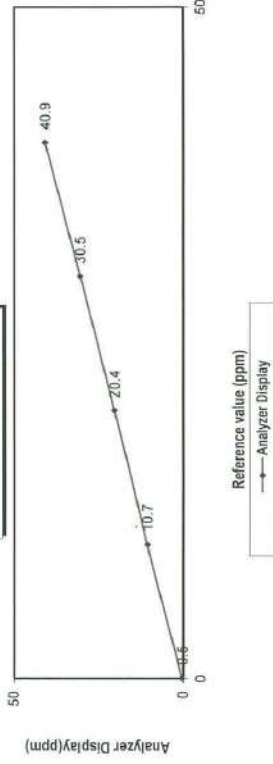
Equipment : Gas Analyzer (CO) Model : 48i
Manufacturer : Thermo Scientific Serial Number : CM08140004

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Thermo Scientific
Nitric Oxide (NO) 45.35 PPM 146i
Methane (CH₄) - PPM 1180540071
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.5	0.5	0.5
Level 2	20.00%	10.0	10.7	6.5	6.5
Level 3	40.00%	20.0	20.4	2.0	2.0
Level 4	60.00%	30.0	30.5	1.6	1.6
Level 5	80.00%	40.0	40.9	2.2	2.2
Remark : Measuring Range		50.0 ppm	Average Difference (%)		2.57

Multi-Point Gas Test Chart



Calculate by
Sriechan Y.
14/10/21

Approve by
P. J. J.
14/10/21

MULTI-POINT GAS TEST REPORT

Test Date : Nov 24, 2021

Equipment : Gas Analyzer (CO)
Manufacturer : Thermo Scientific

Model : 48i
Serial Number : 1200636467

Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	146i
Methane (CH ₄)	-	PPM	1180540071
Carbon Monoxide (CO)	1007	PPM	
Cylinder No. :	CC159599		
Expiration Date :	Jul 30, 2022		

Dilutor Detail

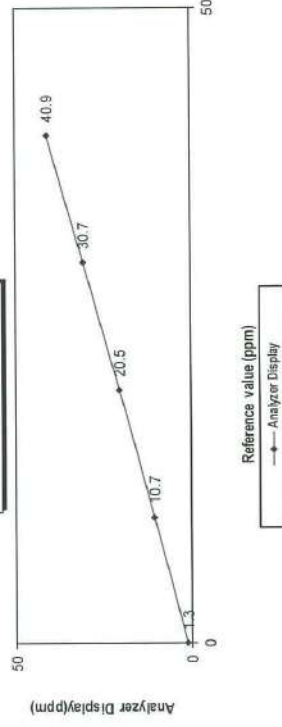
Manufacturer :	Thermo Scientific
Model :	146i
Serial Number :	1180540071

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	1.3	1.3	1.3
Level 2 20.00%	10.7	0.7	6.5	6.5
Level 3 40.00%	20.5	0.5	2.4	2.4
Level 4 60.00%	30.7	0.7	2.3	2.3
Level 5 80.00%	40.9	0.9	2.2	2.2
Average Difference (%)				2.95

Remark : Measuring Range 50.0 ppm
:Acceptable Limit $\pm 5\%$

Multi-Point Gas Test Chart



Calculate by
Sincinhar 11/24/21

Approve by
Sincinhar 11/24/21

MULTI-POINT GAS TEST REPORT

Test Date : Nov 24, 2021

Equipment : Gas Analyzer (CO)
Manufacturer : Thermo Scientific

Model : 48i
Serial Number : 1200636466

Standard Gas Concentration

Sulphur Dioxide (SO ₂)	44.75	PPM	Thermo Scientific
Nitric Oxide (NO)	45.35	PPM	146i
Methane (CH ₄)	-	PPM	1180540071
Carbon Monoxide (CO)	1007	PPM	
Cylinder No. :	CC159599		
Expiration Date :	Jul 30, 2022		

Dilutor Detail

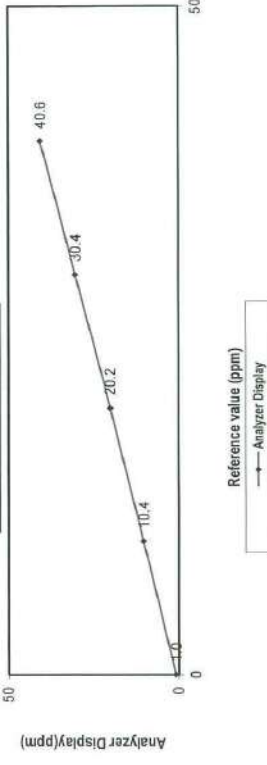
Manufacturer :	Thermo Scientific
Model :	146i
Serial Number :	1180540071

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	1.0	1.0	1.0
Level 2 20.00%	10.4	0.4	3.8	3.8
Level 3 40.00%	20.2	0.2	1.0	1.0
Level 4 60.00%	30.4	0.4	1.3	1.3
Level 5 80.00%	40.6	0.6	1.5	1.5
Average Difference (%)				1.73

Remark : Measuring Range 50.0 ppm
:Acceptable Limit $\pm 5\%$

Multi-Point Gas Test Chart



Calculate by
Sincinhar 11/24/21

Approve by
Sincinhar 11/24/21

MULTI-POINT GAS TEST REPORT

Test Date : Nov 30, 2021

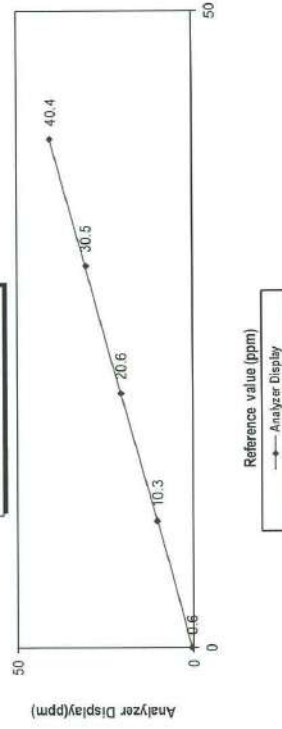
Equipment : Gas Analyzer (CO) Model : 481
Manufacturer : Thermo Scientific Serial Number : 1201497730

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Manufacturer : Thermo Scientific
Nitric Oxide (NO) 45.35 PPM Model : 1461
Methane (CH₄) - PPM Serial Number : 1180540071
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	0.6	0.6	0.6
Level 2 20.00%	10.3	0.3	2.9	2.9
Level 3 40.00%	20.6	0.6	2.9	2.9
Level 4 60.00%	30.5	0.5	1.6	1.6
Level 5 80.00%	40.4	0.4	1.0	1.0
Remark : Measuring Range 50.0 ppm				1.81
:Acceptable Limit $\pm 5\%$				
Average Difference (%)				

Multi-Point Gas Test Chart



Calculate by
Sirichai Y.
30/11/2021

Approve by
Sirichai Y.
30/11/2021

MULTI-POINT GAS TEST REPORT

Test Date : Nov 30, 2021

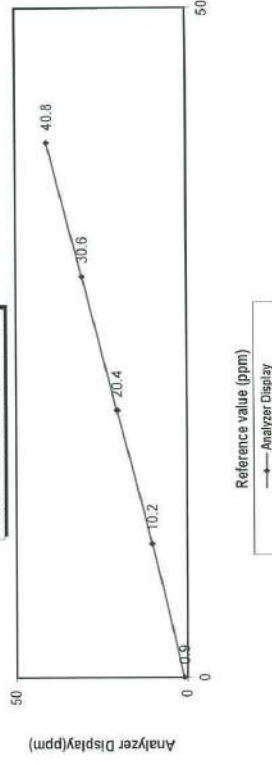
Equipment : Gas Analyzer (CO) Model : 481
Manufacturer : Thermo Scientific Serial Number : 1200906880

Standard Gas Concentration
Sulphur Dioxide (SO₂) 44.75 PPM Manufacturer : Thermo Scientific
Nitric Oxide (NO) 45.35 PPM Model : 1461
Methane (CH₄) - PPM Serial Number : 1180540071
Carbon Monoxide (CO) 1007 PPM
Cylinder No. : CC159599
Expiration Date : Jul 30, 2022

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.0	0.9	0.9	0.9
Level 2 20.00%	10.2	0.2	2.0	2.0
Level 3 40.00%	20.4	0.4	2.0	2.0
Level 4 60.00%	30.6	0.6	2.0	2.0
Level 5 80.00%	40.8	0.8	2.0	2.0
Remark : Measuring Range 50.0 ppm				1.75
:Acceptable Limit $\pm 5\%$				
Average Difference (%)				

Multi-Point Gas Test Chart



Calculate by
Sirichai Y.
30/11/2021

Approve by
Sirichai Y.
30/11/2021

MULTI-POINT GAS TEST REPORT

Test Date : June 5, 2021

Equipment : Hydrocarbon Analyzer Model : APHA-370
Manufacturer : HORIBA Serial Number : VUPVTC21

Standard Gas Concentration

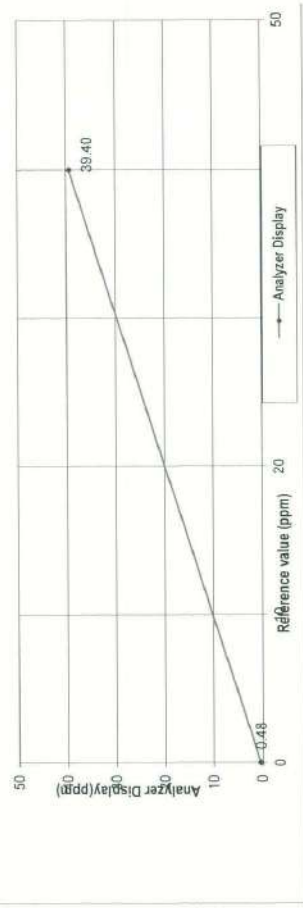
Sulphur Dioxide (SO₂) - PPM
Nitric Oxide (NO) - PPM
Methane (CH₄) 39.8 PPM
Carbon Monoxide (CO) - PPM
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Multi-point gas test data

Level	Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.48	0.48	0.48	0.48
Level 2	50.00	39.40	-0.60	-1.52	1.52
Average Difference (%)					1.00

Remark : Measuring Range : 50.00 ppm
Acceptable Limit \pm 5%

Multi-Point Gas Test Chart



Calculate by
S. N. N. Y.
5 June 2021

Approve by
10/10/21
5 June 2021

CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Part Number: E04NI99E15A01D3 Reference Number: 122-402135167-1
Cylinder Number: EB0143262 Cylinder Volume: 144.4 CF
Laboratory: 124 - Durham (SAP) - NC Cylinder Pressure: 2015 PSIG
PGVP Number: B22021 Valve Outlet: 680
Gas Code: CO, NO, NOX, SO₂, BALN Certification Date: Jun 21, 2021
Expiration Date: Jun 21, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800/R-12/031, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.98 PPM	G1	+/- 1.4% NIST Traceable	06/14/2021, 06/21/2021
NITRIC OXIDE	45.00 PPM	45.94 PPM	G1	+/- 1.4% NIST Traceable	06/14/2021, 06/21/2021
SULFUR DIOXIDE	45.00 PPM	44.88 PPM	G1	+/- 1.0% NIST Traceable	06/14/2021, 06/21/2021
CARBON MONOXIDE	1000 PPM	984.8 PPM	G1	+/- 0.7% NIST Traceable	05/14/2021
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	20081120	CC708068	49.82 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Feb 02, 2025
PRM	12386	D685025	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 20, 2020
GNIS	401423838102	CC505581	4.348 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.1	Feb 18, 2023
NTRM	16011043	CC473277	49.02 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jun 17, 2022
NTRM	14060119	CC434277	990.9 PPM CARBON MONOXIDE/NITROGEN	+/- 0.8%	Nov 15, 2025

The SRM, PRM or RGM noted above is only in reference to the GMS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR801333 CO	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 NO	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 NO2	FTIR	Jun 03, 2021
Nicolet 6700 AHR801333 SO2	FTIR	Jun 03, 2021

Triad Data Available Upon Request

NOTES: PO #5221002807
GROSS WT: 28.40kg
NET WT: 4.73kg



CERT 3082.01

เอกสารไม่ควบคุม

The analytical test results reported on this certificate relate only to the cylinder number specified above. This concludes the test report.

Approved for Release

MULTI-POINT GAS TEST REPORT

Test Date : July 7, 2021

Equipment : Hydrocarbon Analyzer
Manufacturer : HORIBA
Model : APHA-370
Serial Number : SSGEYBJ

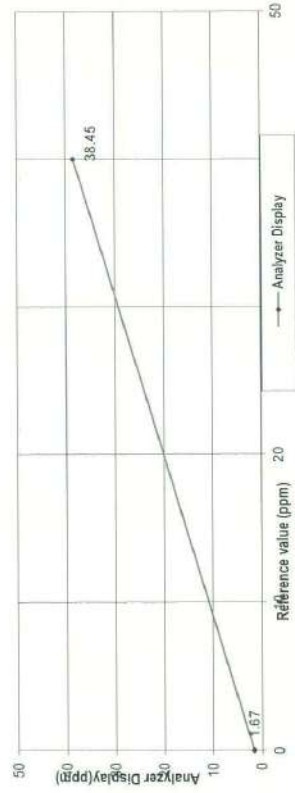
Standard Gas Concentration
Sulphur Dioxide (SO₂) :
Nitric Oxide (NO) :
Methane (CH₄) : 39.8
Carbon Monoxide (CO) :
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Dilutor Detail
Manufacturer :
Model :
Serial Number :

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.00	1.67	1.67	1.67
Level 2 80.00%	40.00	38.45	-4.03	4.03
Remark : Measuring Range 50.00 ppm				
:Acceptable Limit \pm 5%				
Average Difference (%) 2.85				

Multi-Point Gas Test Chart



Calculate by
Srikan Y.
7 July 2021

Approve by
Srikan Y.
7 July 2021

MULTI-POINT GAS TEST REPORT

Test Date : June 5, 2021

Equipment : Hydrocarbon Analyzer
Manufacturer : HORIBA
Model : APHA-370
Serial Number : PDXGXF7

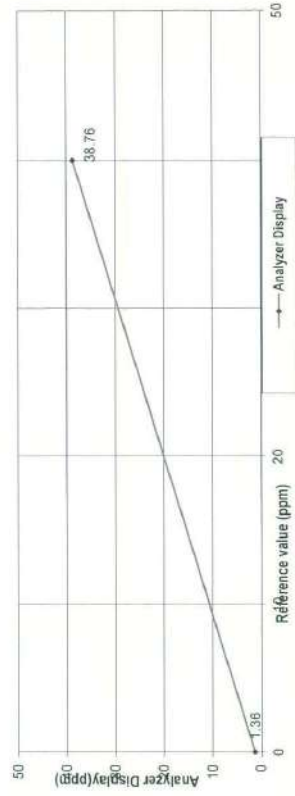
Standard Gas Concentration
Sulphur Dioxide (SO₂) :
Nitric Oxide (NO) :
Methane (CH₄) : 39.8
Carbon Monoxide (CO) :
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Dilutor Detail
Manufacturer :
Model :
Serial Number :

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.00	1.36	1.36	1.36
Level 2 80.00%	40.00	38.76	-3.20	3.20
Remark : Measuring Range 50.00 ppm				
:Acceptable Limit \pm 5%				
Average Difference (%) 2.28				

Multi-Point Gas Test Chart



Calculate by
Srikan Y.
6 June 2021

Approve by
Srikan Y.
6 June 2021

MULTI-POINT GAS TEST REPORT

Test Date : July 12, 2021

Equipment : Hydrocarbon Analyzer
Manufacturer : HORIBA
Model : APHA-370
Serial Number : HAMEHJ5M

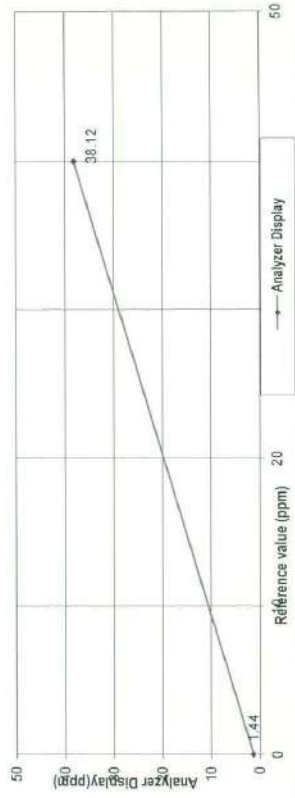
Standard Gas Concentration
Sulphur Dioxide (SO₂) : PPM
Nitric Oxide (NO) : PPM
Methane (CH₄) : 39.8 PPM
Carbon Monoxide (CO) : PPM
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Dilutor Detail
Manufacturer : PPM
Model : PPM
Serial Number : PPM

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.00	1.44	1.44	1.44
Level 2 80.00%	40.00	-1.88	-4.93	4.93
Remark : Measuring Range 50.00 ppm				3.19
: Acceptable Limit $\pm 5\%$				

Multi-Point Gas Test Chart



Calculate by
Srichan Y.
7/12/2021

Approve by
Nithan
12 July 2021

MULTI-POINT GAS TEST REPORT

Test Date : July 7, 2021

Equipment : Hydrocarbon Analyzer
Manufacturer : HORIBA
Model : APHA-370
Serial Number : VV2FY3R3

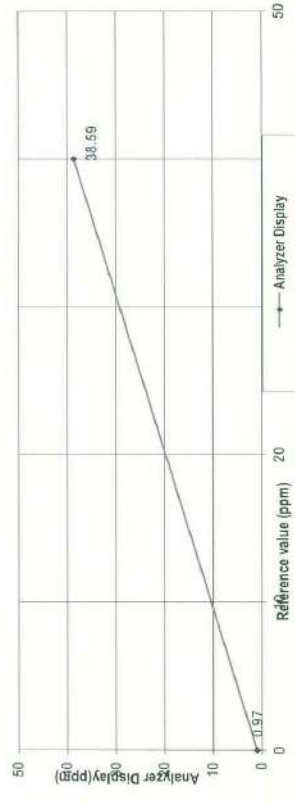
Standard Gas Concentration
Sulphur Dioxide (SO₂) : PPM
Nitric Oxide (NO) : PPM
Methane (CH₄) : 39.8 PPM
Carbon Monoxide (CO) : PPM
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Dilutor Detail
Manufacturer : PPM
Model : PPM
Serial Number : PPM

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero	0.00	0.97	0.97	0.97
Level 2 80.00%	40.00	-1.41	-3.65	3.65
Remark : Measuring Range 50.00 ppm				2.31
: Acceptable Limit $\pm 5\%$				

Multi-Point Gas Test Chart



Calculate by
Srichan Y.
7/7/2021

Approve by
Nithan
7 July 2021

MULTI-POINT GAS TEST REPORT

Test Date : July 16, 2021

Equipment : Hydrocarbon Analyzer Model : APHA-370
Manufacturer : HORIBA Serial Number : 93JN1M9

Standard Gas Concentration

Sulphur Dioxide (SO₂) - PPM
Nitric Oxide (NO) - PPM
Methane (CH₄) 39.8 PPM
Carbon Monoxide (CO) - PPM
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Dilutor Detail

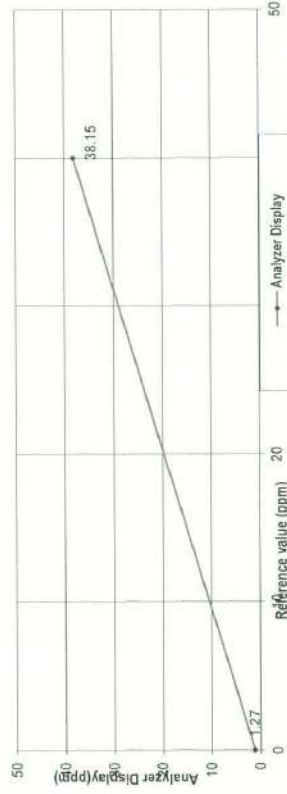
Manufacturer :
Model :
Serial Number :

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero 0.00	1.27	1.27	1.27	1.27
Level 2 80.00%	38.15	-1.85	-4.85	4.85
Average Difference (%)				3.06

Remark : Measuring Range 50.00 ppm
Acceptable Limit $\pm 5\%$

Multi-Point Gas Test Chart



Calculate by
Sachai Y.
16 July 2021

Approve by
Pattana W.
16 July 2021

MULTI-POINT GAS TEST REPORT

Test Date : June 2, 2021

Equipment : Hydrocarbon Analyzer Model : APHA-370
Manufacturer : HORIBA Serial Number : RTHK2PDH

Standard Gas Concentration

Sulphur Dioxide (SO₂) - PPM
Nitric Oxide (NO) - PPM
Methane (CH₄) 39.8 PPM
Carbon Monoxide (CO) - PPM
Cylinder No. : D824432
Expiration Date : Aug 4, 2028

Dilutor Detail

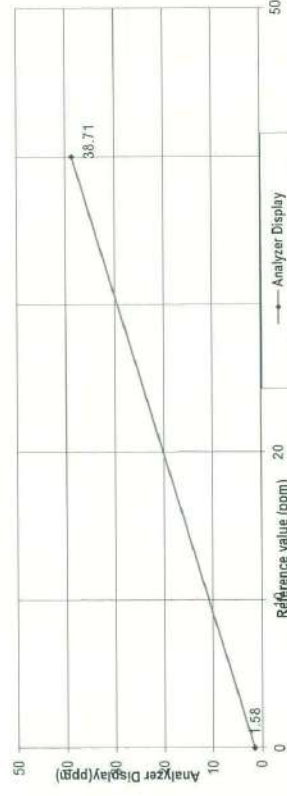
Manufacturer :
Model :
Serial Number :

Multi-point gas test data

Reference Value (ppm)	Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1 Zero 0.00	1.58	1.58	1.58	1.58
Level 2 80.00%	38.71	-1.29	-3.33	3.33
Average Difference (%)				2.46

Remark : Measuring Range 50.00 ppm
Acceptable Limit $\pm 5\%$

Multi-Point Gas Test Chart



Calculate by
Sachai Y.
2 June 2021

Approve by
Pattana W.
2 June 2021



Cert.No.: 21CH1339
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.7/7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (\pm)	Coverage factor k
pH Electrode S/N: 200402SIA605377	4.008	4.01	156	0.0071	2.00
	6.982	6.98	-17	0.011	2.00
	6.982	6.99	-17	0.0099	2.00
	10.015	10.01	-193	0.013	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model :
- Serial No. : 200402SIA605377

Dimension of probe;

- Length : 110 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point ($^{\circ}\text{C}$)	Standard Temperature ($^{\circ}\text{C}$)	UUC* Reading ($^{\circ}\text{C}$)	Error ($^{\circ}\text{C}$)	Uncertainty of measurement (\pm $^{\circ}\text{C}$)	Coverage factor k
25.0	25.002	25.0	-0.002	0.20	2.00
30.0	30.005	30.0	-0.005	0.20	2.00
35.0	35.002	35.0	-0.002	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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Cert.No.: 21CH1339
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	46530031	130RC098	20E3666	14 Oct 2021
2) Ref. Standard Thermometer	4982054	110RC044	20I1233	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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	761016	02 Aug 2023
pH 6.982	CPA chem	754030	28 June 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 (4.7/7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (\pm mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: JC02743	4.00	177.48	177	4.01	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	0.00	0	7.00	0.58	2.00
		-177.48	-177	10.01	0.58	2.00

เอกสารไม่ควบคุม

Measurement Results

Repeatability



The "d" in the graph represents the readability 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




The "d" in the graph represents the readability of the range/interval in which the test was performed.

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+66 2723 0382
MT-TH.ServicesSupport@mt.com

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
Zip / Postal: 10260
State / Province: Bangkok
Order Number: 
Contact: Suwit Chotnok

Weighing Device

Manufacturer: Mettler Toledo
Model: AB204-S
Serial No.: 1128312528
Building: N/A
Floor: 2
Room: Balance Room 2 (206)
Instrument Type: Weighing Instrument
Asset Number: UAE_AIR_0192550
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: CPW002/20

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/span of the weighing instrument was adjusted before calibration 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.

As Found	Temperature		Humidity	
	Start: 22.5 °C	End: 21.4 °C	Start: 56.1 %	End: 63.2 %

As Found Calibration Date: 07-Apr-2022
As Left Calibration Date: N/A
Issue Date: 08-Apr-2022
Calibrator: Sirawit Chianchan
Approved Signatory: 

☒ Kassakorn Tassanachaisakul
☐ Santi Jitinyom
☐ Surachet Sukkate

Remarks

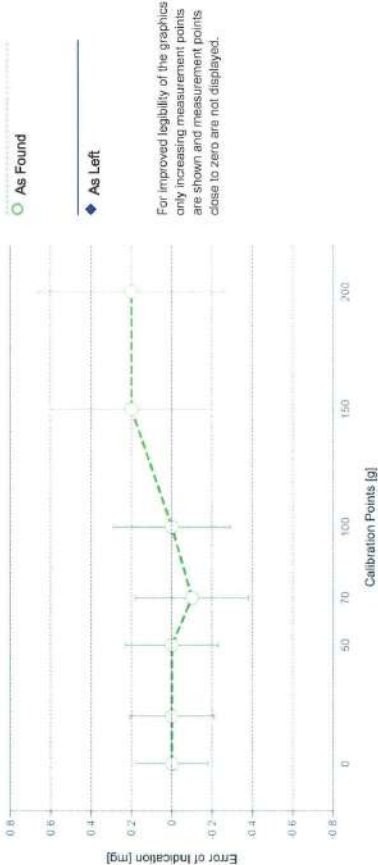
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory
Test weight by Filter pan : 1 g = 0.9999 g, 3 g = 3.0000 g, 5 g = 5.0000 g

End of Accredited Section

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

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	0.20 mg	2
6	20.0000 g	20.0000 g	0.0000 g	0.21 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	0.28 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.29 mg	2
10	150.0000 g	150.0002 g	0.0002 g	0.40 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.46 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 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.

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.:	WS80	Date of Issue:	23-Feb-2022
Certificate Number:	C208581631	Calibration Due Date:	14-Aug-2023
Thermo Hygrometer			
Equipment No.:	IN161	Date of Issue:	14-Jun-2021
Certificate Number:	21H1220	Calibration Due Date:	01-Jun-2022

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+66 2723 0382
MT-TH ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom Suk 41, Sukhumvit Rd., Bang Chak
City: Prira Khlong
Contact: Suwit Chotnok
Zip / Postal: 10260
State / Province: Bangkok
Order Number:  0 3 3 4 2 3 9 0 *

Weighing Device


Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Serial No.: B108115858
Building: N/A
Floor: 2
Room: Balance Room 2 (206)
Instrument Type: Weighing Instrument
Asset Number: UAE.AIR.016/2555
Terminal Model: N/A
Terminal Serial No.: N/A
Terminal Asset No.: N/A

Range	Max. Capacity	Repeatability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
Mettler Toledo Work Instruction: CPW002/20
This calibration certificate contains measurements for As Found and As Left calibrations.
The sensitivity/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: 22.6 °C	End: 22.1 °C	Start: 56.0 %	End: 51.9 %
As Left	Start: 22.3 °C	End: 22.4 °C	Start: 46.2 %	End: 55.8 %

As Found Calibration Date: 07-Apr-2022
As Left Calibration Date: 07-Apr-2022
Issue Date: 08-Apr-2022
Calibrator: Sirawit Chamchan
Approved Signatory: 
☒ Kassekom Tassanachaisakul
☐ Santi Jitniyom
☐ Surachet Sukkate

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

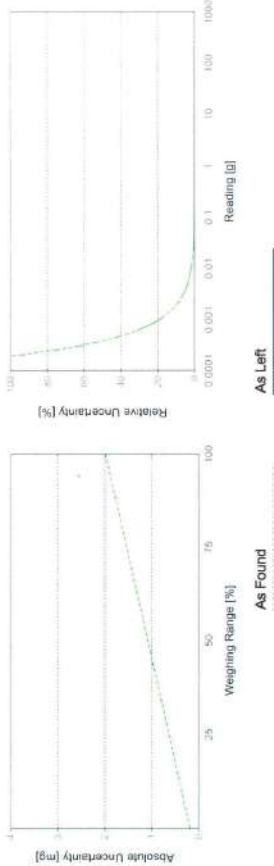
Uncertainty of Uncertainty Equation

Range		As Found	As Left	
	d			Max
1	0.0001 g	220 g	$U_1 = 0.19 \text{ mg} + 0.00817 \text{ mg/g} \cdot R$	N/A

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
0.0220 g	0.19 mg	0.86% N/A
0.2200 g	0.19 mg	0.087% N/A
2.2000 g	0.21 mg	0.0095% N/A
22.0000 g	0.37 mg	0.0017% N/A
220.0000 g	2.0 mg	0.00090% N/A



Error of Indication

As Found				
1	Reference Value	Indication	Error of Indication	Expanded Uncertainty
1	0.0000 g	0.0000 g	0.0000 g	0.15 mg
2	0.1000 g	0.1001 g	0.0001 g	0.16 mg
3	1.0000 g	0.9999 g	-0.0001 g	0.16 mg
4	5.0000 g	5.0000 g	0.0000 g	0.16 mg
5	10.0000 g	10.0001 g	0.0001 g	0.17 mg
6	20.0000 g	20.0001 g	0.0001 g	0.18 mg
7	50.0000 g	50.0003 g	0.0003 g	0.20 mg
8	70.0001 g	70.0005 g	0.0004 g	0.26 mg
9	100.0000 g	100.0005 g	0.0005 g	0.27 mg
10	150.0000 g	150.0007 g	0.0007 g	0.38 mg
11	200.0001 g	200.0008 g	0.0007 g	0.44 mg

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



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 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.

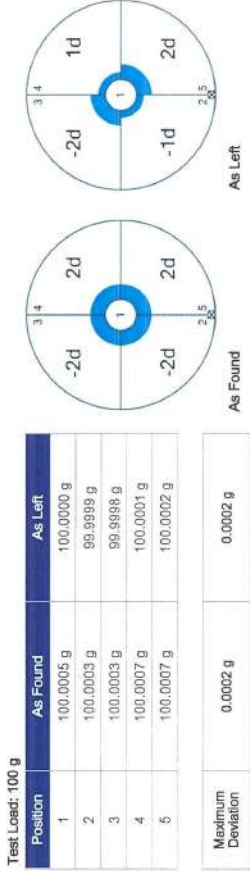
Measurement Results

Repeatability



The "g" in the graph represents the readability 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



The "g" in the graph represents the readability of the range/interval in which the test was performed.

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: $3 K$

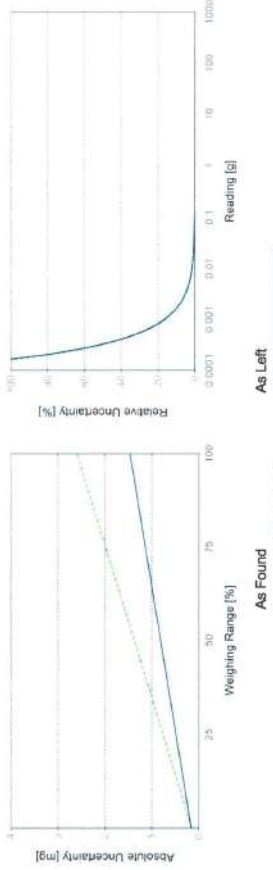
Linearization of Uncertainty Equation

Range		As Found	As Left
d	Max		
1	0.0001 g	220 g	$U_1 = 0.16 \text{ mg} + 0.0111 \text{ mg/g} \cdot R$

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	
0.0220 g	0.16 mg	0.73%	0.16 mg	0.73%
0.2200 g	0.16 mg	0.074%	0.16 mg	0.073%
2.2000 g	0.18 mg	0.0084%	0.17 mg	0.0079%
22.0000 g	0.40 mg	0.0018%	0.29 mg	0.0013%
220.0000 g	2.6 mg	0.0012%	1.5 mg	0.00066%



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:	C208581631	Calibration Due Date:	14-Aug-2023

Thermo Hygrometer

Equipment No.:	IN161	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 pan : 1 g = 1.0000 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.



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CALIBRATION DATA

1. Noise Level in term of standard deviation

Element	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn
Absorbance	-0.0004	0.0002	0.0007	0.0002	-0.0016	-0.0001	-0.0004	-0.0001
	0.0002	-0.0005	0.0010	0.0007	0.0000	-0.0003	0.0007	-0.0014
	-0.0002	0.0001	0.0008	0.0000	-0.0001	-0.0003	-0.0012	-0.0006
	0.0000	-0.0007	0.0007	0.0000	-0.0005	-0.0004	-0.0004	-0.0012
	0.0001	0.0004	0.0013	0.0014	-0.0001	-0.0001	0.0003	-0.0008
	0.0000	-0.0004	0.0003	-0.0012	-0.0005	-0.0007	-0.0004	-0.0008
	0.0000	-0.0009	0.0009	-0.0002	-0.0010	-0.0008	0.0007	-0.0003
	-0.0004	-0.0003	0.0015	0.0010	-0.0005	-0.0003	-0.0002	-0.0004
	0.0004	0.0008	0.0014	-0.0004	-0.0014	-0.0005	-0.0006	-0.0003
	-0.0006	-0.0013	0.0012	-0.0006	-0.0006	-0.0006	-0.0007	-0.0007
	0.0005	-0.0003	0.0014	-0.0004	-0.0008	-0.0003	-0.0006	-0.0011
	-0.0007	-0.0014	0.0004	-0.0001	-0.0001	0.0000	0.0000	-0.0003
	0.0008	0.0004	0.0005	-0.0006	-0.0008	0.0000	-0.0005	-0.0009
	0.0011	0.0002	0.0005	0.0017	-0.0016	-0.0008	0.0004	-0.0005
	0.0002	0.0010	0.0014	-0.0002	-0.0010	-0.0010	0.0002	-0.0001
	0.0001	-0.0011	0.0011	-0.0003	-0.0011	-0.0003	-0.0008	-0.0012
	0.0000	-0.0015	0.0009	-0.0010	-0.0011	-0.0013	0.0000	-0.0004
	0.0015	-0.0012	0.0005	0.0002	-0.0017	-0.0001	0.0005	-0.0002
	0.0006	0.0014	0.0010	0.0002	-0.0003	0.0001	-0.0006	-0.0010
	0.0001	0.0003	0.0003	-0.0001	-0.0004	-0.0002	-0.0001	-0.0001
Average Absorbance	0.000	0.000	0.001	0.000	-0.001	0.000	0.000	-0.001
Standard Deviation	0.0005	0.0008	0.0004	0.0007	0.0005	0.0004	0.0005	0.0004

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Request No. 25-65 / 0398 MTC. ACL. No. 486 / 65

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Request No. 25-65 / 0398

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CALIBRATION CERTIFICATE

NOMENCLATURE : 1. Atomic Absorption Spectrophotometer "Agilent Technologies"

Model AA240FS, Serial No. MY13160001

2. Working standard solution "Inorganic Ventures"

Multi Analyte Custom Grade Solution, Lot No. P2-MEB675610

SUBMITTED BY : United Analyst and Engineering Consultant Co., Ltd.

3 Soi Udomsuk41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

CALIBRATION PROCEDURE : 1. Performance Verification of Atomic Absorption Spectrophotometer (WI-500-02-30)
2. Estimation Uncertainty of Measurement in Analytical Chemistry (QP-513)

REFERENCE MATERIAL : Traceable to NIST "Agilent Technologies", "Carlo Erba"
Cadmium Lot No. 0108047046, Chromium Lot No. 0106315418, Copper Lot No. 0107480530, Iron Lot No. 0104697566,
Lead Lot No. 0104659473, Manganese Lot No. T109228A, Nickel Lot No. 0104978044, Zinc Lot No. 0100792297

CALIBRATION RANGE: 0.020,0.10,0.30,0.50,0.70 mg/l at 228.8 nm.Cd, 0.10,0.20,0.30,0.50,0.70 mg/l at 357.9 nm.Cr,
0.05,0.10,0.30,0.50,0.70 mg/l at 324.7 nm.Cu, 0.10,0.30,0.50,0.70,1.00 mg/l at 248.3 nm.Fe, 0.20,0.50,0.70,1.00,1.50 mg/l
at 217.0 nm.Pb, 0.05,0.10,0.30,0.50,0.70 mg/l at 279.5 nm.Mn, 0.10,0.30,0.50,0.70,1.00 mg/l at 232.0 nm.Ni,
0.05,0.10,0.30,0.50,0.70 mg/l at 213.9 nm.Zn

AMBIENT CONDITIONS : Temperature 22 °C Relative humidity 60 %

The Atomic Absorption Spectrophotometer set has been calibrated against Reference Material traceable to National Institute of Standards and Technology (NIST) by The Analytical Chemistry Laboratory. The results are attached herewith.



Calibrated by
(Mr. Danai Srithongkum)

Approved by
(Mrs. Thipapaya Junvee Fortune)
Director of Analytical Chemistry Laboratory
Ref. 2025265020400522001

Calibration Date : 3 February 2022

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3. Trueness

3.1 Reading on wavelength- Cadmium(Cd) at 228.8 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Cd	0.02004	0.019	-0.001	5.19	± 0.004
	0.30060	0.291	-0.010	3.19	± 0.006
	0.70140	0.678	-0.023	3.34	± 0.012

3.2 Reading on wavelength- Chromium (Cr) at 357.9 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Cr	0.1002	0.101	0.001	0.80	± 0.007
	0.3006	0.298	-0.003	0.86	± 0.012
	0.7014	0.635	-0.066	9.47	± 0.023

3.3 Reading on wavelength- Copper (Cu) at 324.7 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Cu	0.0502	0.046	-0.004	8.37	± 0.004
	0.3012	0.295	-0.006	2.06	± 0.010
	0.7028	0.694	-0.009	1.25	± 0.021

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2. Precision

Element	Conc. (mg/l)	Absorbance										Ave. Abs.	SD	%RSD
		0.0074	0.0062	0.0065	0.0062	0.0070	0.0068	0.0070	0.0065	0.0065	0.0069			
Cd	0.02	0.0074	0.0062	0.0065	0.0062	0.0070	0.0068	0.0070	0.0065	0.0065	0.0069	0.007	0.0004	5.76
	0.30	0.0952	0.0959	0.0951	0.0957	0.0952	0.0950	0.0952	0.0948	0.0956	0.0943	0.095	0.0005	0.49
	0.70	0.2213	0.2180	0.2203	0.2208	0.2234	0.2211	0.2196	0.2219	0.2201	0.2194	0.221	0.0015	0.67
Cr	0.10	0.0096	0.0098	0.0097	0.0102	0.0106	0.0097	0.0098	0.0099	0.0103	0.0093	0.010	0.0004	3.83
	0.30	0.0309	0.0302	0.0300	0.0316	0.0306	0.0299	0.0309	0.0297	0.0311	0.0296	0.030	0.0007	2.20
	0.70	0.0659	0.0667	0.0664	0.0648	0.0656	0.0662	0.0658	0.0638	0.0638	0.0669	0.066	0.0011	1.70
Cu	0.05	0.0080	0.0075	0.0078	0.0075	0.0077	0.0081	0.0080	0.0075	0.0074	0.0076	0.008	0.0003	3.26
	0.30	0.0417	0.0419	0.0412	0.0421	0.0424	0.0420	0.0423	0.0403	0.0418	0.0415	0.042	0.0006	1.47
	0.70	0.0969	0.0965	0.0972	0.0957	0.0961	0.0958	0.0961	0.0963	0.0959	0.0972	0.096	0.0006	0.58
Fe	0.10	0.0090	0.0105	0.0078	0.0099	0.0091	0.0093	0.0096	0.0094	0.0093	0.0084	0.009	0.0007	8.11
	0.50	0.0462	0.0470	0.0464	0.0464	0.0467	0.0462	0.0467	0.0460	0.0468	0.0466	0.047	0.0003	0.67
	1.00	0.0867	0.0886	0.0910	0.0892	0.0897	0.0873	0.0892	0.0885	0.0888	0.0874	0.089	0.0013	1.43
Pb	0.20	0.0091	0.0095	0.0088	0.0087	0.0082	0.0094	0.0090	0.0087	0.0082	0.0090	0.009	0.0004	4.94
	0.70	0.0322	0.0321	0.0324	0.0318	0.0335	0.0326	0.0327	0.0315	0.0336	0.0321	0.032	0.0007	2.09
	1.50	0.0653	0.0645	0.0663	0.0664	0.0652	0.0671	0.0662	0.0666	0.0657	0.0608	0.066	0.0008	1.28
Mn	0.05	0.0092	0.0092	0.0097	0.0087	0.0085	0.0079	0.0096	0.0085	0.0084	0.0099	0.009	0.0007	7.33
	0.30	0.0616	0.0630	0.0632	0.0633	0.0634	0.0628	0.0640	0.0633	0.0640	0.0629	0.063	0.0007	1.08
	0.70	0.1396	0.1366	0.1386	0.1377	0.1386	0.1386	0.1396	0.1380	0.1374	0.1383	0.138	0.0009	0.67
Ni	0.10	0.0102	0.0092	0.0097	0.0104	0.0091	0.0105	0.0105	0.0096	0.0098	0.0102	0.010	0.0005	5.22
	0.50	0.0488	0.0489	0.0489	0.0495	0.0484	0.0490	0.0481	0.0492	0.0495	0.0492	0.049	0.0004	0.91
	1.00	0.0976	0.0979	0.0975	0.0992	0.0977	0.0973	0.0986	0.0962	0.0985	0.0982	0.098	0.0008	0.85
Zn	0.05	0.0340	0.0349	0.0340	0.0352	0.0337	0.0351	0.0344	0.0346	0.0349	0.0343	0.035	0.0005	1.49
	0.30	0.1669	0.1653	0.1628	0.1642	0.1657	0.1637	0.1659	0.1652	0.1654	0.1657	0.165	0.0012	0.72
	0.70	0.3456	0.3467	0.3445	0.3430	0.3422	0.3444	0.3437	0.3438	0.3435	0.3438	0.344	0.0013	0.37

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3.7 Reading on wavelength- Nickel (Ni) at 232.0 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Ni	0.099	0.102	0.003	3.03	± 0.007
	0.495	0.489	-0.006	1.21	± 0.010
	0.990	0.975	-0.015	1.52	± 0.020

3.8 Reading on wavelength- Zinc (Zn) at 213.9 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Zn	0.050	0.050	0.000	0.00	± 0.012
	0.300	0.307	0.007	2.33	± 0.011
	0.700	0.660	-0.040	5.71	± 0.015

Remark : The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2 ($k = 2$) which gives a level of confidence of approximately 95%

Calibrated by.....
(Mr. Danai Srithongkum)

Approved by.....
(Mrs. Thippaya Junvee Fortune)
Director of Analytical Chemistry Laboratory
Calibration date : 3 February 2022

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E-mail : sumalee@tistr.or.th

FA.BLMTC.002 Rev.4

เอกสารไม่ควบคุม



Request No. 25-65 / 0398

4 / 5

MTC. ACL. No. 486 / 65

3.4 Reading on wavelength- Iron (Fe) at 248.3 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Fe	0.1003	0.106	0.006	5.68	± 0.008
	0.5015	0.522	0.021	4.09	± 0.017
	1.0030	0.993	-0.010	1.00	± 0.032

3.5 Reading on wavelength- Lead (Pb) at 217.0 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Pb	0.1988	0.197	-0.002	0.91	± 0.014
	0.6958	0.722	0.026	3.77	± 0.022
	1.4910	1.463	-0.028	1.88	± 0.041

3.6 Reading on wavelength- Manganese (Mn) at 279.5 nm.

Element	Standard Value of RM (mg/l)	Reading (mg/l)	Error of Measurement (mg/l)	Error of Measurement (%)	Uncertainty (mg/l)
Mn	0.04955	0.054	0.004	8.98	± 0.004
	0.29730	0.317	0.0197	6.63	± 0.006
	0.69370	0.682	-0.0117	1.69	± 0.012

Continue 5 / 5
INDUSTRIAL METROLOGY AND TESTING SERVICE CENTRE

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpai@tistr.or.th Website:www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
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Office
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Thailand
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Fax. (66) 0 2323 9165
E-mail : sumalee@tistr.or.th

FA.BLMTC.002 Rev.4

เอกสารไม่ควบคุม

ภาคผนวก ซ
การประกันและควบคุมคุณภาพ (QA/QC)



DIVE
DATE _____
TIME _____

☐ PASS
☐ NOT PASS

Name _____
MPE ± 0.2%

Signature _____ Date _____
Approve

cert. no.: 2200704-001-01

Electronic Balance

Mettler Toledo

model : ABCD-S

c/n . 1198312528

22 Dec 2021 Dec 24, 2021

ID.No: WAE.AIR.010/2550

21 Dec 21

Certificate No.: 2200704-001-01

Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address:
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhnong, Bangkok 10260

Page 1 of 5

Equipment:	Electronic Balance
Manufacturer:	Mettler Toledo
Model:	AB204-S
Serial No.:	1128312528
ID No.:	UAE.AIR.019/2550
Order No.:	2200704
Operation No.:	2200704-001
Date of Receipt:	24 November 2021
Date of Calibration:	24 November 2021

Calibrated by
Mr. Worapob Sooktong
Approved by

Mr. Worapob Sooktong

Scientist

(Mr.Pheraphat Tuanjit)

Manager, Division of Calibration Laboratory

Responsible for the Technical Management Team

November 2021

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.

CS-009 Revision: 00 Date: 14-12-61

เอกสารควบคุม



nfi



nfi

2006 So. 36 Abu Dhabi Road Bang 11712, Suburban Bang Phay District Bangkok 10700 Thailand
Tel: +66 (0) 2428 8666 Fax: +66 (0) 2428 8655 Website: www.nfi.co.th E-mail: calibration@nfi.co.th

Calibration Report

Certificate No.: 2200704-001-01
Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S
Resolution: 0.0001 g
Serial No.: 1128312528
ID No.: UAE.AIR.019/2550
Capacity: 200 g

Date of Calibration: 24 November 2021
Environment Condition: Ambient Temperature: 21.5 ± 0.5 °C Relative Humidity: 43 ± 2.5 %
Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:

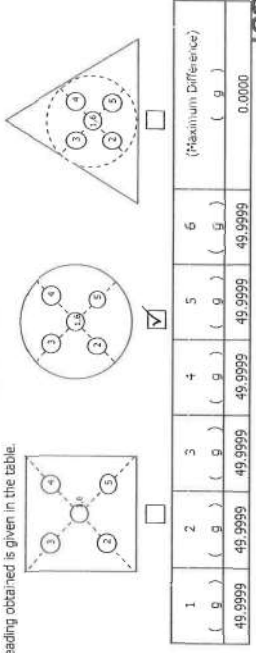
1. Calibration Method: NFI Method W-HA-001 In-House Method based on UKAS Lab 14 : 2019
2. Reference Standards:
Reference Standard
Standard Weight Class E2 1-500mg 83080608554 TCS M21010975 12 January 2022
Standard Weight Class E2 1-500g 83080608128 TCS M21010985 13 January 2022
Instrument
Thermo-Hygro Meter 11A1 aaw-hil BTH 003/55 Quality Reborn QR21-0297 15 February 2022
3. This certification is traceable to SI UNIT
4. This 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.

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
10	0.00000
20	0.00000

2. Off-Center Error:

A mass of 50 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.



เอกสารควบคุม

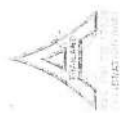
Calibration Report

Certificate No.: 2200704-001-01
Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S
Resolution: 0.0001 g
Serial No.: 1128312528
ID No.: UAE.AIR.019/2550
Capacity: 200 g

Date of Calibration: 24 November 2021
Calibration Results: (Continued)
Calibration Range: 0-20 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Test Weight by filter pan)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unloaded	0.00000	0.0000	0.0000	0.000082	2.00
0.01	0.01000	0.0100	0.0000	0.000082	2.00
0.05	0.05000	0.0500	0.0000	0.000082	2.00
0.1	0.10000	0.1000	0.0000	0.000082	2.00
0.5	0.50000	0.5000	0.0000	0.000083	2.00
1	1.00001	1.0000	0.0000	0.000083	2.00
2	2.00001	2.0000	0.0000	0.000083	2.00
3	3.00001	3.0000	0.0000	0.000084	2.00
4	4.00001	4.0000	0.0000	0.000085	2.00
5	5.00000	4.9999	0.0001	0.000084	2.00
10	9.99998	9.9999	0.0001	0.000087	2.00
15	14.99998	14.9999	0.0001	0.000089	2.00
20	19.99999	19.9999	0.0001	0.000089	2.00

เอกสารควบคุม



nfi



2006 So. 35, Rajabhat Road Bang (Pras) Subdistrict, Bang Phai District Bangkok 10700 Thailand
Tel: +66 (0) 2422 0668 Fax: +66 (0) 2422 0668 E-mail: calibration@nmit.go.th

nfi

Calibration Report

Certificate No.: 2200704-001-01
Equipment: Electronic Balance
Model: AB204-S
Serial No.: 1128312528
Capacity: 200 g
Manufacturer: Mettler Toledo
Resolution: 0.0001 g
ID No.: UAE.AIR.019/2550

Date of Calibration: 24 November 2021
Environment Condition: Ambient Temperature: 21.5 ± 0.5 °C Relative Humidity: 43 ± 2.5 %
Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:

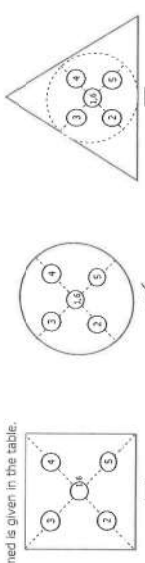
1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019
2. Reference Standards:
Reference Standard
Model **Serial No.** **Calibrated By** **Certificate No.** **Due Date**
Standard Weight: Class E2 1-500mg B308066854 TCS M21010975 12 January 2022
Standard Weight: Class E2 1-500g B3080668128 TCS M21010985 13 January 2022
Instrument **Model** **Serial No.** **Calibrated By** **Certificate No.** **Due Date**
Thermo-Hygro Meter 11A1 gaw.hhl BTH 003/55 Quality Reborn QR21-0237 15 February 2022

3. This certification is traceable to SI UNIT
4. This 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.

Calibration Results:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
100	0.00000
200	0.00000

2. Off-Center Error:
A mass of 50 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.



1	2	3	4	5	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
49.9999	49.9999	49.9999	49.9999	49.9999	49.9999	0.0000

เอกสารควบคุม

Calibration Report

Certificate No.: 2200704-001-01
Equipment: Electronic Balance
Model: AB204-S
Serial No.: 1128312528
Capacity: 200 g
Manufacturer: Mettler Toledo
Resolution: 0.0001 g
ID No.: UAE.AIR.019/2550

Date of Calibration: 24 November 2021
Calibration Results: (Continued)
Calibration Range: 0-200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.00000	0.0000	0.0000	0.000082	2.00
0.1	0.10000	0.1000	0.0000	0.000082	2.00
0.5	0.50000	0.5000	0.0000	0.000083	2.00
1	1.00001	1.0000	0.0000	0.000083	2.00
5	5.00000	4.9999	0.0001	0.000084	2.00
10	9.99998	9.9999	0.0001	0.000087	2.00
20	19.99999	19.9999	0.0001	0.000089	2.00
50	49.99990	49.9999	0.0000	0.00012	2.00
70	69.99989	69.9999	0.0000	0.00014	2.00
100	100.00000	99.9999	0.0001	0.00017	2.00
120	119.99999	119.9999	0.0001	0.00019	2.00
150	149.99990	149.9999	0.0000	0.00022	2.00
200	200.00009	199.9999	0.0002	0.00029	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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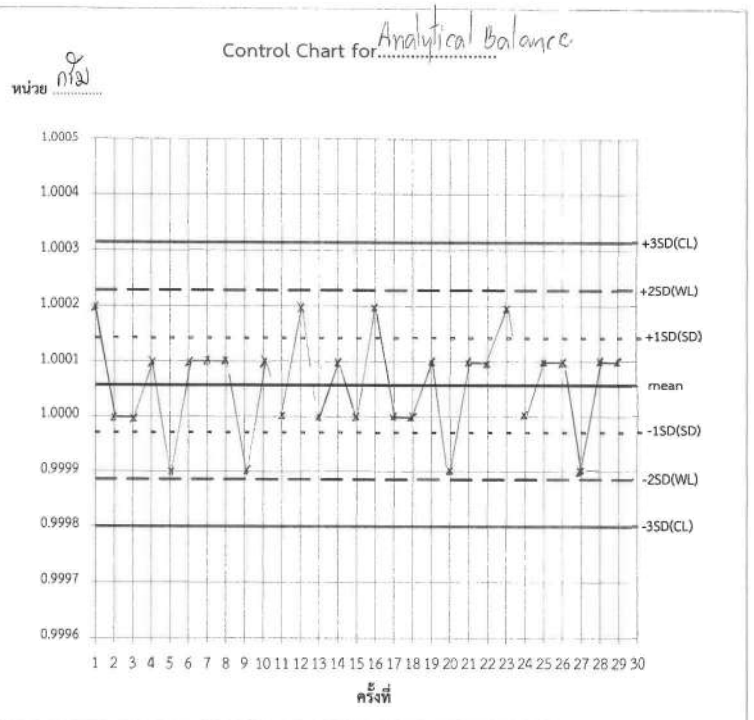
เอกสารควบคุม

พารามิเตอร์
ข้อมูลพื้นฐาน

Analytical balance
1 กilo

แบบบันทึก Quality Control Chart

ครั้งที่	วัน/เดือน/ปี	QC	จำนวนครั้งที่เกินช่วง (ระบุ + / 0 / -)				QC Result	ผู้บันทึก	ผู้ตรวจสอบ	หมายเหตุ
			Trending	SD	WL	CL				
เกณฑ์ที่ยอมรับ(ไม่เกิน)			7	4 of 5	2 of 3	1	✓ / ✗			
1	15/3/65	1.0001	+	+			/	4	/	
2	16/3/65	1.0000	-				/	4	/	
3	17/3/65	1.0000	-				/	4	/	
4	18/3/65	1.0001	+				/	4	/	
5	19/3/65	0.9999	-	-			/	4	/	
6	20/3/65	1.0001	+				/	4	/	
7	21/3/65	1.0001	+				/	4	/	
8	22/3/65	1.0001	+				/	4	/	
9	23/3/65	0.9999	-	-			/	4	/	
10	24/3/65	1.0001	+				/	4	/	
11	25/3/65	1.0000	-				/	4	/	
12	26/3/65	1.0001	+	+			/	4	/	
13	27/3/65	1.0000	-				/	4	/	
14	28/3/65	1.0001	+				/	4	/	
15	29/3/65	1.0000	-				/	4	/	
16	30/3/65	1.0001	+	+			/	4	/	
17	31/3/65	1.0000	-				/	4	/	
18	1/4/65	1.0000	-				/	4	/	
19	2/4/65	1.0001	+				/	4	/	
20	3/4/65	0.9999	-	-			/	4	/	
21	4/4/65	1.0001	+				/	4	/	
22	5/4/65	1.0001	+				/	4	/	
23	6/4/65	1.0001	+	+			/	4	/	
24	7/4/65	1.0000	-				/	4	/	
25	8/4/65	1.0001	+				/	4	/	
26	9/4/65	1.0001	+				/	4	/	
27	10/4/65	0.9999	-	-			/	4	/	
28	11/4/65	1.0001	+				/	4	/	
29	12/4/65	1.0001	+				/	4	/	
30										



QC Accept * QC Reject *SD, WL, CL หากเกินเกณฑ์ต้องทำการวิเคราะห์สาเหตุที่
และหากยังเกินเกณฑ์อีกให้ทำการแจ้งผู้จัดการส่วนเพื่อดำเนินการแก้ไขทันที

หมายเหตุ : เก็บใบเพิ่ม : Air-06

1/1

mean	1.00006	หน่วย	กรัม
SD	0.00009	หน่วย	กรัม

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Certificate No: 2202/04-001-01		Equipment : Electronic Balance	
Brand: Mettler Toledo		Model: AB204-S	
Serial No: 1128112518		ID No: UAE.FM.019/2550	
Nominal Value	Standard Value	Average Reading	Error
(g)	(g)	(g)	(g)
0.1	0.10000	0.10000	0.00000
0.5	0.50000	0.50000	0.00000
1	1.00001	1.00000	0.00000
5	5.00000	4.99999	-0.00001
10	9.99998	9.99999	-0.00001
20	19.99999	19.99999	-0.00001
50	49.99990	49.99990	0.00000
70	69.99989	69.99990	0.00001
100	100.00000	99.99999	-0.00001
120	119.99999	119.99999	-0.00001
150	149.99990	149.99990	0.00000
200	200.00009	199.99999	-0.00010
UUC : Unit Under Calibration			
Remarks			

เอกสารควบคุม

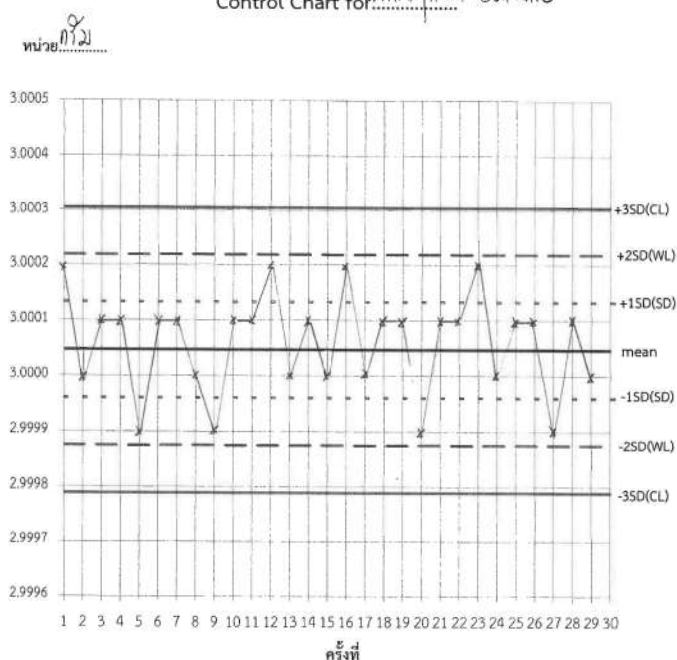
พารามิเตอร์ :
ข้อมูลพื้นฐาน

Analytical Balance
5 กรัม

แบบบันทึก Quality Control Chart

ครั้งที่	วัน/เดือน/ปี	QC	จำนวนครั้งที่เกินช่วง (ระบุ +/0/-)				QC	ผู้บันทึก	ผู้ตรวจสอบ	หมายเหตุ
									
			Trending	SD	WL	CL	Result			
เกณฑ์ที่ยอมรับ(ไม่เกิน)			7	4 of 5	2 of 3	1	✓/x			
1	15/11/65	3.0001		+			/	4	✓	
2	16/11/65	3.0000	+				/	4	✓	
3	17/11/65	3.0001	+				/	4	✓	
4	18/11/65	3.0001	+				/	4	✓	
5	19/11/65	3.9999	-	-			/	4	✓	
6	20/11/65	3.0001	+				/	4	✓	
7	21/11/65	3.0001	+				/	4	✓	
8	22/11/65	3.0000	-				/	4	✓	
9	23/11/65	3.9999	-	-			/	4	✓	
10	24/11/65	3.0001	+				/	4	✓	
11	25/11/65	3.0001	+				/	4	✓	
12	26/11/65	3.0001	+	+			/	4	✓	
13	27/11/65	3.0000	-				/	4	✓	
14	28/11/65	3.0001	+				/	4	✓	
15	29/11/65	3.0000	-				/	4	✓	
16	30/11/65	3.0001	+	+			/	4	✓	
17	1/12/65	3.0000	-				/	4	✓	
18	2/12/65	3.0001	+				/	4	✓	
19	3/12/65	3.0001	+				/	4	✓	
20	4/12/65	3.9999	-	-			/	4	✓	
21	5/12/65	3.0001	+				/	4	✓	
22	6/12/65	3.0001	+				/	4	✓	
23	27/1/65	3.0001	+	+			/	4	✓	
24	30/1/65	3.0000	-				/	4	✓	
25	31/1/65	3.0001	+				/	4	✓	
26	1/2/65	3.0001	+				/	4	✓	
27	2/2/65	3.9999	-	-			/	4	✓	
28	31/4/65	3.0001	+				/	4	✓	
29	4/4/65	3.0000	-				/	4	✓	
30										

Control Chart for Analytical Balance



✓ QC Accept

✗

QC Reject

*SD, WL, CL หากเกินเกณฑ์ต้องทำการวิเคราะห์ซ้ำทันที

และหากยังเกินเกณฑ์อีกให้ทำการแจ้งผู้จัดการส่วนเพื่อดำเนินการแก้ไขทันที

mean 5.00005
SD 0.00009

หน่วย : กรัม
หน่วย : กรัม

หมายเหตุ : เก็บในแฟ้ม : Air-06

1/1

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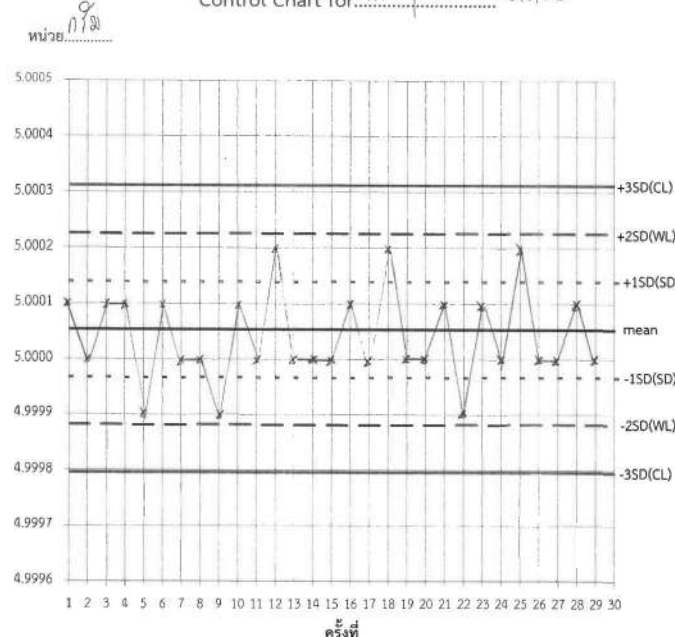
พารามิเตอร์ :
ข้อมูลพื้นฐาน

Analytical Balance
5 กรัม

แบบบันทึก Quality Control Chart

ครั้งที่	วัน/เดือน/ปี	QC	จำนวนครั้งที่เกินช่วง (ระบุ + / 0 / -)				QC	ผู้บันทึก	ผู้ตรวจสอบ	หมายเหตุ
									
			Trending	SD	WL	CL	Result			
เกณฑ์ที่ยอมรับ(ไม่เกิน)		7	4 of 5	2 of 3	1	✓ / ✕				
1	15/11/65	5.0001	+				/	4	0	
2	16/11/65	5.0000	-				/	4	0	
3	17/11/65	5.0001	+				/	4	0	
4	18/11/65	5.0001	+				/	4	0	
5	19/11/65	4.9999	-	-			/	4	0	
6	20/11/65	5.0001	+				/	4	0	
7	21/11/65	5.0000	-				/	4	0	
8	22/11/65	5.0000	-				/	4	0	
9	23/11/65	4.9999	-	-			/	4	0	
10	24/11/65	5.0001	+				/	4	0	
11	25/11/65	5.0000	-				/	4	0	
12	26/11/65	5.0001	+	+			/	4	0	
13	15/12/65	5.0000	-				/	4	0	
14	16/12/65	5.0000	-				/	4	0	
15	19/12/65	5.0000	-				/	4	0	
16	18/11/65	5.0001	+				/	4	0	
17	21/11/65	5.0000	-				/	4	0	
18	23/11/65	5.0001	+	+			/	4	0	
19	25/12/65	5.0000	-				/	4	0	
20	24/12/65	5.0000	-				/	4	0	
21	13/12/65	5.0001	+				/	4	0	
22	18/12/65	4.9999	-	-			/	4	0	
23	19/12/65	5.0001	+				/	4	0	
24	20/12/65	5.0000	-				/	4	0	
25	21/12/65	5.0001	+	+			/	4	0	
26	11/11/65	5.0000	-				/	4	0	
27	11/11/65	5.0000	-				/	4	0	
28	21/11/65	5.0001	+				/	4	0	
29	11/11/65	5.0000	-				/	4	0	
30										

Control Chart for Analytical Balance



✓ QC Accept

✗

QC Reject

*SD, WL, CL หากเกินเกณฑ์ต้องทำการวิเคราะห์ซ้ำทันที

และหากยังเกินเกณฑ์อีกให้ทำการแจ้งผู้จัดการส่วนเพื่อดำเนินการแก้ไขทันที

mean 5.00005
SD 0.00009

หน่วย : กรัม
หน่วย : กรัม

หมายเหตุ : เก็บในแฟ้ม : Air-06

1/1

\\uae.netapp\Netapp_LAB\Lab-BK\ISO_KCE17025\ISOIEC 17025 QUALITY SYSTEM REVIEW\user\New\2 Form_New\7.7\UAE.FM.7.7.004-1(1)_แบบบันทึก Quality Control Chart

ผลการประกันคุณภาพของห้องปฏิบัติการวิเคราะห์ (QA/QC) สำหรับ บริษัท ทางด่วนและรถไฟฟ้ากรุงเทพ จำกัด (มหาชน)

(เก็บตัวอย่างระยะทางใกล้จุดสูบน้ำเข้าโรงกรองน้ำสามเสน (NEAR INLET) โรงผลิตน้ำสามเสน เมื่อวันที่ 24 - 29 มีนาคม 2565)

ANALYSIS NO.	UNIT	DETECTION LIMIT	METHOD BLANK	LEAD RESULT	ICV			SSCV			LFB		
					NOMINAL (mg/L)	MEASURED (mg/L)	RECOVERY (%)	NOMINAL (mg/L)	MEASURED (mg/L)	RECOVERY (%)	NOMINAL (mg/L)	MEASURED (mg/L)	RECOVERY (%)
AG133-1	µg/m ³	0.002	< 0.002	0.007	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-2	µg/m ³	0.002	< 0.002	0.014	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-3	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-4	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-5	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
ACCEPTABLE LIMIT	< 0.002						95-105			90-110			85-115

ผลการประกันคุณภาพของห้องปฏิบัติการวิเคราะห์ (QA/QC) สำหรับ บริษัท ทางด่วนและรถไฟฟ้ากรุงเทพ จำกัด (มหาชน)

(เก็บตัวอย่างที่ระยะทางใกล้จุดสูบน้ำเข้าโรงกรองน้ำไปทางต้นน้ำในระยะ 1.5 กิโลเมตร (หน้า7-11) เมื่อวันที่ 24 - 29 มีนาคม 2565)

ANALYSIS NO.	UNIT	DETECTION LIMIT	METHOD BLANK	LEAD RESULT	ICV			SSCV			LFB		
					NOMINAL (mg/L)	MEASURED (mg/L)	RECOVERY (%)	NOMINAL (mg/L)	MEASURED (mg/L)	RECOVERY (%)	NOMINAL (mg/L)	MEASURED (mg/L)	RECOVERY (%)
AG133-6	µg/m ³	0.002	< 0.002	0.016	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-7	µg/m ³	0.002	< 0.002	0.014	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-8	µg/m ³	0.002	< 0.002	0.006	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-9	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-10	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
ACCEPTABLE LIMIT	< 0.002						95-105			90-110			85-115

ผลการประกันคุณภาพของห้องปฏิบัติการวิเคราะห์ (QA/QC) สำหรับ บริษัท ทางด่วนและรถไฟฟ้ากรุงเทพ จำกัด (มหาชน)

(เก็บตัวอย่างที่ระยะห่างใกล้จุดสูบน้ำเข้าโรงกรองน้ำไปทางต้นน้ำในระยะ 3 กิโลเมตร (กองซ่อมท่อประปา) เมื่อวันที่ 24 - 29 มีนาคม 2565)

ANALYSIS NO.	UNIT	DETECTION LIMIT	METHOD BLANK	LEAD RESULT	ICV			SSCV			LFB		
					NOMINAL	MEASURED	RECOVERY	NOMINAL	MEASURED	RECOVERY	NOMINAL	MEASURED	RECOVERY
					(mg/L)	(mg/L)	(%)	(mg/L)	(mg/L)	(%)	(mg/L)	(mg/L)	(%)
AG133-11	µg/m ³	0.002	< 0.002	0.009	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-12	µg/m ³	0.002	< 0.002	0.004	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-13	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-14	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-15	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
ACCEPTABLE LIMIT		< 0.002					95-105			90-110			85-115

ผลการประกันคุณภาพของห้องปฏิบัติการวิเคราะห์ (QA/QC) สำหรับ บริษัท ทางด่วนและรถไฟฟ้ากรุงเทพ จำกัด (มหาชน)

(เก็บตัวอย่างที่ระยะห่างใกล้จุดสูบน้ำเข้าโรงกรองน้ำไปทางต้นน้ำในระยะ 4.5 กิโลเมตร (หลังป้อมจราจร สน.เตาปูน) เมื่อวันที่ 24 - 29 มีนาคม 2565)

ANALYSIS NO.	UNIT	DETECTION LIMIT	METHOD BLANK	LEAD RESULT	ICV			SSCV			LFB		
					NOMINAL	MEASURED	RECOVERY	NOMINAL	MEASURED	RECOVERY	NOMINAL	MEASURED	RECOVERY
					(mg/L)	(mg/L)	(%)	(mg/L)	(mg/L)	(%)	(mg/L)	(mg/L)	(%)
AG133-16	µg/m ³	0.002	< 0.002	0.016	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-17	µg/m ³	0.002	< 0.002	0.008	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-18	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-19	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
AG133-20	µg/m ³	0.002	< 0.002	< 0.002	0.700	0.696	99.4	0.700	0.698	99.7	0.700	0.688	98.3
ACCEPTABLE LIMIT		< 0.002					95-105			90-110			85-115

ผลการประกันคุณภาพภายในห้องปฏิบัติการวิเคราะห์คุณภาพน้ำผิวดิน ของโครงการระบบทางด่วนขั้นที่ 2 ทางพิเศษศรีรัช

ดัชนี	หน่วย	DETECTION LIMIT	METHOD BLANK	INITIAL CALIBRATION VERIFICATION (ICV)		LABORATORY FORTIFIED BLANK (LFB)			T22AF796-0006 ผลการวิเคราะห์	
				NOMINAL	MEASURED	%RECOVERY	NOMINAL	MEASURED	%RECOVERY	DUPLICATE
LEAD	mg/L Pb	0.003	< 0.003	0.700	0.679	97.0	0.700	0.685	97.9	1
เกณฑ์ที่ยอมรับได้						90 - 110%			85 - 115%	2
									< 0.003	RPD
									< 0.003	
										≤ 10%

ดัชนี	หน่วย	T22AF796-0006 ผลการวิเคราะห์				LABORATORY FORTIFIED BLANK (LFB)			CONTINUOUS CALIBRATION VERIFICATION (CCV)		
		LABORATORY FORTIFIED MATRIX (LFM)				NOMINAL	MEASURED	%RECOVERY	NOMINAL	MEASURED	%RECOVERY
		SAMPLE	NOMINAL	MEASURED	%RECOVERY						
LEAD	mg/L Pb	< 0.003	0.700	0.671	95.9	0.700	0.661	94.4	0.700	0.664	94.9
เกณฑ์ที่ยอมรับได้					85 - 115%			85 - 115%			90 - 110%

ภาคผนวก ฅ

หนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๑๐(๑)/ ๑๘๗๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐ ๙ กุมภาพันธ์ ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขณัตถสารสิทธิ์ของห้องปฏิบัติการวิเคราะห์เอกชน
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 ๖-๑๔๕๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๑ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

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

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทั้งทางเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางจินดา เสงศรีพันธ์)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษทางอากาศ
ปฏิบัติการทางมลพิษทางอากาศกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเฝ้าระวังมลพิษทางอากาศ

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๔๔

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@div.gmai.go.th

-๒-

- ๓๖) นายสุกัญฐ์ คุณธนกาญจน์
๓๗) นางสาวศิริภาพร เหมอินทร์
๓๘) นางสาวนิตา ชำนิล
๓๙) นางสาวพรนิกา อธิจินดา
๔๐) นายนันทพร พันธุ์ชาติกุล

- ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๓๖
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๓๗
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๓๘
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๓๙
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๔๐

(นางจินดา เสงศรีพันธ์)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษทางอากาศ
ปฏิบัติการทางมลพิษทางอากาศกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๔๕๕
ที่ อก ๐๓๑๐(๑)/ ๑๘๗๕ ลงวันที่ ๐ ๙ กุมภาพันธ์ ๒๕๖๕

สิ่งที่ส่งมาด้วย ๑

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

- ๑) นางสาวกฤตวรรณ ภีระธีรกุล
- ๒) นายณรงค์ นิพัทธ์
- ๓) นางสาวนันทิศา บุญไชย
- ๔) นางปิยะพัชร สุทธิพงษ์
- ๕) นางนันทิศา นันทิไชย
- ๖) นางสาวเบญจวรรณ วีระชัย
- ๗) นายพนรัตน์ วงศ์บุรุษชัย
- ๘) นางสาววิจิตรวรรณ บุญลา
- ๙) นายสุวิทย์ จอดนอก
- ๑๐) นางสาวโชติกา สมบูรณ์
- ๑๑) นางสาวบุษกร เลิศกาญจนา
- ๑๒) นางสาววิไลลักษณ์ ศรีสุข
- ๑๓) นางสาวปริมา จรัสโชติพิณ
- ๑๔) นายศิลา บรรจงใจรักษ์
- ๑๕) นายปฏิกรณ์ คณะนา
- ๑๖) นายธีรวัฒน์ ชะเม็ง
- ๑๗) นางสาวศิริพร ศรีประสิทธิ์
- ๑๘) นางสาวสาวิตรี ธีร
- ๑๙) นางสาวพรพรรณ สุราษฎร์
- ๒๐) นายภูษังค์ พานิชย์เลิศอาไพ
- ๒๑) นายณัฐวัฒน์ แสงสหัส
- ๒๒) นายเอกรัตน์ ปะดะมิตร
- ๒๓) นางสาวนิทัศน์ ศรีสุภาสิริโชค
- ๒๔) นางสาวเจษฎาพร ทาสะอาด
- ๒๕) นางสาวสุวรรณา คงทอง
- ๒๖) นางสาววรรณ พัดสองชั้น
- ๒๗) นายวิรัช มอแก้ว
- ๒๘) นายธีรพงษ์ เทพดนตรี
- ๒๙) นายอนุศาสน์ สยวดี
- ๓๐) นายกรวิทย์ เจียศิริกุล
- ๓๑) นางสาวอริกา วงศ์สวัสดิ์
- ๓๒) นางสาวนภวรรณ คงคำ
- ๓๓) นายสุวิทย์ อรุณจันทร์
- ๓๔) นางสาวศศิธร อ่อนคำ
- ๓๕) นางสาวพริ้มพรรณ สมบูรณ์ธรรม

- ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๑
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๒
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๓
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๔
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๕
ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๖
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ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๑๐
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(นางจินดา เสงศรีพันธ์)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษทางอากาศ
ปฏิบัติการทางมลพิษทางอากาศกรมโรงงานอุตสาหกรรม

๓๖) นายสุกัญฐ์...

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๔๕๕
ที่ อก ๐๓๑๐(๑)/ ๑๘๗๕ ลงวันที่ ๐ ๙ กุมภาพันธ์ ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย

- ๑) นายสุกัญฐ์ พันธุ์
- ๒) นางสาวธรรมา แก้วชื่อนอก
- ๓) นายพิรุณ ใจบุญ
- ๔) นางสาววิไลลักษณ์ แก้วสง
- ๕) นายสมชาติ อุนรัตน์
- ๖) นางสาวปรมาภรณ์ ทองแก้ว
- ๗) นางสาวกัญญา สมพงษ์
- ๘) นายอรุณพร เทพทอง
- ๙) นางสาวอรรครัตน์ พุทธิ
- ๑๐) นางสาววรรณ สายบุญเรือน
- ๑๑) นายฤทธิพงษ์ นามพิชัย
- ๑๒) นางสาวอรภากร อ่อนคง
- ๑๓) นายกิตติศักดิ์ ทรงจรัส
- ๑๔) นางสาวอักษิณทร์ บุญคง
- ๑๕) นางสาวพริ้มลดา แวนทอง
- ๑๖) นายวิชัย สุวรรณราช
- ๑๗) นายอภิวิชญ์ พ่วง
- ๑๘) นายมานิต ปานขัติ
- ๑๙) นายศพร ธนพิรุณ
- ๒๐) นางสาวกัญญา โสธา
- ๒๑) นางสาวกมล สุทธิ
- ๒๒) นางสาวณณิศา อภิสิทธิ์
- ๒๓) นายศิริพงษ์ จงมดุงเกียรติ
- ๒๔) นางสาวสุภาวดี อธิชา
- ๒๕) นายพงศ์เทพ เหล่าเพชร
- ๒๖) นายชัยชัย พันธุ์
- ๒๗) นางสาวพิจรา คดีพิศาล
- ๒๘) นางสาวเมธิกา เสือคำจันทร์
- ๒๙) นายกนกพงศ์ บุญพวง
- ๓๐) นางสาวพริดา เจริญชัยสมบัติ
- ๓๑) นายพนรัตน์ จงใจ
- ๓๒) นายพีรพัฒน์ บุญอุทิศศิลป์
- ๓๓) นายปริดา โขบุญมีกุล
- ๓๔) นายชัยวัฒน์ เลื่อนทอง
- ๓๕) นายปิยะนุช ศรีภูใจ

- ทะเบียนเลขที่ ๖-๑๔๕๕-๖-๐๐๐๑
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ปฏิบัติการทางมลพิษทางอากาศกรมโรงงานอุตสาหกรรม

๓๖) นายสุกัญฐ์...

๓๖) นายณัฐกร ชูธรรมรัตน์
๓๗) นายกันนิกร ไร่โส
๓๘) นายจักรพันธ์ ภูมิรินทร์
๓๙) นายปริยญา กลมเกลียว
๔๐) นายธีรวัฒน์ มาตราโพธิ์ศรี
๔๑) นายธีรเมธ สุขศรี
๔๒) นายบุญฤทธิ์ ก้อนสิน
๔๓) นายพรชัญญ์ โกลกุล
๔๔) นายชิตะ แสงจันทร์
๔๕) นายณัฐพงษ์ เมืองชัย
๔๖) นายธนัท เลิศประเสริฐ
๔๗) นางสาวนิภาพร จันทเขตต์
๔๘) นายยุทธพงษ์ อิศระสุข
๔๙) นายธนากร ภูตระกูลพัฒนา
๕๐) นางสาวศิริวรรณ ขอนพา
๕๑) นายสมพงษ์ สกุลไทย
๕๒) นายสุวิทย์ นิธิเชษฐวงศ์
๕๓) นายอชฎาฐ งามศิริ
๕๔) นายเอกภูมิ เสนอใจ
๕๕) นายสุสันต์ บุญเลี้ยง
๕๖) นายชนเดช ทวานเสนาะ
๕๗) นายพิพัฒน์ ต้นอนกุล
๕๘) นายอภิสิทธิ์ ศรีคงแก้ว
๕๙) นายภูทนต์ มงคลสูง
๖๐) นายสุวิทย์ แก้วรากมู
๖๑) นางสาวนารินทร์ สานนท์
๖๒) นายศุภกร รินวงศ์
๖๓) นายศักดิ์สิทธิ์ เกติง
๖๔) นางสาวศิริพร อภิการรัตน์
๖๕) นางสาวจินตสุภา เปลี่ยนศรี
๖๖) นางสาวนครนภา กมลบุญ
๖๗) นางสาวอารียา ทราภรณ์
๖๘) นายจิรวัฒน์ สุขเกษม
๖๙) นายกิตติพงษ์ สอนชัยภูมิ
๗๐) นายจันทพล สอนเพชร
๗๑) นางสาวพัชราภรณ์ แสงฟ้า
๗๒) นายรัตนชัย เหล่ามา

ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๓๖
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(นางจินตา เดชะศรีนทร์)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษทางอากาศ
ปฏิบัติการตามมติที่ประชุมของงานอุตสาหกรรม

๗๓) นายอิทธิพงษ์...

๗๓) นายอิทธิพงษ์ ศรีวิเศษ
๗๔) นางสาวกรรณิการ์ ลำสิงหา
๗๕) นายฐาปกรณ์ พิมพ์ศรี
๗๖) นายพรชัย คุ้มม่วง
๗๗) นางสาวทัศนีย์ ไชยหาร
๗๘) นายธีรพงษ์ ศรีคำแหง
๗๙) นางสาวณัฐชา พรหมศิริ
๘๐) นางสาวลัดดาวัลย์ โพธิ์พันธ์
๘๑) นางสาวกมลวรรณ เจริญจันทร์
๘๒) นายณัฐวัฒน์ จันทร์คุณ
๘๓) นายปิยวัฒน์ ไหมบุญ
๘๔) นางสาวพรนิจา กลิ่นอุณ
๘๕) นายณัฐพงศ์ ศรีพันธ์
๘๖) นางสาวลักขณา จันทร์สุข
๘๗) นายสงกรานต์ มาลัยทอง
๘๘) นางสาวสาธิตา แซ่เตียว
๘๙) นายศักดิ์ดนัย นุ่มเงิน
๙๐) นายวรพงษ์ นนทจันทร์
๙๑) นางสาวชนาภา มาคะมาพร
๙๒) นางสาวธนธรม์ คุณาพันธุ์ชัย
๙๓) นายวิเศษพร สารรักษ์
๙๔) นางสาวธิดา วัชรพันธุ์วัฒน์
๙๕) นายภูทนต์ พงศ์สถาพร
๙๖) นายณัฐชัย พรหมอารักษ์
๙๗) นายชินนทร์ พานแก้ว
๙๘) นายปรัชชาพล โสภ
๙๙) นายวิรัตน์ แสนงาม
๑๐๐) นางสาวอนรรคน์ ลาภรม
๑๐๑) นายอาทิตย์ อุดมผล
๑๐๒) นายปวรร บุญนาค
๑๐๓) นายอิทธิเดช ใจบุญ
๑๐๔) นายคณิติน พงษ์อัคราบุพร
๑๐๕) นางสาวสุวรรณ์ จันทร์ประทีป
๑๐๖) นายเสกสรรค์ เอ็มกลิ่นบัว

ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๓๓
ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๓๔
ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๓๕
ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๓๖
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ทะเบียนเลขที่ ๖-๑๕๕-๖-๐๐๗๒


(นางจินตา เดชะศรีนทร์)
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษทางอากาศ
ปฏิบัติการตามมติที่ประชุมของงานอุตสาหกรรม

สิ่งที่ส่งมาด้วย ๓

เอกสารแนบท้ายหนังสือรับข้อหาข้อหาขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูนิเทค แอนนาไลติกส์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕-
ที่ ออ ๐๓๑(๑)/ ๑๘๗๕ ลงวันที่ ๐๙ กุมภาพันธ์ ๒๕๖๕

ขอขย้ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๕๗ รายการ

น้ำเสีย จำนวน 46 รายการ

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

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

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
36	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^[4] 2) Soxhlet Extraction Method ^[4] Electrometric Method ^[4]
37	pH	
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] <i>อีกที</i>

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] <i>อีกที</i>

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] <i>อีกที</i>

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] <i>อีกที</i>

42 Dibenzo(a,h)anthracene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
42	Diben(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-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
56	1,3-Dichloropropene	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⁾ <i>สีชมพู</i>

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⁾ <i>สีชมพู</i>

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⁾ <i>สีชมพู</i>

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⁾ <i>สีชมพู</i>

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 ₃ - C ₆)	1) Purge and Trap, Gas Chromatographic Method ^[11,21] 2) Purge and Trap, Gas Chromatographic/Mass spectrometric Method ^[11,25]
110	TPH (C ₈ - C ₁₂)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21]
111	TPH (C ₁₆ - C ₃₅)	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]

อากาศเสีย (ปล่อยระบาย) 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 ^[5]
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]

สิ่งบ่งชี้...

สิ่งบ่งชี้หรือวัสดุที่ไม่ใช้แล้ว 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 ^(2,6,13) 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) <i>อีกที</i>

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 ^(2,6,13,14) 3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14,16) 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,14)
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) <i>อีกที</i>

15 DOE,...

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) <i>อีกที</i>

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾ 4) Digestion, Inductively Coupled Plasma Method ^(7,13) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾
24	Molybdenum	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
25	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13) 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) <i>อีกที</i> 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾ 4) Digestion, Inductively Coupled Plasma Method ^(7,13) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾ 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',3,4',5,5',6- Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6- Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,9,28] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] Electrometric Method ^[31,32] 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]
28	pH	
29	Selenium	

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]

สืบ 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 ^[7,15] 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 ^[10,24] 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 ^[10,24] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
12	Benzo(k)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^[10,24] 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 ^[10,24] 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	สารมลพิษ	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 ^[10,24] 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 ^[10,24] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]

43 Di-n-butyl phthalate...

ลำดับ	สารมลพิษ	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-Dichloropropane	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	สารมลพิษ	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 ^[10,24] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
68	Fluorene	1) Ultrasonic Extraction, Gas Chromatographic Method ^[10,24] 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	สารมลพิษ	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] <i>ฉันทา</i>

96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - 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 - 2,3,3',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	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] <i>ฉันทา</i>

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

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
	- 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	
97	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 ₁₀)	1) Purge and Trap, Gas Chromatographic Method ^[12,21] 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[12,25]
109	TPH (C ₉ -C ₁₆)	Ultrasonic Extraction, Gas Chromatographic Method ^[10,21]
110	TPH (C ₁₆ -C ₃₅)	Ultrasonic Extraction, Gas Chromatographic Method ^[10,21]
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[12,25] <i>ฉันทา</i>

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]

เอกสารอ้างอิง

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเคมีภัณฑ์ที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรตารีที่ใช้แก๊สเป็นเชื้อเพลิง.

ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.

2. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ได้เจือปน. ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 111 ง. *ฉันทา*

3. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

4. APHA, AWWA, WEF. *Standard Methods for the Examination of Water and Wastewater*. 23rd ed. Washington, DC: APHA, 2017.

5. United States Environmental Protection Agency. *Standards of Performance for New Stationary Sources*. 40 CFR 60. Appendix A, 2019.

6. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods*. SW-846, 1997.

7. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Acid Digestion of Sediments, Sludges, and Soils*. SW-846 Method 3050B, 1996.

8. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium*. SW-846 Method 3060A, 1996.

9. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste 3. Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction*. SW-846 Method 3510C, 1996.

10. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Ultrasonic Extraction*. SW-846 Method 3550C, 2007.

11. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Purge and Trap for Aqueous Samples*. SW-846 Method 5030C, 2003.

12. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Closed System Purge and Trap and Extraction for Volatile Organics in Soil and Waste Sample*. SW-846 Method 5035A, 2000.

13. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Optical Emission Spectrometry*. SW-846 Method 6010D, 2014.

14. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Flame Atomic Absorption Spectrophotometry*. SW-846 Method 7000B, 2007.

15. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Arsenic (Atomic Absorption, Gaseous Hydride)*. SW-846 Method 7061A, 1992. *จำกัด*

16. United States...

16. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric)*. SW-846 Method 7196A, 1992.

17. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Liquid Waste (Manual Cold Vapor Technique)*. SW-846 Method 7470A, 1994.

18. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)*. SW-846 Method 7471B, 1998.

19. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry*. SW-846 Method 7473, 2007.

20. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Selenium (Atomic Absorption, Borohydride Reduction)*. SW-846 Method 7742, 1994.

21. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Nonhalogenated Organics Using GC/FID*. SW-846 Method 8015D, 2003.

22. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Organochlorine Pesticides by Gas Chromatography*. SW-846 Method 8081B, 2007.

23. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Polychlorinated Biphenyls (PCBs) by Gas Chromatography*. SW-846 Method 8082A, 2007.

24. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Polynuclear Aromatic Hydrocarbons*. SW-846 Method 8100, 1980.

25. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry*. SW-846 Method 8260D, 2018.

26. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry*. SW-846 Method 8270E, 2018.

27. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzoylation Derivatization*. SW-846 Method 8151A, 1996. *จำกัด*

28. United States...

28. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide : Distillation*. SW-846 Method 9010C, 2004.

29. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oils*. SW-846 Method 9013A, 2014.

30. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts using Titrimetric and Manual Spectrophotometric Procedures*. SW-846 Method 9014, 2014.

31. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. pH Electrometric Measurement*. SW-846 Method 9040C, 2004.

32. United States Environmental Protection Agency. *Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soil and Waste pH*. SW-846 Method 9045D, 2004. *จำกัด*

