

ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือที่ใช้ในการตรวจวิเคราะห์
(Calibration)



ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์

Item	Description	Parameter	List of Equipment	Equipment No.	Calibration	Next Calibration	
1.	Stack Air	Particulate	Dry Gas Meter/SK23	S/N 8004291	14/02/2023	February 2024	
			Dry Gas Meter/SK25EX	S/N 604	14/02/2023	February 2024	
			Digital Thermometer/DP-52	S/N L411635	03-13/03/2023	March 2024	
			Digital Barometer/PH3-318	S/N 8011410	25/05/2023	May 2024	
2.	Ambient Air	NO _x as NO ₂	Electronic Balance/METTLER TOLEDO	S/N 1116392227	11/04/2023	April 2024	
			Gas Analyzer (E-Instruments)/E6000-SDS	S/N 1339	03/01/2024	January 2025	
			SO ₂	Gas Analyzer (E-Instruments)/E6000-SDS	S/N 1339	03/01/2024	January 2025
			TSP	ORIFICE TRANSFER STANDARD/Tisch	S/N 0068	21/09/2022	September 2023
		High Volume Air Sampler/TET		S/N No. 37	13/07/2023	July 2024	
		High Volume Air Sampler/TET		S/N No. 39	05/07/2023	July 2024	
		High Volume Air Sampler/TET		S/N No. 40	05/07/2023	July 2024	
		PM-10	Electronic Balance/METTLER TOLEDO	S/N 1116392227	11/04/2023	April 2024	
			ORIFICE TRANSFER STANDARD/Tisch	S/N 0068	21/09/2022	September 2023	
			High Volume Air Sampler/TET	S/N No.20	13/07/2023	July 2024	
			High Volume Air Sampler/TET	S/N No.23	11/07/2023	July 2024	
		NO ₂	High Volume Air Sampler/TET	S/N No.32	11/07/2023	July 2024	
			Electronic Balance/METTLER TOLEDO	S/N 1116392227	11/04/2023	April 2024	
			CERTIFICATE OF ACCURACY : Linde	S/N A00917SK	05/07/2023	July 2026	
			NO _x Analyzer/API 200A	S/N 80	09/11/2023	May 2024	
		SO ₂	NO _x Analyzer/API 200A	S/N 777	07/11/2023	May 2024	
			NO _x Analyzer/API 200E	S/N 731	09/11/2023	May 2024	
			CERTIFICATE OF ACCURACY : Linde	S/N D636151	18/09/2023	September 2027	
			SO ₂ Analyzer/API 100E	S/N 139	07/11/2023	May 2024	
		WS & WD	SO ₂ Analyzer/Thermo 43C	S/N 43C-FL-67266366	06/11/2023	May 2024	
			SO ₂ Analyzer/API 100E	S/N 383	07/11/2023	May 2024	
			Wind speed and wind direction/Vantage VUE	S/N Display MT220822047	20/11/2023	November 2024	



TET

Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์ (ต่อ)

Item	Description	Parameter	List of Equipment	Equipment No.	Calibration	Next Calibration
3.	Working Air	Total Dust	Personal Air Sampler/Gillan	S/N 20140505013	12/01/2024	February 2024
			Personal Air Sampler/Gillan	S/N 20140605013	12/01/2024	February 2024
			Personal Air Sampler/Gillan	S/N 20140605017	12/01/2024	February 2024
			Electronic Balance/XP 205	S/N 1129273885	11/04/2023	April 2024
		Respirable Dust	Personal Air Sampler/Gillan	S/N 20090703020	12/01/2024	February 2024
			Personal Air Sampler/Gillan	S/N 20110505104	12/01/2024	February 2024
			Personal Air Sampler/Gillan	S/N 20110501071	12/01/2024	February 2024
			Electronic Balance/XP 205	S/N 1129273885	11/04/2023	April 2024
		pH	pH Meter/Horiba (Temperature)	S/N B06D0012	01/11/2023	November 2024
			Electronic Balance/METTLER TOLEDO	S/N 1116392227	10/04/2024	April 2025
			BOD Incubator/Model R250-DS	S/N 2059-1017-0029	29/06/2023	June 2024
			Electronic Balance/METTLER TOLEDO	S/N 1116392227	10/04/2024	April 2025
4.	Water	TDS	pH Meter/Horiba (Temperature)	S/N B06D0012	01/11/2023	November 2024
			Spectrophotometer/PerkinElmer	S/N 365K9042909	18/08/2023	August 2024
			Electronic Balance/METTLER TOLEDO	S/N 1116392227	10/04/2024	April 2025
			Spectrophotometer/PerkinElmer	S/N 365K9042909	18/08/2023	August 2024
		Oil & Grease	ICP394/PerkinElmer/OPTIMA8000	S/N 078N1310024C	28/03/2024	September 2024
			ICP394/PerkinElmer/OPTIMA8000	S/N 078N1310024C	28/03/2024	September 2024
			Incubator Model INE 500	E.505.0595	09-10/04/2024	April 2025
			Sound Level Calibrator/ST-120	S/N ST120C0263E	21/12/2023	December 2024
		Temperature	Sound Level Calibrator/TENMARS TM-100	S/N 181203570	16/01/2024	January 2024
			Sound Level Meter/ACO TYPE 6226	S/N 130104	03/01/2024	February 2024
			Sound Level Meter/SCARLET ST-110	S/N 820878	03/01/2024	February 2024



TET

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ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์ (ต่อ)

Item	Description	Parameter	List of Equipment	Equipment No.	Calibration	Next Calibration
6.	Occupational Health and Safety	Leq 8 hr	Sound Level Calibrator/TENMARS TA-100	S/N 181203570	16/01/2023	January 2024
			Sound Level Calibrator/DIGICON TENMARS	S/N 180501628	16/08/2023	August 2024
			Integrated Sound Level/ACO TYPE 6236	S/N 112029	03/01/2024	February 2024
			Integrated Sound Level/ACO TYPE 6236	S/N 152077	03/01/2024	February 2024
			Integrated Sound Level/ACO TYPE 6236	S/N 152076	01/06/2024	June 2024
			Integrated Sound Level/ACO TYPE 6236	S/N 152077	01/06/2024	June 2024
		Noise Dose	Noise Dose Meter/SOUNDTEK ST-130	S/N 220100054	25/02/2023	February 2024
			Noise Dose Meter/SOUNDTEK ST-130	S/N 220100055	07/03/2023	March 2024
			Noise Dose Meter/SOUNDTEK ST-130	S/N 220100050	15/02/2024	February 2025
			Noise Dose Meter/SOUNDTEK ST-130	S/N 220100054	15/02/2024	February 2025
		Heat	Thermal Environment Monitor/JANTYTECH JT2011-E2A	S/N 3522210143	09-13/03/2023	March 2024
			Thermal Environment Monitor/JANTYTECH JT2011-E2A	S/N 3522210144	09-13/03/2023	March 2024



Thai Environmental Technic Limited
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THAI ENVIRONMENTAL TECHNIC LIMITED
บริษัท เทคโนโลยีสิ่งแวดล้อม จำกัด

CONTROL UNIT CALIBRATION

(Metric units , mm)

Date **14-Feb-23** Initial **758.3** Final **758.4** Average **758.35** mmHg
Barometric press, Pb

Dry Gas Meter Data
Console No. **M50-04** Serial No. **913428** Reference Dry Gas Meter Data
Metering System ID **S-110** Model **S-110**
DGM Number **8004294** Correction factor(Yr) **0.997**
DGM Model **SK 25** Last Calibration Data **30-May-22**

Orifices manometer/ setting ΔH mm H ₂ O	Ref . DMG Volume V _r Liters	DGM Volume V _m Liters	Temperature (° C)				Time min	DGM Correction factor (Y)	ΔH@ mm H ₂ O	
			Ref	Dry Gas Meter						T _m
				Inlet T _i	Outlet T _o	Avg				
15.00	100.00	100.22	28.00	28.00	28.00	28.50	8.19	0.9950	46.3628	
25.00	100.00	100.25	28.00	28.00	28.00	28.50	6.34	0.9978	46.3499	
50.00	100.00	99.98	28.00	28.00	28.00	28.50	4.49	0.9940	46.6060	
80.00	100.00	99.54	28.00	28.00	28.00	28.50	3.55	0.9955	46.7500	
100.00	100.00	99.25	28.00	28.00	28.00	28.50	3.17	0.9965	46.6862	
Average								0.9950	46.5510	
Dued Date of Calibrate									14-Feb-24	

Calibrated by Pyechol B
Approved : Pyechol B

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
Note: For ΔH₀, Orifice pressure differential this exposure is 0.756Pa (0.0212in.H₂O) at standard temperature and pressure, acceptable tolerance of individual values from the average is +0.3inches (3.1mm) H₂O.



THAI ENVIRONMENTAL TECHNIC LIMITED
บริษัท เทคโนโลยีสิ่งแวดล้อม จำกัด

CONTROL UNIT CALIBRATION

(Metric units , mm)

Date **14-Feb-23** Initial **758.40** Final **758.50** Average **758.45** mmHg
Barometric press, Pb

Dry Gas Meter Data
Console No. **M50-06** Serial No. **913428** Reference Dry Gas Meter Data
Metering System ID **S-110** Model **S-110**
DGM Number **604** Correction factor(Yr) **0.997**
DGM Model **SK25EX** Last Calibration Data **30-May-22**

Orifice manometer setting ΔH mm H ₂ O	Ref . DMG Volume V _r Liters	DGM Volume V _m Liters	Temperature (° C)				Time min	DGM Correction factor (Y)	ΔH@ mm H ₂ O
			Ref	Dry Gas Meter		Avg T _m			
				Inlet T _i	Outlet T _a				
15.00	100.00	99.97	27.00	27.00	28.00	27.50	8.19	0.9975	46.2024
25.00	100.00	99.85	27.00	27.00	28.00	27.50	6.34	0.9977	46.1896
50.00	100.00	99.82	27.00	27.00	28.00	27.50	4.49	0.9956	46.4448
80.00	100.00	100.20	27.00	27.00	28.00	27.50	3.55	0.9890	46.5882
100.00	100.00	100.40	27.00	27.00	28.00	27.50	3.17	0.9851	46.5246
Average								0.9930	46.3899
Dued Date of Calibrate									14-Feb-24

Calibrated by Pyechol B
Approved : Pyechol B

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
Note: For ΔH₀, Orifice pressure differential this exposure is 0.756Pa (0.0212in.H₂O) at standard temperature and pressure, acceptable tolerance of individual values from the average is +0.3inches (3.1mm) H₂O.



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
51/11 PATTANAKARN ROAD SOI 18, SUKHUMVIT, BANGKOK 10250
TEL. 0-2717-3006-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No.: 23T437
Page: 1 of 2

Equipment: Digital Thermometer With Sensor
Manufacturer: Olgison
Model: DP-92
Serial No.: L411635
ID No.: No 10
Condition As-Received: Used Item
Received Date: 17 February 2023
Calibration Date: 03 March 2023
References: 2302-0659DSC
Submitted by: Thai Environmental Technic Limited
1/5 Soi Ramkhamhaeng 145, Khwaeng/Khiet Saphan Sung,
Bangkok 10240

Procedure used: Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into liquid bath temperature controller and comparison with Standard Thermocouple (Type R/S) into high temperature furnace.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standards instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Black Slack Thermometer	1560	8C454	221616	23 May 2023
2) PRT Scanner Module	2562	A01303	221616	23 May 2023
3) Industrial PRT Probe	5827A	979442	221616	23 May 2023
4) Digital Thermometer	1529	A4B760	221039	09 Sep 2023
5) Industrial Platinum Resistance Thermometer	5627	824302	221069	09 Sep 2023
6) Digital Multimeter	2700	4016315	22E3264	05 Oct 2023
7) Thermocouple Type S	TCS	TCS-002	TT-0125-22	28 Oct 2023

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 Metrology Thailand (NIMT)

Calibrated by: Sithithon Poomai
Issue Date: 17 March 2023

Approved Signatory:
[] Chalchawan Khurpluek
[] Wanlop Larpkum

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Cert. No.: 23T437
Page: 2 of 2

Result of Calibration:- Without Adjustment
Function: Temperature measurement for Channel T1
This equipment was connected with Thermocouple Type K. S/N. 11005001 ID No. NO.10
Dimension of probe: Diameter 8 mm., Length 1030 mm. Sheath material: Stainless Steel

Immersion Depth (mm.)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (±°C)
180	200.0068	200.0	-0.0068	0.74
180	400.0035	399.8	-0.2035	1.4
150	600.02	600.1	0.0800	3.1

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD SOI 18, SUANLUANG, SUKULUANG, BANGKOK 10250
TEL: 0-2717-3006/24 FAX: 0-2719-9484



JAS-ANALYSIS
ACCREDITED
CALIBRATION BODY

Certificate of Calibration

Certificate No.: 23P1657
Page: 1 of 2

Equipment: Digital Barometer
Manufacturer: Lutron
Model: PHR-316
Serial No.: 5011410
ID No.: No.4
Condition As-Received: Used Item
Received Date: 24 May 2023
Calibration Date: 25 May 2023
Reference: 2305-0816/WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1008 mbar

Submitted by: Thai Environmental Technic Limited

116 Soi Rattikhamthong 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

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

Condition of this result of calibration

1. Reference standards instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard Barometer	DP142	1422505246	MP-0004-23	03 May 2024

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

3. Scale and conversion factor is 1 kPa = 7.50062 mmHg

4. This result of calibration instrument was in absolute pressure.

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

6. This result of calibration was calibrated while opening the plug to vent the atmospheric pressure.

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 through:

- National Institute of Metrology Thailand (NIMT)

Calibrated by: Sukon Khathuew
Issue Date: 26 May 2023

Approved Signatory: Attapol P.
() Phallina Praopachai
() Sura Suwanasri
✓ Attapol Panurach

R 0315718



Cert.No.: 23P1657
Page: 2 of 2

Result of calibration: Without adjustment
Function: Absolute Pressure Measurement
Range: 730 mmHg to 770 mmHg
Resolution: 0.1 mmHg

Increasing Pressure					
Applied Pressure (mmHg)	729.90	739.90	749.89	759.88	769.89
UUC* Indication (mmHg)	730.6	740.6	750.6	760.6	770.6
Error (mmHg)	0.70	0.70	0.71	0.71	0.71

Decreasing Pressure					
Applied Pressure (mmHg)	759.89	769.89	779.88	789.89	799.90
UUC* Indication (mmHg)	770.6	780.6	790.6	800.6	810.6
Error (mmHg)	0.71	0.71	0.71	0.70	0.70

The uncertainty of measurement was ± 0.23 mmHg

* 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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Attapol P.

R 1153290



TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Portable Gas Calibration Report

Manufacturer: E-instrumenta
Instrument Model: 56000-SDS
Instrument serial no.: 1339
Instrument ID: 11

Date of Calibration: 3-Jan-24
Ambient Condition
Temperature (23±5 °C): 25.0 °C
Humidity (55±15 % RH): 50.0 % RH
Barometer (mmHg): 759.4 mmHg

Standard gas References

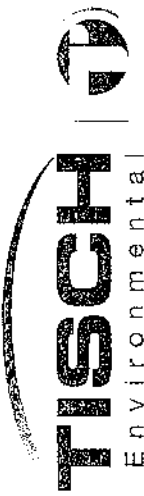
Standard gas	Cylinder No.	Traceability	Due date
Oxygen (O ₂)	36232	Linde	June 26, 2031
Nitric Oxide(NO)	D824463	Linde	June 5, 2026
	D824524	Linde	August 22, 2025
Nitrogen Dioxide(NO ₂)	CCS18873	Aligas	August 17, 2024
	CCS18878	Aligas	August 18, 2024
Sulfur Dioxide (SO ₂)	D824500	Linde	October 11, 2024
	D271305	Linde	October 11, 2024
Carbon Monoxide(CO)	D824500	Linde	October 11, 2024
	D271305	Linde	October 11, 2024

Calibration Results

Parameter	Standard gas	Reading	Actual Error	Test Limit	Result
O ₂ (%vol)	0.0	0.0	0.0	±0.2 % vol	PASS
	14.0	13.9	-0.1		
NO (ppm)	0.0	0.0	0.0		PASS
	198.0	197.0	-1.0		
	392.0	394.0	2.0		
NO ₂ (ppm)	0.0	0.0	0.0	±5.0 ppm 0...100	PASS
	40.1	40.0	-0.1	ppm ±5% measured	
	82.2	83.0	0.8	Value 101...5000	
SO ₂ (ppm)	0.0	0.0	0.0	ppm	PASS
	406.0	405.0	-1.0		
	804.0	802.0	-2.0		
CO (ppm)	0.0	0.0	0.0		PASS
	404.0	403.0	-1.0		
	793.0	792.0	-1.0		

Calibrate by: John, Approved by: Ramnat M

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 345 Klongsue/Khet Saphan Sung Bangkok 10540 Thailand
• Tel : +66(0)2373-7755(Auto) Fax : +66(0)2373-79 79 • admin@tet1995.com • www.tet1995.com



RECALIBRATION
DUE DATE:
September 21, 2023

Certificate of Calibration

Calibration Certification Information
Cal. Date: September 21, 2022 Rootsmeier S/N: 438320 Ta: 296 °K
Operator: Jim Tisch Pa: 748.3 mm Hg
Calibration Model #: TC-5025A Calibrator S/N: 0068

Run	Vol. Init (m3)	Vol. Final (m3)	AVol (m3)	ATime (min)	ΔP (mm Hg)	ΔH (in H ₂ O)
1	1	2	1	1.3760	3.2	2.01
2	3	4	1	0.9710	6.4	4.00
3	5	6	1	0.8730	8.0	5.00
4	7	8	1	0.8300	8.8	5.50
5	9	10	1	0.8870	12.7	8.01

Data Tabulation

Vstd (m3)	Qstd (b-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pa_{std}} \right) \left(\frac{T_{std}}{T_a} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pa_e} \right)}$ (y-axis)
0.9870	0.7173	1.4080	0.9957	0.7236	0.8895
0.9828	1.0121	1.9912	0.9914	1.0211	1.2579
0.9806	1.1233	2.2262	0.9893	1.1332	1.4054
0.9796	1.1802	2.3369	0.9882	1.1907	1.4750
0.9744	1.4184	2.8160	0.9830	1.4309	1.7789
QSTD	m= 2.01042 b= -0.03659		QA	m= 1.25839 b= -0.02312	
	r= 0.99996			r= 0.99996	

Calculations

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

Standard Conditions

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

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

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



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Technic
ITEM : TSP
Site ID : Bangkok
Serial No : (NO.37)
Date : 13-Jul-23
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Average Press. (mm Hg) : 750.6
Average Temp (°C) : 28.9
Corrected Pressure (mm Hg) : 760.0
Temperature (deg K) : 298.0
Corrected Average (mm Hg) :
Average Temp (Deg K) :

Calibration Orifice

Make : Tisch
Model : TB-5025A
Serial# : 0058
Qstd Slope : 2.01042
Qstd Intercept : -0.36590
Calibration Due Date : 21-Sep-23

Calibration Information

Plate or Test #	ORIFICE (in H ₂ O)	Qstd (m ³ /min)	Indicates (CFM)	IC (corrected)	Linear Regression Slope : 30.2397 Intercept : 0.2413 Corr. Coeff : 0.9875
1	12.50	1.341	50.0	57.00	
2	9.20	1.691	54.0	52.00	
3	7.20	1.517	50.0	48.00	
4	5.00	1.294	40.0	40.00	
5	3.00	1.044	30.0	30.00	

Calculations

$Q_{std} = 1/m[\sqrt{(Pa/Pstd)(Tstd/Ta)-b}]$
 $IC = [(\sqrt{(Pa/Pstd)(Tstd/Ta)-b})]$
 m = sampler slope
 b = sampler intercept
 I = chart response
 T_{av} = daily average temperature
 P_{av} = daily average pressure

Calibrate By : _____

Approve By : _____

$Q_{std} = 760$ mm Hg
For subsequent calculation of sampler flow:
 $1/m[(T)/\sqrt{(298/T_{av})(P_{av}/760)}]-b]$

NOTE: Ensure calibration orifice has been certified within 12 months of use



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Technic
ITEM : TSP
Site ID : Bangkok
Serial No : (NO.39)
Date : 5-Jul-23
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Average Press. (mm Hg) : 750.6
Average Temp (°C) : 28.9
Corrected Pressure (mm Hg) : 760.0
Temperature (deg K) : 298.0
Corrected Average (mm Hg) :
Average Temp (Deg K) :

Calibration Orifice

Make : Tisch
Model : TB-5025A
Serial# : 0068
Qstd Slope : 2.01042
Qstd Intercept : -0.36590
Calibration Due Date : 21-Sep-23

Calibration Information

Plate or Test #	ORIFICE (in H ₂ O)	Qstd (m ³ /min)	Indicates (CFM)	IC (corrected)	Linear Regression Slope : 29.4911 Intercept : 1.2135 Corr. Coeff : 0.9818
1	12.50	1.352	50.0	57.00	
2	9.20	1.691	54.0	52.00	
3	7.00	1.498	50.0	48.00	
4	5.00	1.294	40.0	40.00	
5	3.00	1.044	30.0	30.00	

Calculations

$Q_{std} = 1/m[\sqrt{(Pa/Pstd)(Tstd/Ta)-b}]$
 $IC = [(\sqrt{(Pa/Pstd)(Tstd/Ta)-b})]$
 m = sampler slope
 b = sampler intercept
 I = chart response
 T_{av} = daily average temperature
 P_{av} = daily average pressure

Calibrate By : _____

Approve By : _____

$Q_{std} = 760$ mm Hg
For subsequent calculation of sampler flow:
 $1/m[(T)/\sqrt{(298/T_{av})(P_{av}/760)}]-b]$

NOTE: Ensure calibration orifice has been certified within 12 months of use



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High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : TSP
Site ID : Bangkok
Serial No : (NO. 40)
Date : 5-Jul-23
Calibrate By : Papat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 29.0
Corrected Pressure (mm Hg) : 760.0
Corrected Temperature (deg K) : 298.0
Average Press. (mm Hg) : 750.6
Average Temp (°C) : 28.9
Average Temp (deg K) : 302.0

Calibration Orifice

Make : Tiach
Model : TB-5025A
Serial# : 0068
Qstd Slope : 2.01042
Qstd Intercept : -0.36590
Calibration Due Date : 21-Sep-23

Calibration Information

Plate or Test #	ORIFICE (in H ₂ O)	Qstd (m ³ /min)	Indicate (CFM)	IC (corrected)	Linear Regression
1	12.20	1.962	40.0	57.00	Slope : 29.4911
2	9.20	1.691	54.0	52.00	Intercept : 1.2335
3	7.00	1.498	50.0	48.00	Corr. Coeff : 0.9818
4	5.00	1.294	40.0	40.00	
5	3.00	1.044	30.0	30.00	

Calculations

$$Q_{std} = 1/m(\sqrt{Pa/Pstd})(T_{std}/T_a)^{1/4} - b$$
$$IC = [1/(\sqrt{Pa/Pstd})(T_{std}/T_a)] - b$$

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m(I)(\sqrt{298/T_a})(P_{av}/760)^{1/4} - b$$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : Papat

Approve By : Papat



Thai Environmental Technic Limited
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High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : PM10
Site ID : Bangkok
Serial No : (NO. 20)
Date : 13-Jul-23
Calibrate By : Papat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 29.0
Corrected Pressure (mm Hg) : 760.0
Corrected Temperature (deg K) : 302.0
Average Press. (mm Hg) : 750.6
Average Temp (°C) : 29.3
Average Temp (deg K) : 302.5

Calibration Orifice

Make : Tiach
Model : TB-5025A
Serial# : 0068
Qstd Slope : 2.01042
Qstd Intercept : -0.03659
Calibration Due Date : 21-Sep-23

Calibration Information

Plate or Test #	ORIFICE (in H ₂ O)	Qstd (m ³ /min)	Indicate (CFM)	IC (corrected)	Linear Regression
1	12.20	1.756	60.0	60.00	Slope : 34.6244
2	9.20	1.527	54.0	54.00	Intercept : 0.7804
3	7.20	1.353	50.0	50.00	Corr. Coeff : 0.9913
4	5.00	1.100	40.0	40.00	
5	3.00	0.860	30.0	30.00	

Calculations

$$Q_{std} = 1/m(\sqrt{Pa/Pstd})(T_{std}/T_a)^{1/4} - b$$
$$IC = [1/(\sqrt{Pa/Pstd})(T_{std}/T_a)] - b$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m(I)(\sqrt{298/T_a})(P_{av}/760)^{1/4} - b$$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : Papat

Approve By : Papat



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : PM10
Site ID : Bangkok
Serial No : (No. 25)
Date : 11-Jul-23
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 28.0
Corrected Pressure (mm Hg) : 760.0
Average Press. (mm Hg) : 750.8
Corrected Average (mm Hg) : 750.0
Average Temp (°C) : 28.2
Average Temp (Deg K) : 30.0

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 2.01042
Qstd Intercept : -0.03659
Calibration Due Date : 21-Sep-23

Calibration Information

Plate or Test #	ORIFICE (in H ₂ O)	Qstd (m ³ /min)	Indicate (CFM)	IC (corrected)	Linear Regression
1	12.00	1.741	60.0	60.00	Slope : 35.3007
2	9.00	1.510	54.0	54.00	Intercept : 0.2307
3	7.00	1.334	50.0	50.00	Corr. Coeff : 0.9894
4	5.00	1.130	40.0	40.00	
5	3.00	0.860	30.0	30.00	
					# of Observations: 5

Calculations

$$Q_{std} = 1/m[\text{Sqrt}((120)(P_a/P_{std})(T_{std}/T_a)) - b]$$
$$IC = [(\text{Sqrt}(P_a/P_{std})(T_{std}/T_a)) - b]$$

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response

m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m[(1)(\text{Sqrt}(298/T_a)(P_a/P_{std})) - b]$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : _____

Approve By : _____

m = sampler slope
b = sampler intercept
I = chart response
Ta = daily average temperature
Pa = daily average pressure



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : PM10
Site ID : Bangkok
Serial No : (No. 32)
Date : 11-Jul-23
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 28.0
Corrected Pressure (mm Hg) : 760.0
Average Press. (mm Hg) : 750.8
Corrected Average (mm Hg) : 750.0
Average Temp (°C) : 28.6
Average Temp (Deg K) : 30.0

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 2.01042
Qstd Intercept : -0.03659
Calibration Due Date : 21-Sep-23

Calibration Information

Plate or Test #	ORIFICE (in H ₂ O)	Qstd (m ³ /min)	Indicate (CFM)	IC (corrected)	Linear Regression
1	12.00	1.741	60.0	60.00	Slope : 30.6651
2	9.00	1.543	55.0	55.00	Intercept : 4.2303
3	7.00	1.353	50.0	50.00	Corr. Coeff : 0.9278
4	5.00	1.130	40.0	40.00	
5	3.00	0.860	30.0	30.00	
					# of Observations: 5

Calculations

$$Q_{std} = 1/m[\text{Sqrt}((120)(P_a/P_{std})(T_{std}/T_a)) - b]$$
$$IC = [(\text{Sqrt}(P_a/P_{std})(T_{std}/T_a)) - b]$$

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response

m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m[(1)(\text{Sqrt}(298/T_a)(P_a/P_{std})) - b]$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : _____

Approve By : _____

m = sampler slope
b = sampler intercept
I = chart response
Ta = daily average temperature
Pa = daily average pressure



TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

THE LINDE GROUP

Linde

Certificate of Analysis

Special Gases Mixture

Customer Details

Name: Thai Environmental Technic Limited
Address: 176 Soi Rattana Thani 45/5 Saphan Song, Bangkok 10400
Customer Ref No: 176

Certificate Details

Number: 1734/23
Date of Issue: 5 Jul 2016
Expiry Date: 5 Jul 2016
Material Details: 90178560
Production Order: 940300-SL-44
Gas Content: 5.520 M%
Cylinder Owner: UNOC
Cylinder No: 609175
Valve: GSA 60.55
Cylinder Size: 40
Cylinder Life: 10

Laboratory Report

Component: Nitric Oxide
Other NOx Impurity: In Nitrogen
Normal Concentration: 40.0 ppm
Analysis Result: 40.5 ppm
Uncertainty: ± 0.5 ppm
Method of Analysis: (6) 182357
Reference Standard: Nitric Oxide in Nitrogen
Reference Standard Used in Analysis: Cylindric mixture
Concentration: 7500 ppm
Batch No: 182357
Expiry Date: 31 Jun 2016

Instrument/Make/Model: FTIR Spectrometer Nicolet 550
Analytical Instrument Used in Analysis: FTIR Spectrometer Nicolet 550

Recommended Usage Condition: 5% of actual concentration before comparison with the certificate
Storage Condition: Keep in cool, dry place and avoid direct sunlight

Comments: When receiving please note this certificate number

Note: This certificate is valid for the period of 12 months from the date of issue. It is not valid for use after this period. The certificate is not valid for use if the gas content is not within the specified range. The certificate is not valid for use if the gas content is not within the specified range.

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016

Signature: [Signature]
Date: 5 Jul 2016



TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

NOx Analyzer Calibration Report

Calibrate Date: 9-Nov-23
Analyzer Type: NOx
Brand: API
Model: 200 A
Serial Number: 80 (Rev. 7)
Range: 500 ppb

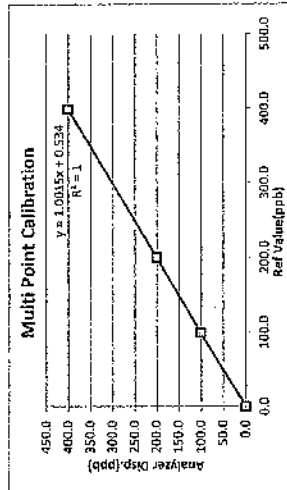
Temperature (°C): 25°C
Barometer (mmHg): 759.9
Humidity (50±15 %): 50.0%RH
Dilutor: API M700 S/N 625
Zero Air: API M701 S/N 1926
Standard gas: 300917 SX

Calibration of Span

Supply Gas	Ref Value (ppb)	Before of Span (ppb)			After of Span (ppb)			% diff of Span
		NOx	NO	NO ₂	NOx	NO	NO ₂	
Zero	0.0	1.2	1.1	0.1	0.0	0.0	0.0	0.0
Span	400.0	395.0	394.0	-1.0	400.0	400.0	0.0	0.0

Multi Point Calibration

Ref Value (ppb)	Analyzer Disp. (ppb)			Output Difference		
	NOx	NO	NO ₂	Diff (ppb)	% Diff	Ave. (%) Diff
0.0	0.1	0.1	0.0	0.09	0.000	0.023
100.0	101.2	101.3	-0.1	1.30	0.013	1.30
200.0	201.3	200.8	0.5	0.80	0.004	0.40
400.0	401.0	401.0	0.0	1.00	0.003	0.25
Average Diff (%)						0.49



Calibrate by: [Signature]
Approved by: [Signature]

วันที่พิมพ์: 09

วันที่รับใช้: 02/09/15

เลขที่ใบพิมพ์: QF-QP16-06

Thai Environmental Technic Limited 176 Soi Rattana Thani 45/5 Saphan Song Bangkok 10400 Thailand
Tel: +6602373-7797 Fax: +6602373-7779 • admin@tet1995.com • www.tet1995.com



Thai Environmental Technic Limited

บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

NOx Analyzer Calibration Report

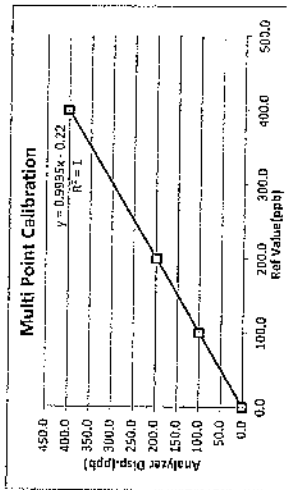
Calibrate Date : 7-Nov-23
Analyzer Type : NOx
Brand : API
Model : 200 A
Serial Number : 777 (No. 25)
Range : 500 ppb
Temperature (°C) : 25°C
Barometer (mmHg) : 759.9
Humidity (50±15%) : 50.0±8RH
Diluter : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A06917 SK

Calibration of Span

Supply Gas	Ref Value(ppb)	Before of Span (ppb)			After of Span (ppb)			% diff of Span
		NOx	NO	NO ₂	NOx	NO	NO ₂	
Zero	0.0	0.8	0.2	0.6	0.0	0.0	0.0	0.0
Span	400.0	385.0	388.0	391.0	400.0	400.0	400.0	0.0

Multi Point Calibration

Ref Value(ppb)	Analyzer Disp.(ppb)			Output Difference		
	NOx	NO	NO ₂	Diff(ppb)	% Diff	Abs (%) Diff
0.0	0.4	0.3	0.1	0.30	0.001	0.08
100.0	100.3	100.1	0.2	0.10	0.001	0.10
200.0	198.7	198.1	0.6	-1.90	-0.010	0.95
400.0	400.8	400.3	0.5	0.30	0.001	0.08
Average Diff (%)						0.30



Calibrate by:

Approved by:

แก้ไขครั้งที่ : 00

วันที่อนุมัติ : 02/09/15

เลขที่แบบฟอร์ม : QP-QP16-06

Thai Environmental Technic Limited 1/6 Soi Sukhumvit 145 Khwaeng/Phat Sathu Sai, Bangkok 10140 Thailand
• Tel : +66(0)2373-7799 • Fax : +66(0)2373-7999 • Admin@tecs885.com • www.tecs885.com



Thai Environmental Technic Limited

บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

NOx Analyzer Calibration Report

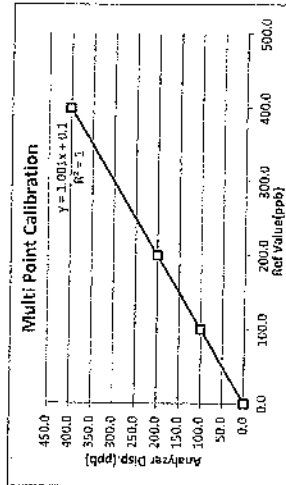
Calibrate Date : 9-Nov-23
Analyzer Type : NOx
Brand : API
Model : 200 E
Serial Number : 731 (No. 28)
Range : 500 ppb
Temperature (°C) : 25°C
Barometer (mmHg) : 759.0
Humidity (50±15%) : 50.0±8RH
Diluter : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A06917 SK

Calibration of Span

Supply Gas	Ref Value(ppb)	Before of Span (ppb)			After of Span (ppb)			% diff of Span
		NOx	NO	NO ₂	NOx	NO	NO ₂	
Zero	0.0	0.7	0.5	0.2	0.0	0.0	0.0	0.0
Span	400.0	388.0	382.0	6.0	400.0	400.0	0.0	0.0

Multi Point Calibration

Ref Value(ppb)	Analyzer Disp.(ppb)			Output Difference		
	NOx	NO	NO ₂	Diff(ppb)	% Diff	Abs (%) Diff
0.0	0.1	0.3	0.0	0.10	0.000	0.03
100.0	100.9	100.2	0.7	0.20	0.002	0.20
200.0	200.8	200.3	0.5	0.30	0.002	0.15
400.0	400.8	400.5	0.3	0.50	0.001	0.13
Average Diff (%)						0.13



Calibrate by:

Approved by:

แก้ไขครั้งที่ : 00

วันที่อนุมัติ : 02/09/15

เลขที่แบบฟอร์ม : QP-QP16-06

Thai Environmental Technic Limited 1/6 Soi Sukhumvit 145 Khwaeng/Phat Sathu Sai, Bangkok 10140 Thailand
• Tel : +66(0)2373-7799 • Fax : +66(0)2373-7999 • Admin@tecs885.com • www.tecs885.com



Certificate of Analysis
Special Gases Mixture

Customer Details
Name: Thai Environmental Technic Limited
Address: 1/6 Soi Ramkhamhaeng 45, Saphan Song, Khet Saphan Song, Bangkok 10240
Customer Tag No.:

Certificate Details
Number: 25007/23
Date of Issue: 18-Sep-2023
Expiry date: 18-Sep-2027
Material Details
Production Order: 70179846
Material Code: 608400-SK-44
Cylinder No: D636157
Gas content: 5.520 M³
Filling pressure: 145 bar
Valve: CGA 660 55
Cylinder Owner: LINDE
Cylinder Material: Spectro seal
Cylinder Size: 40 L

Laboratory Report

Component	Nominal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide In Nitrogen	40.0 ppm	41.7 ppm	± 1% relative	(6) 148-352	8-Sep-18-Sep-23

Reference Standard used in Assay
Reference Standard Sulphur Dioxide In Nitrogen
Cylinder number 80C1506295G
Concentration 25.35 ± 0.25 ppm
Expiry date: 9-Jun-2024

Instrument/Make/Model
FIR Spectrometers Nicolet 550
Analytical Principle
FIR-SO2
Last Multipoint Calibration
6-Sep-2023

Recommended usage condition
Minimum utilization: 5% of actual content or before expiry date whichever comes first.
Storage condition: Keep in well ventilation and secure area.
Comments

When reordering, please quote the material number

Notes:
1. All results expressed in this report are on mole/fraction basis, unless otherwise specified. The Assay at Linde has been performed in accordance with the EPA Method 100/2-12-731 for the Assay and Certification of Gaseous Calibration Standards using procedure G3.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
3. The uncertainty of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognized national and industry standards.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyser, (3) Electrochemical Oxygen Analyser, (4) Electrochemical Moisture Analyser, (5) Total Hydrocarbon Analyser, (6) Other - specified

Signature
Sukanya Panyasontorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.
PG 002/7006
18/01/2023

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)
155 ถนนสุขุมวิท ชั้น 15 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
โทรศัพท์ (662) 254-4000 โทรสาร (662) 254-4001
โทรสาร (662) 254-4002 โทรสาร (662) 254-4003



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

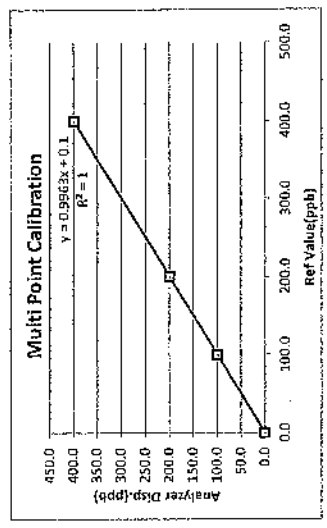
Calibrate Date: 7-Nov-23
Analyzer Type: SC2
Brand: API
Model: 100 E
Serial Number: 139 (No. 1)
Range: 500 ppb
Temperature (°C): 25°C
Barometer (mmHg): 760.0
Humidity (50±15 %): 50.0 %RH
Dilutor: APC M700 S/N 625
Zero Air: API M701 S/N 1926
Standard gas: D636157

Calibration of Span

Supply Gas	Ref Value(ppb)	Before of Span(ppb)	After of Span(ppb)	Abs% diff of Span
Zero	0.0	3.0	0.0	0.0
Span	400.0	413.0	400.0	0.0

Multi Point Calibration

Ref Value(ppb)	Analyzer Disp(ppb)	Diff(ppb)	Percent Diff	Abs Percent Diff
0.0	0.3	0.3	0.00	0.00
100.0	99.5	-0.5	-0.01	0.50
200.0	199.3	-0.7	0.00	0.35
400.0	398.7	-1.3	0.00	0.33
Average Diff (%)				0.31



Calibrate by: [Signature]
Approved by: [Signature]

วันที่ตรวจ : 00
วันที่อนุมัติ : 02/09/15
วันที่รับใบมอบ : QF-QP16-06
Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 45 Saphan Song Bangkok 10240 Thailand
Tel : +66(0)2373-7709(Auto) Fax : +66(0)2373-7799 • email: tet@tet1995.com • www.tet1995.com



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

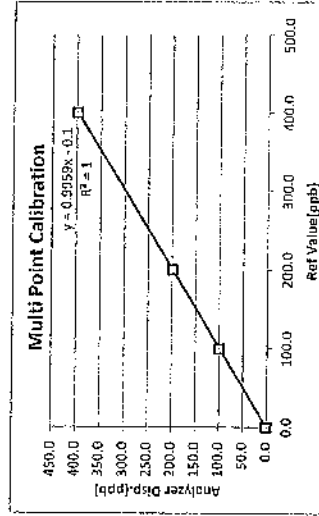
Calibrate Date : 6-Nov-23
Analyzer Type : SO₂
Brand : Thetwo
Model : 43C
Serial Number : 43C-TL-67266366 (No. 9)
Range : 500 ppb
Temperature (°C) : 25°C
Barometer (mmHg) : 760.0
Humidity (50±15 %) : 50.0 %RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : D636157

Calibration of Span

Supply Gas	Ref Value(ppb)	Before of Span(ppb)	After of Span(ppb)	Abs% diff of Span
Zero	0.0	2.1	0.0	0.0
Span	400.0	395.0	400.0	0.0

Multi Point Calibration

Ref Value(ppb)	Analyzer Disp(ppb)	Output Difference		
		Diff (ppb)	Percent Diff	Abs Percent Diff
0.0	0.3	0.3	0.00	0.08
100.0	99.2	-0.8	-0.01	0.80
200.0	198.7	-1.3	-0.01	0.65
400.0	398.5	-1.5	0.00	0.38
Average Diff (%)				0.48



Calibrate by: [Signature] Approved by: [Signature]

แก้ไขครั้งที่ : 00 วันที่อนุมัติ : 02/09/15 ภาาที่กาศาณังกรม : QP-QP16-06



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

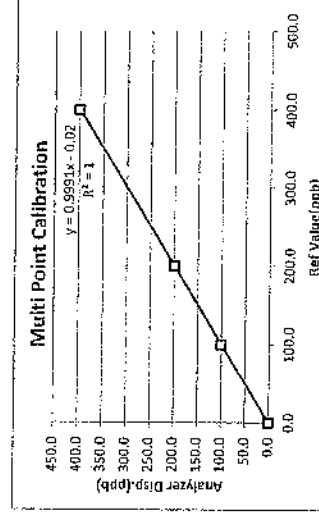
Calibrate Date : 7-Nov-23
Analyzer Type : SO₂
Brand : API
Model : 100E
Serial Number : 383 (No. 12)
Range : 500 Ppb
Temperature (°C) : 25°C
Barometer (mmHg) : 760.0
Humidity (50±15 %) : 50.0 %RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : D636157

Calibration of Span

Supply Gas	Ref Value(ppb)	Before of Span(ppb)	After of Span(ppb)	Abs% diff of Span
Zero	0.0	2.1	0.0	0.0
Span	400.0	399.0	400.0	0.0

Multi Point Calibration

Ref Value(ppb)	Analyzer Disp(ppb)	Output Difference		
		Diff (ppb)	Percent Diff	Abs Percent Diff
0.0	0.2	0.2	0.00	0.05
100.0	99.8	-0.2	0.00	0.20
200.0	199.5	-0.5	0.00	0.25
400.0	399.8	-0.2	0.00	0.05
Average Diff (%)				0.14



Calibrate by: [Signature] Approved by: [Signature]

แก้ไขครั้งที่ : 00 วันที่อนุมัติ : 02/09/15 เลขที่แบบฟอร์ม : QP-QP16-06

THAI METEOROLOGICAL DEPARTMENT



4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 20 November, 2023

Certification No. 411/23

Page : 1 of 2

Object : Wind speed and wind direction
 Manufacturer : Davis Instruments Inc.
 Type : Vantage VUE Model No. : #6251EU
 ID No. : No.35
 Serial No. : Display MT220822047 Transmitter MT231004046
 Customer : Thai Environmental Technic Limited,
 1/6 Soi Ramkhamhaeng 145,
 Khwaeng/Khet Saphan Sung, Bangkok 10240.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1016.0 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563
 : HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0900.0000 serial 9023
 N.I.S.T. Test Reference Number 731/21480 : Standard Velocity at 20 - 30 m/sec
 : Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
 Serial Number 110730029 (sensor 120629586)
 JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0.20 m/sec



Calibrated by : *Wicharnapol Subwat*
 Mr. Wicharnapol Subwat
 Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 411/23

20 November, 2023

Page : 2 of 2

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425		TESTED ANEMOMETER	
	Pressure mbar H2O	Velocity m/sec H2O	Velocity m/sec	Correction m/sec
1.00	-	-	0.9	0.10
3.02	-	-	2.7	0.32
5.00	-	-	4.9	0.10
7.00	-	-	6.8	0.20
9.02	-	-	9.0	0.02
11.01	-	-	10.8	0.21
13.01	-	-	13.0	0.01
15.01	-	-	15.0	0.01
17.02	-	-	17.0	0.02
20.02	-	-	20.0	0.02

Wind Aloft Plotting Board, U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : *Wicharnapol Subwat*
 Mr. Wicharnapol Subwat
 Mechanical Engineer





Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Personal Pump Calibration Report

Equipment Type	:	Personal Pump/Parameter
Equipment Range	:	0.1-7.0 l/min
Calibration Range	:	0.1-4.0 l/min
Calibration Type	:	Drycal
Calibration S/N	:	DC-L-342

[illegible]

Calibration Date 12 / 01 / 67

Calibration By *J. J. Calabrese*

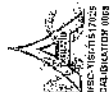
Remark : Uncertainty Type A = $\sigma_{\bar{x}}$ SD

\bar{X} : Mean
 \sqrt{n} : Standard deviation
SD :

-]-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
854/4 PATTANAKARN ROAD SOI 14, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9481



Cert.No.: 23MM161
Page.: 1 of 3

Certificate of Calibration

Equipment :	Electronic Balance
Manufacturer :	Mettler Toledo
Model :	XP205DR
Serial No. :	1129273885
ID No. :	

Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
KhwaengKhet Saphan Sung,
Bangkok 10240

Location : Balance Room

Received order : 10 April 2023

Calibration Date : 11 April 2023

Ambient Temperature : 15 °C to 40 °C

Relative Humidity : 30 % to 90 %

Calibrated by: Khit Ruttanaprapachai

Approved by: _____
Approved Signatory

() Pomhippa Tamayakul
(✓) Matee Butkruea
() Suwit [mai]

Issue Date : 25 April 2023

The uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written

Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0053465



Equipment: Electronic Balance
Condition As-Received: Used Item
Reference: 2304-01460C-13

Cert.No.: 23MM161
Page: 2 of 3

Procedure used :-

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

Condition of this result of calibration

1. Reference standard instruments:-
Instruments Model Serial No. ID No. Test report No. Due date
1) Standard Weight Set (E2) 15934 24053 70RC007 MM-0010-22 20 Jan 2024
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on request at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

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

Range capacity :		0 g to 81 g	81 g to 220 g	220 g
Resolution		0.0001 g	0.0001 g	0.0001 g
Before Adjustment :				
Applied Weight (g)	Balance Reading (g)			
	Uncertainty (± mg)			
80	79.99946			
200	199.9984			
After Adjustment :				
Applied Weight (g)	Balance Reading (g)			
	Uncertainty (± mg)			
80	79.99946			
200	199.9984			

1. Determination of the standard deviation of weighing machine

Applied Weight (g)	Standard Deviation of Reading (g)
80	0.000023
200	0.000028

Wudu

a 1158497



Equipment: Electronic Balance
Condition As-Received: Used Item
Reference: 2304-01460C-13

Cert.No.: 23MM161
Page: 3 of 3

Result of calibration

2. Effect of off-center loading

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

Position 1 (g)	Position 2 (g)	Position 3 (g)	Position 4 (g)	Position 5 (g)
-0.0001	-0.0001	-0.0002	-0.0001	0.0000

3. Departure from nominal value

Applied Weight (g)	Balance		Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
	Reading (g)	Uncertainty (± mg)			
Unload	0.00000	0.039	0.00000	0.039	2.28
0.01	0.01000	0.039	0.00000	0.039	2.28
0.05	0.05000	0.039	0.00000	0.039	2.28
1	1.00001	0.040	-0.00001	0.040	2.23
2	2.00001	0.040	-0.00001	0.040	2.23
5	5.00001	0.042	-0.00001	0.042	2.17
10	10.00001	0.045	-0.00001	0.045	2.13
20	20.00001	0.051	-0.00001	0.051	2.06
50	49.99998	0.085	+0.00002	0.085	2.00
80	80.00002	0.15	-0.00002	0.15	2.00
200	199.9999	0.30	+0.0001	0.30	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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Wudu

a 1158496



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
(CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES)
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG SUANLUANG BANGKOK 10250
TEL 0-31733062-9 FAX 0-31710401



Cert.No.: 23CHO644
Page: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Horiba
Model : LAQUA-PH1300
Serial No. : B08D0012
ID No. : Ins-LAB-026
Condition As-Received : Used Item
Received Date : 31 October 2023
Calibration Date : 01 November 2023
Reference : 2310-0843OC-7
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khwaeng Saphan Sung,
Bangkok 10240
Laboratory (Thai Environment Technic Limited)
(25.4 - 24.2) °C
(69.3 - 66.7) %
In - house method :
- CP-0CH2 by direct measurement with standard
voltage calibrator and direct measurement
with certified reference material (CRM)
Calibrated by : Khit Rutanaprapachai
Approved by :
(✓) Salitip Meangmai
() Warakorn Lenggrakul
() Porpan Paipim
Issue Date : 10 November 2023

The Uncertainties are for a confidence probability of approximately 95%

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

A 0060438



Cert.No.: 23CHO644
Page: 2 of 2

Condition of this calibration result

1. Reference Standard Instrument :-
Instrument Serial No. ID No. Cert. No. Due Date
1) Document Process Calibrator 43100066 130RC092 23E1204 10 Apr 2024
2) Digital Thermometer 130RC018 23T1585 13 Sep 2024
This certification is traceable to the International System of Unit maintained through:-
- Technology Promotion Association (Thailand - Japan)
2. Certified Reference Materials : The measurement results are traceable to SI through CPA client Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1836
Buffer Solution Manufacturer Lot No. Exp. Date
pH 1.679 CPA chem B23319 20 Jun 2024
pH 4.008 CPA chem 931958 01 Oct 2025
pH 6.865 CPA chem 788986 01 Jan 2024
pH 9.181 CPA chem 931960 01 Oct 2024
*pH 12.45 Hach Lange GmbH C02902 19 Nov 2023
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 (1.7,4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input		Actual Reading	Uncertainty of Measurement (±mV)	Coverage factor k
		pH	mV			
pH Meter S/N: B06D0012	1.680	314.73	314.7	1.680	0.058	2.00
	4.000	177.48	177.4	4.000	0.058	2.00
	6.860	8.28	8.3	6.860	0.058	2.00
	7.000	0.00	0.0	7.000	0.058	2.00
	9.180	-128.97	-129.0	9.180	0.058	2.00
	10.000	-177.48	-177.4	10.000	0.058	2.00

Function : pH Measurement

Performing four buffers standard curve by using buffer nominal pH (1.7,4,7,9)

Unit Under Calibration	Standard Buffer Solution	Actual pH Reading		Uncertainty of pH measurement (±)	Coverage factor k
		Actual pH Reading (mV)	Actual pH Reading (mV)		
pH Electrode S/N: 9X3D0637	1.679	1.686	290.3	0.0071	2.13
	4.008	3.992	159.1	0.0089	2.25
	6.865	6.845	-10.1	0.016	2.20
	9.181	9.138	-143.9	0.014	2.00
	12.45	12.427	-335.9	0.056	2.00

Remark: * : Not NSQ-ONSC Accredited

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

-000-

Salitip

a 1188741



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert.No.: 24MM272
Page.: 1 of 3

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : AB204
Serial No. : 1116392227
ID No. : Ine-LAB-033
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Location : Balance Room
Received order : 09 April 2024
Calibration Date : 10 April 2024
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 90 %

Calibrated by : Khil Ruttanapreapheal

Approved by :
Approved Signatory

() Ponpan Paipim
() Suwit Injal
(✓) Kunchit Promprat

Issue Date : 12 April 2024

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2404-0113OC-14
Page: 2 of 3
Cert.No.: 24MM272

Procedure used :-

Calibration were conducted using In-house calibration procedure CP-OB01 based on UKAS LAB 14 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

- 1) Standard Weight Set (E2) 15884
70RC138 MM-0020-23 30 Jan 2025
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by External Calibration

Range capacity : 0 g to 210 g Resolution 0.0001 g

Before Adjustment :

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement	
			Uncertainty (± mg)	Coverage Factor (k)
100	100.0000	0.0000	0.19	2
200	200.0001	-0.0001	0.30	2

After Adjustment :

1. Determination of the standard deviation of weighing machine			(n = 10)	
Applied Weight (g)			Standard Deviation of Reading (g)	
100	100		0.00007	
200	200		0.00008	



Equipment : Electronic Balance
Condition As-Received :
Reference : 2404-01130C-14

Result of calibration

2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.

The weighing machine reading error obtained is given in the table

Position 1	Position 2	Position 3	Position 4	Position 5	Maximum difference between off-center and central loading (g)
(g)	(g)	(g)	(g)	(g)	(g)
0.0000	+0.0001	0.0000	+0.0001	+0.0003	0.0003

3. Departure from nominal value

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (\pm mg)	Coverage Factor (k)
Unload	0.0000	0.0000	0.14	2.11
0.01	0.0101	-0.0001	0.14	2.11
0.1	0.1001	-0.0001	0.14	2.11
0.5	0.5002	-0.0002	0.14	2.11
1	1.0002	-0.0002	0.14	2.11
5	5.0000	0.0000	0.14	2.11
10	10.0001	-0.0001	0.14	2.11
25	25.0000	0.0000	0.15	2.07
50	49.9999	+0.0001	0.15	2.06
100	100.0002	-0.0002	0.19	2
200	200.0002	-0.0002	0.30	2

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 %.

-0.00-




TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES : EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKULPORN ROAD SOI 18, SUANLUANG, SUANLUANG 10550
TEL. 0-2717 3000-29 FAX. 0-2719-9481



CERTIFICATE OF CALIBRATION
CALIBRATION NO.

Cert. No.: 23TM704
Page: 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : Accuplus
Model : I250-DS
Serial No. : 2055-1017-0029
ID No. : LAB BOD 06
Submitted by : Thai Environmental Technic Limited
1/6 Soi Rangkhamhaeng 145,
Kwaeng/Khat Saphan Suiy,
Bangkok 10240
Location : Laboratory (Thai Environmental Technic Limited)
Received Order : 29 June 2023
Calibration Date : 29 June 2023
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
Calibrated by : Suwit Inpiel
Approved by : 
() Pannhippa Tameyakul
() Malee Butiruea

Issue Date : 5 July 2023

The Uncertainties are for a confidence probability of approximately 95 %

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

A 0053593



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
554/4 PATTANAKARN RD.11 SOI 18, SUANLUANG, SUANLUANG DISTRICT, 10250
TEL. 0-2717-3000-39 FAX. 0-2717-64584



Cert.No.: 23CHO493
Page: 1 of 3

Certificate of Calibration

Equipment : Spectrophotometer

Manufacturer : Perkin Elmer

Model : Lambda 365

Serial No. : 365K0042609

ID No. : -

Condition As-Received:

Received Date : 18 August 2023

Calibration Date : 18 August 2023

Reference : 2308-0469OC-1

Submitted by :
Thai Environmental Technic Limited
1/8 Soi Rangkhamhaeng 145,
KhwaengKhet Saphan Sung,
Bangkok 10240

Calibration Place :
Laboratory (Thai Environment Technic Limited)

Ambient Temperature : (25.5 - 25.3) °C (On-Site)

Relative Humidity : (57.8 - 60.6) % (On-Site)

Calibration Procedure : In - house method :

CP-QCHA based on ASTM E 275-01

Calibrated by : Kunchit Promprut

Approved by :

(✓) Sathip Meangmai
() Warakorn Jerngagratkul
() Porpan Paipim

Issue Date : 22 August 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written

Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Cert. No. : 23CHO493
Page : 2 of 3

Condition of calibration result

1. Reference Standard Material :

Material	Serial No.	Certificate No.	Due date
1. Absorbance Standard set	8331	105939	28 Sep 2024
2. Wavelength Standard set	8417	100498	25 Mar 2024
3. Wavelength Standard set	8418	100499	25 Mar 2024
4. Stray Light Standard set	8419	108963	01 Feb 2025

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

4. Spectral Bandwidth : 1 nm
Scan Speed : 30 nm/min

Calibration Results : without adjustment

Wavelength Accuracy

Certified Values of Reference Material (nm)	UUC Reading (nm)	Uncertainty of Measurement (± nm)	Coverage Factor k
418.53	418.54	0.12	2.00
536.52	536.13	0.12	2.00
638.00	637.64	0.14	2.03
684.50	684.49	0.13	2.00
879.41	879.42	0.12	2.00

Sathip

A 0057186

A 1176586



Cert. No.: 23CHO493

Page: 3 of 3

Calibration Results : without adjustment
Photometric Accuracy

Wavelength (nm)	Certified Values of Reference Material (Abs)	UUC Reading (Abs)	Uncertainty of Measurement (±Abs)	Coverage Factor k
420.0	Zero	0.0000	0.0028	2.00
	0.5712	0.5689	0.0031	2.00
	0.7510	0.7494	0.0031	2.00
	1.0883	1.0877	0.0033	2.00
546.1	Zero	-0.0001	0.0028	2.00
	0.5224	0.5209	0.0028	2.00
	0.8858	0.8839	0.0028	2.00
	0.9837	0.9821	0.0028	2.00
635.0	Zero	-0.0001	0.0028	2.00
	0.5397	0.5375	0.0028	2.00
	0.8832	0.8810	0.0028	2.00
	0.9886	0.9861	0.0028	2.00

Stray Light

* Straylight at 260.74 nm ± 0.11 nm	Reading at 260.74 nm ± 0.11 nm
Abs	2.0488
%T	0.8951

Remark

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer
- The Potassium Dichromate filled cells are measured against a Potassium acid blank.
- Cut-off wavelength of stray light reference material (Potassium Iodide) at wavelength 260.74 nm ± 0.11 nm
- Result = Pass, if Absorbance > 2.00 Abs and Transmission < 1.0 %T at Wavelength 260.74 nm ± 0.11 nm
- * : Not NSC-ONSC Accredited

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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a 1176585

FSR1223

MAINTENANCE REPORT
OPTIMA 8000

Customer : บริษัท เทคโนโลยีสิ่งแวดล้อม
จำกัด
Address : 1/6 ถนนพหลโยธิน 145,
แขวงจตุจักร, เขตจตุจักร,
กรุงเทพมหานคร 10240 TH
User Name: คุณ ชัยพร
Phone: 02-3737799, 081-1303495
E-mail: Keisarin.Chuayphan@eurothasiasia.co
Date Tested: March 28, 2024
Recommendation Recertification
Period 6 Months
Recertification Due: September 27, 2567
Date Last Certified: September 29, 2023
Visit Number: 1 OF 2
TH ONE SOURCE Phone: 081-7316733, 081-1086572
E-mail: thonesource@gmail.com

CONFIGURATION TESTED

MODEL OPTIMA 8000
SERIAL NUMBER 07851310024C
1F1380368

ACCESSORIES/COMPONENT
NOT INCLUDED

WinLab32 Version 5.5.0
PN:6150T21E4Q1E

TESTED EQUIPMENT

IPV Methods

TEST STANDARD USED

Mixed standard 1/10
Mixed standard 1/100

PE NUMBER

N0691579
N9300321

CUSTOMER SUPPLIED

2 % HNO3
10 % HNO3

COMMENTS



MAINTENANCE REPORT
OPTIMA 8000

SERIAL NUMBER	078S1310024C	DATE TESTED	March 28, 2024
1. MECHANICAL CHECKS			
A. Inspect and clean all fans and filters. <input type="checkbox"/> OK			
B. Inspect and replace as necessary, all torch components including the HF Flat coil <input type="checkbox"/> OK			
C. Inspect all tubing for sign of cracking or leaking. <input type="checkbox"/> OK			
D. Adjust water and gas pressure regulator settings. <input type="checkbox"/> OK			
E. Inspect and leak check pneumatics drawers. <input type="checkbox"/> OK			
F. Clean the exterior of the instrument. <input type="checkbox"/> OK			
2. OPTICAL CHECKS			
A. Inspect and clean all optical components. <input type="checkbox"/> OK			
B. As required, check and replace all purge filters. <input type="checkbox"/> OK			
C. Recheck optical alignment. <input type="checkbox"/> OK			
3. COOLING SYSTEM CHECKS			
A. Perform preventive maintenance on chiller. <input type="checkbox"/> OK			
B. Flush out water the chiller and replace with coolant mix30plus every twelve months <input type="checkbox"/> OK			
4. PERFORMANCE CHECKS			
A. Torch View Alignment. <input type="checkbox"/> OK			
B. Wavelength Calibration. <input type="checkbox"/> OK			



MAINTENANCE REPORT
OPTIMA 8000

SERIAL NUMBER	078S1310024C	DATE TESTED	March 28, 2024
PARAMETER			
Precision			
Zn 213.856	% RSD ≤ 1.0		0.33
Mg 280.260	% RSD ≤ 1.0		0.63
Mg 285.207	% RSD ≤ 1.0		0.59
Ba 455.403	% RSD ≤ 1.0		0.28
Detection Limits: Axial			
As 193 nm, 3(sd) ≤ 10.0 ppb			1.39
Se 196 nm, 3(sd) ≤ 5.0 ppb			5
Tl 190 nm, 3(sd) ≤ 10.0 ppb			1.08
Pb 220 nm, 3(sd) ≤ 3.0 ppb			0.28
Mn 257 nm, ≤ 30 ppb			3.80
BEC: Axial			
Detection Limits: Radial			
As 193 nm, 3(sd) ≤ 60.0 ppb			2.53
Zn 213 nm, 3(sd) ≤ 2.0 ppb			0.22
Mn 257 nm, 3(sd) ≤ 1.0 ppb			0.05
La 379 nm, 3(sd) ≤ 3.0 ppb			0.07
Ba 455 nm, 3(sd) ≤ 0.3 ppb			0.04
Ba 493 nm, 3(sd) ≤ 0.6 ppb			0.02
Mn 257 nm, ≤ 30 ppb			10.83
BEC: Radial			
Spectral Resolution: UV			
As 193 nm, ≤ 0.009			0.00687
NI 231 nm, ≤ 0.011			0.00792
NI 341 nm, ≤ 0.015			0.01195
Spectral Resolution: VIS			
Ba 455 nm, ≤ 0.020			0.01482

SERIAL NUMBER	078S1310024C	DATE TESTED	March 28, 2024
---------------	--------------	-------------	----------------

Commissioning follow as commissioning performance sheets.

Calculate MnBEC = $\text{IB} \cdot \text{STD Conc} / \text{S-IB}$, where standard conc = 1000 ug/L

IB = Intensity of blank

IS = Intensity of Standard

Used Mira Mist Nebulizer

ตรวจพบว่าLED(green)ในPlasma Control ติดเป็นบางครั้ง แสดงว่าวงจรควบคุมในส่วนของ Neb Flow

man Pneumatics Controller Board เริ่มปฏิบัติงาน.

This is to certify that the above tests have been performed and the configuration tested

2

meets

[illegible]

does not meet

This certificate does not modify PerkinElmer's standard terms and condition of sale, including warranty terms.

Service Department TH One Source Co., Ltd.

Kangachai T.

(Krungchai Treev[chien])

Customer Support Engineer

```
Method loaded
Method Name: Precision
TEC File:
Method Last Saved: 22/4/2554 10:20:08
MSF File:
```

Method Description: N=10- 1.0% RSD

Sequence No.: 3
Sample ID: Precision
Analysis:
Initial Sample Wt:
Dilution:
Sorbate Prep Vol:
Initial Sample Vol:
Data Type: Original
Date Collected: 28/3/2007 13:45:32
Autosampler Location:

```

Nebulizer Parameters: Precision
Analyte      Back Pressure      Flow
All          322.0 kPa         0.55 L/min

```

Analyte	Mean Data: Precision	Mean Corrected Intensity	Calib.		Sample	
			Conc. Units	Std. Dev.	Conc. Units	Std. Dev.
Zn 266.209		146545.0		482.54	0.33%	RSD
Cd 265.271		133458.0		5458.45	0.63%	
Pb 285.213		74604.6		940.15	0.59%	
Ba 455.403		337348.1		9503.39	0.28%	

Analysis Report
Start time: 28/3/2567 11:57:16
Plasma On Time: 28/3/2567 13:19:06
Logged In Analyst: JFJ
Technique: ICP Continuous
Spectrometer: Optima 8000
Autosampler: S10

Sample Information File: C:\Users\Public\PerkinElmer\ICP\Data\Sample Information\24-03-28.sif
Batch ID:
Results Data Set: DURL_Z80324
Result's Library: C:\Users\Public\PerkinElmer\ICP\Data\Results\Results.mdb

Method Loaded
Method Name: DURL-Cal
IEC File:
Method Description: Calibration for Inter Test

Sequence No.: 1
Sample ID: Calib Blank 1
Analyst:
Date Collected: 28/3/2567 13:57:28
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:
Wash Time:

Autosampler Location:
Date Collected: 28/3/2567 14:00:31
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Method Name: DURL-Check
IEC File:
Method Description: MSF File:

Sequence No.: 2
Sample ID: Calib Std 1
Analyst:
Date Collected: 28/3/2567 14:00:31
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 3
Sample ID: 257.610
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 4
Sample ID: 379.478
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 5
Sample ID: 455.403
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 6
Sample ID: 493.408
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 7
Sample ID: 193.696
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 8
Sample ID: 213.857
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Analysis Report
Start time: 28/3/2567 11:57:16
Plasma On Time: 28/3/2567 13:19:06
Logged In Analyst: JFJ
Technique: ICP Continuous
Spectrometer: Optima 8000
Autosampler: S10

Sample Information File: C:\Users\Public\PerkinElmer\ICP\Data\Sample Information\24-03-28.sif
Batch ID:
Results Data Set: DURL_Z80324
Result's Library: C:\Users\Public\PerkinElmer\ICP\Data\Results\Results.mdb

Method Loaded
Method Name: DURL-Cal
IEC File:
Method Description: Calibration for Inter Test

Sequence No.: 1
Sample ID: Calib Blank 1
Analyst:
Date Collected: 28/3/2567 13:57:28
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:
Wash Time:

Autosampler Location:
Date Collected: 28/3/2567 14:00:31
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Method Name: DURL-Check
IEC File:
Method Description: MSF File:

Sequence No.: 2
Sample ID: Calib Std 1
Analyst:
Date Collected: 28/3/2567 14:00:31
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 3
Sample ID: 257.610
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 4
Sample ID: 379.478
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 5
Sample ID: 455.403
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 6
Sample ID: 493.408
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 7
Sample ID: 193.696
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

Sequence No.: 8
Sample ID: 213.857
Analyst:
Date Collected: 28/3/2567 14:06:15
Data Type: Original
Initial Sample Vol:
Dilution:
Sample Prep Vol:

=====

Analysis begun

Start Time: 28/3/2567 14:15:49 Plasma On Time: 28/3/2567 13:19:06
Logged In Analyst: TET Technique: ICP Continuous
Spectrometer: Optima 8000 Autosampler: S19

Sample Information File: C:\Users\Public\Public\ICP\Data\Sample Information\24-83-28.sif

Batch ID: Results data Set: DLX_280324

Results Library: C:\Users\Public\Public\ICP\Data\Results\Results.mdb

=====

Method loaded

Method Name: DLX-Cal

IC File: Method Last Saved: 5/18/2552 13:39:33

Method Description: Calibration for later test MSF File:

=====

Sequence No.: 1 Autosampler Location:

Sample ID: Calib Blank 1 Date Collected: 28/3/2567 14:15:53

Initial Sample Mt: Data Type: Original

Dilution: Initial Sample Vol:

Wash Time: Sample Prep Vol:

=====

Rebubler Parameters: Calib Blank 1

Analyte Back Pressure Flow

All 222.0 kPa 0.55 L/min

=====

Mean Data: Calib Blank 1

Analyte	Mean Corrected Intensity	Std.Dev.	ASD	Calib Conc. Units
As 193.696	32.0	8.30	25.92%	[0.00] g/L
Se 196.026	26.5	5.11	19.26%	[0.00] g/L
Tl 199.801	-38.3	10.38	27.07%	[0.00] g/L
Pb 220.353	353.9	3.91	1.11%	[0.00] g/L

=====

=====

Rebubler Parameters: Calib Blank 1

Analyte Back Pressure Flow

All 222.0 kPa 0.55 L/min

=====

Mean Data: Calib Blank 1

Analyte	Mean Corrected Intensity	Std.Dev.	ASD	Calib Conc. Units
As 193.696	32.0	8.30	25.92%	[0.00] g/L
Se 196.026	26.5	5.11	19.26%	[0.00] g/L
Tl 199.801	-38.3	10.38	27.07%	[0.00] g/L
Pb 220.353	353.9	3.91	1.11%	[0.00] g/L

=====

Sequence No.: 2 Autosampler Location:

Sample ID: DL-Standard Date Collected: 28/3/2567 14:18:16

Analyst: Data Type: Original

Initial Sample Mt: Initial Sample Vol:

Dilution: Sample Prep Vol:

Wash Time:

=====

Rebubler Parameters: DL-Standard

Analyte Back Pressure Flow

All 222.0 kPa 0.55 L/min

=====

Mean Data: DL-Standard

Analyte	Mean Corrected Intensity	Std.Dev.	ASD	Calib Conc. Units
As 193.696	5168.6	94.41	1.83%	[1000] g/L
Se 196.026	237.1	23.20	9.78%	[500] g/L
Tl 199.801	6787.8	43.25	0.64%	[1000] g/L
Pb 220.353	13360.0	22.38	0.17%	[500] g/L

=====

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Calibration Summary

Analyte	Lin, Calc Int	Lin, Calc Int	Lin, Calc Int	Lin, Calc Int
As 193.696	1	0.0	5.169	0.00000
Se 196.026	1	0.0	8.4743	0.00000
Tl 199.801	1	0.0	6.708	0.00000
Pb 220.353	1	0.0	26.60	0.00000

=====

Sequence No.: 3 Autosampler Location:

Sample ID: QC01 HQCS Date Collected: 28/3/2567 14:21:26

=====

=====

Analyst: Data Type: Original

Initial Sample Mt: Initial Sample Vol:

Wash Time: Sample Prep Vol:

=====

=====

Rebubler Parameters: QC01 HQCS

Analyte Back Pressure Flow

All 222.0 kPa 0.55 L/min

=====

=====

Mean Data: QC01 HQCS

Analyte	Mean Corrected Intensity	Std.Dev.	ASD	Calib Conc. Units
As 193.696	135.4	4.50	3.0 g/L	4.50 17.10%
Se 196.026	8.8	37.83	20 g/L	37.93 204.11%
Tl 199.801	2.4	0.03	0 g/L	0.03 9.11%
Pb 220.353	60.4	1.14	2 g/L	1.14 50.16%

=====

=====

Method loaded

Method Name: DLX-Check

IC File: Method Last Saved: 25/2/2543 10:51:16

Method Description: Sample Std.Dev As/Tl <=10 g/L, Se<=5 g/L, Pb<=3 g/L

=====

=====

Sequence No.: 4 Autosampler Location:

Sample ID: 2 % HMDS Date Collected: 28/3/2567 14:24:11

Analyst: Data Type: Original

Initial Sample Mt: Initial Sample Vol:

Dilution: Sample Prep Vol:

Wash Time:

=====

=====

Rebubler Parameters: 2 % HMDS

Analyte Back Pressure Flow

All 222.0 kPa 0.55 L/min

=====

=====

Mean Data: 2 % HMDS

Analyte	Mean Corrected Intensity	Std.Dev.	ASD	Calib Conc. Units
As 193.696	-1.6	-0.3	-0.3 g/L	1.39 459.43%
Se 196.026	10.9	11.69	20 g/L	5.00 50.84%
Tl 199.801	1.1	0.2	0.2 g/L	1.08 649.10%
Pb 220.353	-21.4	0.28	-0.8 g/L	0.28 34.38%

=====



PerkinElmer
For the Better

**Global Service Training Department
Service Engineer Certification**

Krungchai Treevichien

This is to certify that the above mentioned
PerkinElmer representative has trained to
service the instrument indicated below:

ICP-Optima 7X00/8X00 Series

Instructor:-


Geoff Cook

Date:- 13 FEB 2011 to 24 FEB 2011

Certified by:



(Manager, Global Training Operations)



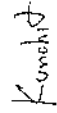
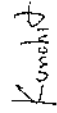
TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9464



REC-762-TS170255
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 24TMC19
Page: 1 of 3

Equipment:	Incubator
Manufacturer:	Memmert
Model:	JNE 500
Serial No.:	E505.0595
ID No.:	Ins-LAB-041
Submitted by:	Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung, Bangkok 10240
Location:	Bacteria Room
Received Order:	09 April 2024
Calibration Date:	09 - 10 April 2024
Ambient Temperature:	(26 ± 10) °C
Relative Humidity:	(50 ± 30) %
Calibrated by:	Preecha Hahib 
Approved by:	 Approved Signatory
Issue Date:	12 April 2024

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2404-0113OC-3

Cert. No.: 24TM618
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument : MY49023932
Serial No. : 23LM122
Traceable : TPA
Due Date : 26 Jul 2024

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

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

Remark : TPA : Technology Promotion Association (Thailand - Japan)

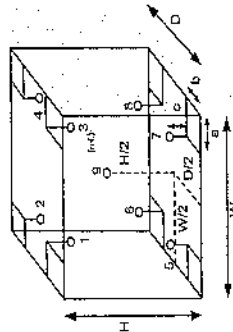
Result of Calibration :-

(*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	26
REL Humid. (%)	43	46
AC Supply (Volt)	220	222



Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm
Dimension of Chamber :
D = 0.40 m
W = 0.55 m
H = 0.48 m
Capacity = 0.11 m³

Position :	Ref. Std. ID No.:
1	19-16RTD-01
2	19-16RTD-02
3	19-16RTD-03
4	19-16RTD-04
5	19-16RTD-05
6	19-16RTD-06
7	21-16RTD-07
8	19-16RTD-08
9 (ref.)	19-16RTD-09



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2404-0113OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM619
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.022	0.27	0.50	2
41.5	41.5	41.5	0.062	0.29	0.53	2
44.5	44.5	44.5	0.033	0.60	1.2	2

Calibration Point (°C)		Measured Temperature (°C)									Uncertainty (± °C)	
		Position										
		1	2	3	4	5	6	7	8	9 (ref.)		
35.0	35.0	35.037	35.081	35.018	35.039	34.634	34.962	34.620	34.990	34.854	0.30	0.30
41.5	41.5	41.873	41.868	41.845	41.803	41.479	41.667	41.437	41.664	41.610	0.30	0.30
44.5	44.5	44.899	44.986	44.845	44.827	43.898	44.270	43.883	44.311	44.410	0.30	0.30

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

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

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

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

-o0o-



SCARLET TECH



Certificate of Calibrator for SF-120 Sound Calibrator

No. 20231221J143

Name of Product Sound Calibrator
Type ST-120
Serial Number ST120C0263E
Specification Class 1
Date 2023/12/21



Tested by Jim Lin

1. Outside : OK
2. Sound Pressure Level : 93.97 dB ; 114.03 dB
3. Frequency : 988.30 Hz
4. Distortion : 1.15 % ; 1.35 %

Environment conditions :
Air temperature : 18 °C
Relative humidity : 62 %
Static pressure : 101.9 kPa

Scarlet Tech Co., Ltd.
4F-3, No. 347, HePing E Rd, 2nd Sec, DaAn District, Taipei City 116, Taiwan
E-mail: info@scarlet.com.tw www.scarlet-tech.com



TISTR

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0197

MTC No. EEL. BP. 60/0166

CALIBRATION CERTIFICATE

Submitted by : THAI ENVIRONMENTAL TECHNIC LIMITED.
Address : 1/6 Soi Rangkhamlaeng 145, Khwaeng/Khut Saphansung, Bangkok 10240.
Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre,
: Soi 1-C, Baangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Calibrator
Manufacturer : Tannas
Model : TM-100
Serial No. : 181203570

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$
Relative Humidity : $(50 \pm 15) \%$
Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Standards used :

1. Digital Function Synthesizer NF Electronics DF-193A S/N 122037.
2. Measuring Amplifier Brüel&Kjaer 2636 S/N 1337484.
3. Programmable Attenuator Tansugawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Keithley 2015-P S/N 4106495.
7. Condenser Microphone Brüel&Kjaer 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 10 Jan. 2023

Date of Calibration : 16 Jan. 2023

1/3

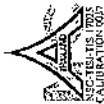
The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governance of TISTR.

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FMILMTC-002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0197

MTC No. EEL. BP. 60/0166

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa , 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	94.26	0.26	± 0.10	± 0.75 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	989.3	-10.7	± 1.5	$\pm 2.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	2.20	± 0.50	$\pm 4.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Date of Calibration : 16 Jan. 2023

2/3

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.4

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E-mail : rump@tistr.or.th Website: www.tistr.or.th

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Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sornlee@tistr.or.th



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0197

MTC No. EEL. BP. 60/0166

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa , 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	111.96	-0.04	± 0.10	± 0.75 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	985.1	-14.9	± 1.5	$\pm 2.0\%$

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	2.60	± 0.60	$\pm 4.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

Approved by :

(Mr. Weerachai Decchaiyae)



Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Ref : 2011266011000062001

End of Certificate

3 / 3

The results relate only to the items tested/calibrated or value assigned.

FM.BL.MTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0632

MTC No. DEL. BP. 28/0866

CALIBRATION CERTIFICATE

Submitted by : TIAI ENVIRONMENTAL TECHNIC LIMITED.
Address : 1/6 Soi Kanukhamheng 145, Khwaeng/Khet Saphanlung, Bangkok, 10240, Thailand.
Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
: Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Calibrator
Manufacturer : Digicon
Model : Tonners
Serial No. : 180501628
Ambient Environment
Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325 ± 1.500) kPa

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.

2. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

3. Programmable Attenuator Tanagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.

7. Condenser Microphone B&K 4180 S/N 3633526.

Calibration Procedure: CP-102-04 based on IEC 60942:2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 10 Aug. 2023

Date of Calibration : 16 Aug. 2023

1/3

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and a 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
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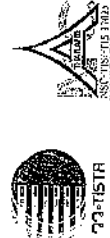
Office/Laboratory

Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2575 1121-30 ext. 115, 116
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FMBL/MTC.002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0632

MTC No. EEL. BP. 28/0866

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0°C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit
1/2 inch Brüel&Kjær 4180	94.45	0.45	± 0.10	±0.75 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit
1/2 inch Brüel&Kjær 4180	991.4	-8.6	± 1.5	±1.0%

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit
1/2 inch Brüel&Kjær 4180	1.40	± 0.50	±3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Date of Calibration : 16 Aug. 2023

2/3

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

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E-mail : kumpalistr@nistr.or.th Website: www.tistr.or.th

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FMBL/MTC.002 Rev.4



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ± 0.3 dB and 114.0 ± 0.5 dB
Frequency : at 1,000 Hz $\pm 1\%$
Calibrator Serial NO. : 181203570
Calibration Date : 2-Jan-2024
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23 \pm 3) $^{\circ}$ C : 25.60 $^{\circ}$ C
Relative Humidity (50 \pm 15) % : 50.0 %RH
Issue Date of Calibration : 2-Feb-2024

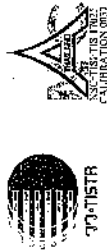
Item	Brand	Model	Serial NO.	Reference Acoustic dB	Before Adjust		After Adjust \pm dB	Deviation \pm dB	Result
					ก่อนปรับ	ปรับที่ 2			
31	ACO	6226	110088	94.0	94.1	94.1	94.0	0.1	PASS
				114.0	114.1	114.1	114.1		
32	ACO	6226	110105	94.0	94.1	94.1	94.0	0.1	PASS
				114.0	114.1	114.1	114.1		
33	ACO	6226	110090	94.0	93.9	93.9	94.0	0.1	PASS
				114.0	113.8	113.8	113.8		
34	ACO	6226	110089	94.0	94.1	94.1	94.0	0.1	PASS
				114.0	114.1	114.1	114.1		
35	ACO	6226	110097	94.0	94.2	94.2	94.0	0.2	PASS
				114.0	114.1	114.1	114.1		
36	ACO	6226	110102	94.0	94.1	94.1	94.0	0.1	PASS
				114.0	114.1	114.1	114.1		
37	ACO	6226	110101	94.0	93.8	93.8	94.0	0.2	PASS
				114.0	113.9	113.9	113.9		
38	ACO	6226	110106	94.0	94.2	94.2	94.0	0.2	PASS
				114.0	114.1	114.1	114.1		
39	ACO	6226	110104	94.0	94.2	94.2	94.0	0.2	PASS
				114.0	114.1	114.1	114.1		
40	ACO	6226	110100	94.0	94.1	94.1	94.0	0.1	PASS
				114.0	114.1	114.1	114.1		

Calibration By :

Approve by :

[Signature]

[Signature]



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0632 MTC No. EFL BP. 28/0866

Nonfatal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0 $^{\circ}$ C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	114.28	0.28	± 0.10	± 0.75 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	986.9	-13.1	± 1.5	$\pm 2.0\%$

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjær 4180	3.14	± 0.70	$\pm 4.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

Approved by :



(Mr. Weerachai Dochaiyap)

Electrical and Electronics Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 16 Aug. 2023

Date of Issue : 21 Aug. 2023

Ref: 2011266081003103001

End of Certificate

3 / 3

The results relate only to the items tested/calibrated or value assigned.
The results and the certificate and its contents are not valid unless written permission is obtained from the governance of TISTR.

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FM/SL/MTC/002 Rev.4



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter Calibration Date : 3-Jan-2024
Calibrator : SCARLET ST 120 Barometric pressure (mmHg) : 759.0 mmHg
Standard : IEC 60942:2017 CLASS1 Temperature (23±3)°C : 23.60 °C
Accuracy : 94.0±0.3 dB and 114.0±0.5 dB Relative Humidity(50±15 %) : 50.0 % RH
Frequency : at 1,000 Hz ±1% Dated Date of Calibrate : 2-Feb-2024
Calibrator Serial NO. : ST120DN6536

Item	Instrument Calibrated		Reference Acoustic dB	Before Adjust			After Adjust ± dB	Deviation ± dB	Result Calibrate
	Brand	Model Serial NO.		ครั้งที่ 1	ครั้งที่ 2	ครั้งที่ 3			
78	SCARLET	ST-11D 820390	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	0.0 0.0	PASS PASS
79	SCARLET	ST-11D 820391	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	0.0 0.0	PASS PASS
80	SCARLET	ST-11D 820392	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	0.0 0.0	PASS PASS
81	SCARLET	ST-11D 820393	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	0.0 0.0	PASS PASS
82	SCARLET	ST-11D 820394	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	0.0 0.0	PASS PASS
83	SCARLET	ST-11D 820377	94.0 114.0	94.1 114.0	94.1 114.0	94.1 114.0	94.0 114.0	0.1 0.1	PASS PASS
84	SCARLET	ST-11D 820876	94.0 114.0	93.9 113.9	93.9 113.9	93.9 113.9	94.0 114.0	0.1 0.1	PASS PASS
85	SCARLET	ST-11D 820878	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	94.0 114.0	0.0 0.0	PASS PASS

Calibration By :

Approve by :



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter Calibration Date : 3-Jan-2024
Calibrator : TENNABAS Sound Calibrator TM-100 Barometric pressure (mmHg) : 759.0 mmHg
Standard : IEC 60942 Temperature (23±3)°C : 23.60 °C
Accuracy : 94.0±0.3 dB and 114.0±0.5 dB Relative Humidity(50±15 %) : 50.0 % RH
Frequency : at 1,000 Hz ±1% Dated Date of Calibrate : 2-Feb-2024
Calibrator Serial NO. : 181203570

Item	Instrument Calibrated		Reference Acoustic dB	Before Adjust			After Adjust ± dB	Deviation ± dB	Result Calibrate
	Brand	Model Serial NO.		ครั้งที่ 1	ครั้งที่ 2	ครั้งที่ 3			
41	ACO	8226 130127	94.0 114.0	94.2 114.1	94.2 114.1	94.2 114.1	94.0 114.1	0.2 0.2	PASS PASS
42	ACO	8226 130128	94.0 114.0	93.8 113.7	93.8 113.7	93.8 113.7	94.0 114.2	0.2 0.3	PASS PASS
43	ACO	8226 130129	94.0 114.0	94.3 114.2	94.3 114.2	94.3 114.2	94.0 114.2	0.3 0.1	PASS PASS
44	ACO	8226 130130	94.0 114.0	94.1 114.0	94.1 114.0	94.1 114.0	94.0 114.0	0.1 0.2	PASS PASS
45	ACO	8226 130131	94.0 114.0	94.2 114.1	94.2 114.1	94.2 114.1	94.0 114.1	0.2 0.1	PASS PASS
46	ACO	8226 112029	94.0 114.0	94.1 114.2	94.1 114.2	94.1 114.2	94.0 114.2	0.1 0.1	PASS PASS
47	ACO	8236 152073	94.0 114.0	93.9 113.9	93.9 113.9	93.9 113.9	94.0 113.9	0.1 0.1	PASS PASS
48	ACO	8236 152074	94.0 114.0	93.9 113.9	93.9 113.9	93.9 113.9	94.0 113.9	0.1 0.1	PASS PASS
49	ACO	8236 152076	94.0 114.0	93.9 113.8	93.9 113.8	93.9 113.8	94.0 113.8	0.1 0.1	PASS PASS
50	ACO	8236 152078	94.0 114.0	94.3 114.2	94.3 114.2	94.3 114.2	94.0 114.2	0.3 0.3	PASS PASS

Calibration By :

Approve by :




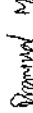
TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter Calibration Date : 3-Jan-2024
Calibrator : TENMARS Sound Calibrator TM-100 Barometric pressure (mmHg) : 759.0 mmHg
Standard : IEC 60942 Temperature (23±3)°C : 25.00 °C
Accuracy : 94.0 ±0.3 dB and 114.0±0.5 dB Relative Humidity(50±15 %) : 50.0 % RH
Frequency : at 1,000 Hz ±1% Dued Date of Calibrate : 2-Feb-2024
Calibrator Serial NO. : B1203570

Item	Instrument Calibrated		Reference Acoustic dB	Before Adjust			After Adjust ±dB	Deviation ±dB	Result
	Brand	Model / Serial NO.		ครั้งที่ 1	ครั้งที่ 2	ครั้งที่ 3			
51	ACO	6236 152077	94.0	94.0	94.0	94.0	94.0	0.0	PASS
			114.0	114.0	114.0	114.0			
52	ACO	6226 150142	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
53	ACO	6226 160095	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
54	ACO	6226 160096	94.0	94.2	94.2	94.2	94.0	0.2	PASS
			114.0	114.2	114.2	114.2			
55	ACO	6226 160097	94.0	94.2	94.2	94.2	94.0	0.2	PASS
			114.0	114.2	114.2	114.2			
56	ACO	6226 160098	94.0	93.9	93.9	93.9	94.0	0.1	PASS
			114.0	113.8	113.8	113.8			
57	ACO	6226 160099	94.0	93.9	93.9	93.9	94.0	0.1	PASS
			114.0	113.8	113.8	113.8			
58	ACO	6226 160143	94.0	93.7	93.7	93.7	94.0	0.3	PASS
			114.0	113.8	113.8	113.8			
59	ACO	6226 160203	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
60	ACO	6226 160204	94.0	93.9	93.9	93.9	0.0	0.1	PASS
			114.0	113.8	113.8	113.8			

Calibration By : 
Approve by : 




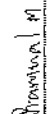
TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter Calibration Date : 1-June-2024
Calibrator : TENMARS Sound Calibrator TM-100 Barometric pressure (mmHg) : 759.0 mmHg
Standard : IEC 60942 Temperature (23±3)°C : 25.00 °C
Accuracy : 94.0 ±0.3 dB and 114.0±0.5 dB Relative Humidity(50±15 %) : 50.0 % RH
Frequency : at 1,000 Hz ±1% Dued Date of Calibrate : 30-June-2024
Calibrator Serial NO. : B89001628

Item	Instrument Calibrated		Reference Acoustic dB	Before Adjust			After Adjust ±dB	Deviation ±dB	Result
	Brand	Model / Serial NO.		ครั้งที่ 1	ครั้งที่ 2	ครั้งที่ 3			
46	ACO	6236 112049	94.0	94.2	94.2	94.2	94.0	0.2	PASS
			114.0	114.2	114.2	114.2			
48	ACO	6236 152074	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
49	ACO	6236 152075	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
50	ACO	6236 152076	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.1	114.1	114.1			
51	ACO	6236 152077	94.0	93.8	93.8	93.8	94.0	0.2	PASS
			114.0	113.7	113.7	113.7			
52	ACO	6226 150142	94.0	93.9	93.9	93.9	94.0	0.1	PASS
			114.0	113.9	113.9	113.9			
53	ACO	6226 160095	94.0	94.0	94.0	94.0	94.0	0.0	PASS
			114.0	114.0	114.0	114.0			
54	ACO	6226 160096	94.0	93.9	93.9	93.9	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
55	ACO	6226 160097	94.0	94.1	94.1	94.1	94.0	0.1	PASS
			114.0	114.0	114.0	114.0			
56	ACO	6226 160098	94.0	94.2	94.2	94.2	94.0	0.2	PASS
			114.0	114.1	114.1	114.1			

Calibration By : 
Approve by : 



SP METROLOGY SYSTEM (THAILAND) CO., LTD.



Certificate of Calibration

Certificate Number : SPR23020460-11

Page : 1 of 3

Customer

: Thai Environmental Technic Limited.

1/6 Soi Rangkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand.

Equipment Name : Noise Dose Meter

Manufacturer : SOUNDTEK

Model : ST-130

Serial Number : 220100054

ID Number : No.34

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Received Date : 24 Feb 2023

Relative Humidity : $50\% \pm 15\%$ Calibration Date : 25 Feb 2023

Location of Calibration : In-Lab Recommend Due Date : 25 Feb 2024

Calibration Procedure : SP-CPE-04-01 Date of Issue : 26 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent. National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Karoon Pengsalung

Calibration Officer

Approved by :

(Mr. Nirut Loha)

Authorized Signatory



SP METROLOGY SYSTEM (THAILAND) CO., LTD.



Calibration Report

Certificate Number : SPR23020460-11

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due Date
Sound Level Calibrator	SL-120	211203773	EEL BP 114/0166	17 Jan 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Certificate of Calibration

Certificate Number : SPR23030020-2 Page : 1 of 3
Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand.

Equipment Name : Noise Dose Meter
Manufacturer : SOUNDTEK
Model : ST-130
Serial Number : 220100065
ID. Number : No.35
Environmental Conditions
Ambient Temperature : 23 °C ± 3 °C Received Date : 01 Mar 2023
Relative Humidity : 50 % ± 15 % Calibration Date : 07 Mar 2023
Location of Calibration : In-Lab Recommend Due Date : 07 Mar 2024
Calibration Procedure : SP-CPE-04-01 Date of Issue : 08 Mar 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Karoon Pengsalung
Calibration Officer
Approved by :
(Mr.Prayoon) Topart)
Authorized Signatory



Result of Calibration

Certificate No. : SPR23020480-11 Page : 3 of 3
Range : 94 to 114 dB Function : @1kHz

Select A	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	114.0	114.0	0.0	0.0	0.15

Select C	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	113.9	113.9	-0.1	-0.1	0.15

Select Z	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	114.0	114.0	0.0	0.0	0.15

Note:
The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty
The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Calibration Report

Certificate Number : SPR23030020-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due Date
Sound Level Calibrator	SL-120	211203773	EELBP.114/0168	17 Jan 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate No. : SPR23030020-2

Page : 3 of 3

Range : 94 to 114 dB Function : @1KHz

Select A	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	113.9	113.9	-0.1	-0.1	0.15

Unit : dB

Select C	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	114.0	114.0	0.0	0.0	0.15

Unit : dB

Select Z	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	114.0	114.0	0.0	0.0	0.15

Unit : dB

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



SP METROLOGY SYSTEM (THAILAND) CO., LTD.



Certificate of Calibration

Certificate Number : SPR24020220-34

Page : 1 of 3

Customer : Thai Environmental Technic Limited.

1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand.

Equipment Name : Noise Dose Meter
Manufacturer : SOUNDTEK
Model : ST-130
Serial Number : 220100050
ID. Number : No.30


Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Received Date : 14 Feb 2024
Relative Humidity : $50\% \pm 15\%$ Calibration Date : 15 Feb 2024
Location of Calibration : In-Lab Recommend Due Date : 15 Feb 2025
Calibration Procedure : SP-CPE-04-01 Date of Issue : 16 Feb 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpakut Approved by : 
Calibration Officer (Mr.Prayodh Topart)
Authorized Signatory

SP-FM-04-15 rev.0



SP METROLOGY SYSTEM (THAILAND) CO., LTD.



Calibration Report

Certificate Number : SPR24020220-34

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due Date
Sound Level Calibrator	SL-130	211203773	EEL BP. 140/0167	28 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research

SP-FM-04-15 rev.0



Result of Calibration

Certificate No. : SPR24020220-34

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Unit : dB

Select C

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Unit : dB

Select Z

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Unit : dB

Note :

The result of calibration was found accurate as shown on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR24020220-38

Page : 1 of 3

Customer : Thai Environmental Technic Limited.

1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan Sung, Bangkok 10240, Thailand.

Equipment Name : Noise Dose Meter

Manufacturer : SOUNDTEK

Model : ST-130

Serial Number : 220100054

ID. Number : No.34

Environmental Conditions

Ambient Temperature : 23 °C ± 3 °C Received Date : 14 Feb 2024

Relative Humidity : 50 % ± 15 % Calibration Date : 15 Feb 2024

Location of Calibration : In-Lab Recommend Due Date : 15 Feb 2025

Calibration Procedure : SP-CPE-04-01 Date of Issue : 16 Feb 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumporn Doxpiakul

Calibration Officer

Approved by :

(Mr.Prayoon Topant)

Authorized Signatory



METROLOGY SYSTEM (THAILAND) CO., LTD.



Calibration Report

Certificate Number : SPR24020220-38

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due Date
Sound Level Calibrator	SL-120	211203773	EEL BP_140/0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at:
TISTR - Thailand Institute of Scientific and Technological Research



METROLOGY SYSTEM (THAILAND) CO., LTD.



Result of Calibration

Certificate No. : SPR24020220-38

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

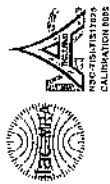
Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



TECHNOLOGY PROMOTION ASSOCIATION (THAI JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PUTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL: 0-2717-3000-24 FAX: 0-2715-9184



Certificate of Calibration

Certificate No.: 23H556
Page: 1 of 2

Equipment: Thermal Environment Monitor
Manufacturer: JANTYTECH
Model: JT2011-E2A
Serial No.: 3522210143
ID No.: HD 5
Condition As-Received: Used Item
Received Date: 03 March 2023
Calibration Date: 09 March 2023
Reference: to 13 March 2023
2303-0140-SC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %
Submitted by: Thel Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145, KhwaengKheol Saphan Sung,
Bangkok 10240

Procedure used: Calibration were conducted using in-chambers calibration procedure CP-H03 according to comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1. Reference standards instruments:

Instrument Model Serial No. Certificate No. Due Date
1) Handheld Thermometer With Sensor 1521 ASA339 221251 12 Oct 2023

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

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

-National Institute of Metrology Thailand (NIMT)

Calibrated by: Chalok Wawarajua
Issue Date: 17 March 2023

Approved Signatory:
[] Chalok Wawarajua
[] Ponthippa Tanayakul
[x] Viporn Tanayawatt

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Cert. No.: 23H556
Page: 2 of 2

Result of Calibration:-		Without Adjustment	
Function:		Temperature Measurement for Ta	
Standard Temperature (°C)	UUC*	Reading (°C)	Error (°C)
20.021	19.8	19.8	-0.221
29.990	29.7	29.7	-0.290
40.012	39.6	39.6	-0.212
		UUC*	0.42
			0.42

Result of Calibration:-		Without Adjustment	
Function:		Temperature Measurement for Tm	
Standard Temperature (°C)	UUC*	Reading (°C)	Error (°C)
20.021	19.9	19.9	-0.121
29.990	29.7	29.7	-0.290
40.012	39.7	39.7	-0.312
		UUC*	0.42
			0.42

Result of Calibration:-		Without Adjustment	
Function:		Temperature Measurement for Tg	
Standard Temperature (°C)	UUC*	Reading (°C)	Error (°C)
20.021	19.8	19.8	-0.221
29.990	29.7	29.7	-0.290
40.012	39.7	39.7	-0.312
		UUC*	0.42
			0.42

UUC*: Unit Under Calibration

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

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



Certificate of Calibration

Certificate No. : 23H557
Page : 1 of 2

Equipment : Thermal Environment Monitor
Manufacturer : JANTYTECH
Model : JT2011-E2A
Serial No. : 3922210144
ID No. : 1HD 6
Condition As-Received : Used Item
Received Date : 03 March 2023
Calibration Date : 09 March 2023
to 13 March 2023
Reference : 2303-0716DSC
Ambient Temperature : (25 ± 3) °C
Relative Humidity : (50 ± 20) %
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

Procedure used : Calibration were conducted using in-house calibration procedure CP-H03 according to comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1. Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Handheld Thermometer With Sensor	1521	AS4339	221261	12 Oct 2023

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 Metrology Thailand (NIMT)

Calibrated by : Chakrit Waewanjua
Issue Date : 17 March 2023

Approved Signatory :
() Chakrit Waewanjua
() Pantiappa Tamoyskul
(✓) Viporn Tantiyawutti

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Cert. No.: 23H557
Page.: 2 of 2

Result of Calibration:- Function:	Without Adjustment Temperature Measurement for T _a	UUC*	Uncertainty of Measurement (±°C)
Standard Temperature (°C)	Reading (°C)		Error (°C)
20.025	19.9		-0.125
30.018	29.7		-0.318
40.007	39.8		-0.207

Result of Calibration:- Function:	Without Adjustment Temperature Measurement for T _{rw}	UUC*	Uncertainty of Measurement (±°C)
Standard Temperature (°C)	Reading (°C)		Error (°C)
20.025	20.0		-0.025
30.018	29.7		-0.318
40.007	39.7		-0.307

Result of Calibration:- Function:	Without Adjustment Temperature Measurement for T _g	UUC*	Uncertainty of Measurement (±°C)
Standard Temperature (°C)	Reading (°C)		Error (°C)
20.025	19.8		-0.225
29.990	29.7		-0.290
40.012	39.7		-0.312

UUC* : Unit Under Calibration

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

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ภาคผนวก ฉ

หนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เลขทะเบียน ว-236





ที่ กอ ๐๓๐๓(๓)/ ๕๘ ๗ ๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒ ๒ มิถุนายน

เรื่อง คัดอาณัติขึ้นทะเบียนและเปลี่ยนชื่อผู้ประกอบการวิสาหกิจ
เรียน กรรมการผู้จัดการ บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงเอกสาร และขอต่ออายุหนังสืออนุญาตให้ประกอบ
ธุรกิจในพื้นที่ ๓ มีนาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือขออนุญาตขึ้นทะเบียนผู้ประกอบการวิสาหกิจ
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด จำนวน ๒๔ แผ่น
พยานหนังสืออ้างถึง บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด ขอต่ออายุหนังสือขึ้นทะเบียน
ผู้ประกอบการวิสาหกิจ เอกสารแนบ ๖-๖๗๖ สำนักรับแจ้ง ๓/๖ ขอทราบคำสั่งเลข ๑๕๕ แนวสหกรณ์
เขตสะพานสูง กรุงเทพมหานคร ขอทราบผลการดำเนินการตามกฎหมายนี้

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว เห็นว่า เทคโนโลยีสิ่งแวดล้อมไทย จำกัด ขอต่ออายุหนังสือ
ทะเบียนผู้ประกอบการวิสาหกิจ เอกสารแนบ ๖-๖๗๖ โดยต้องปฏิบัติตามเงื่อนไข
ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิสาหกิจ

- | | |
|----------------------------|----------------------------|
| ๑) นายอรรถพร โคตรมา | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๑ |
| ๒) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๒ |
| ๓) นางพรทิพย์ เขียวดี | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๓ |
| ๔) นายเอกพายุ ปิยะพรกุล | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๔ |
| ๕) นายสมพล มูลสาร | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๕ |
| ๖) นายรัฐพล สุขดี | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๖ |

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิสาหกิจ

- | | |
|-----------------------------|----------------------------|
| ๑) นางสาวพอลีน อัครวิชัยกร | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๗ |
| ๒) นางสาวนพพรทิพย์ พันธ์ดี | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๘ |
| ๓) นางสาวนพพรทิพย์ พันธ์ดี | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๐๙ |
| ๔) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๐ |
| ๕) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๑ |
| ๖) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๒ |
| ๗) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๓ |
| ๘) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๔ |
| ๙) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๕ |
| ๑๐) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๖ |
| ๑๑) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๗ |
| ๑๒) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๘ |
| ๑๓) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๑๙ |
| ๑๔) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๐ |
| ๑๕) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๑ |
| ๑๖) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๒ |

๑๓) นายจิรวัฒน์...

- ๒ -

- | | |
|-----------------------------|----------------------------|
| ๑๓) นายจิรวัฒน์ อิมมาลย์ | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๓ |
| ๑๔) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๔ |
| ๑๕) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๕ |
| ๑๖) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๖ |
| ๑๗) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๗ |
| ๑๘) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๘ |
| ๑๙) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๒๙ |
| ๒๐) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๐ |
| ๒๑) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๑ |
| ๒๒) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๒ |
| ๒๓) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๓ |
| ๒๔) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๔ |
| ๒๕) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๕ |
| ๒๖) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๖ |
| ๒๗) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๗ |
| ๒๘) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๘ |
| ๒๙) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๓๙ |
| ๓๐) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๔๐ |
| ๓๑) นางสาววราภรณ์ ประทุมแดง | ทะเบียนเลขที่ ๖-๒๓๖-๓-๐๐๔๑ |

ค. ขอบข่ายงานและพื้นที่ให้บริการที่ให้บริการแก่ผู้ประกอบการวิสาหกิจ
พื้นที่ให้บริการ

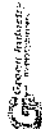
พื้นที่ให้บริการที่ให้บริการแก่ผู้ประกอบการวิสาหกิจ
พื้นที่ให้บริการที่ให้บริการแก่ผู้ประกอบการวิสาหกิจ

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ
๖/๖/๖ ๑๖/๖/๖

นายประจักษ์ คำทรัพย์
ผู้อำนวยการโรงงานอุตสาหกรรม
ผู้ควบคุมดูแลห้องปฏิบัติการวิสาหกิจ

กองวิจัยและพัฒนาเทคโนโลยีชีวภาพ
กรมการศึกษานานาชาติเพื่อส่งเสริมและพัฒนาศักยภาพผู้ประกอบการวิสาหกิจ
โทร. ๐ ๒๕๖๐ ๖๓๖๒ ต่อ ๒๐๓๓-๕
โทรสาร ๐ ๒๕๖๐ ๖๓๖๒ ต่อ ๒๐๓๔
ไปรษณีย์อิเล็กทรอนิกส์ rso@oic.go.th



"อุดมการณ์ก้าวไกล ประเพณีไทยก้าวหน้า ร่วมกันพัฒนา อุดมการณ์ดีเสมอ"



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนเพื่อปฏิบัติการวิเคราะห์เอกชน

บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด เลขทะเบียน ๖-๒๓๖

ที่ ออ ๐๓๐๐(๑)/ ๙ ๙ ๖ ลงวันที่ ๒๒ มิถุนายน ๒๕๖๖

ขอใบชำระค่าภาษีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓๙ รายการ

บัญชี จำนวน ๑๐ รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
2	Arsenic	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a)
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a)
4	α-BHC	3) Digestion, Inductively Coupled Plasma Method ^(a)
5	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
6	Biochemical Oxygen Demand	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
7	Cadmium	5-Day BOD Test, Azide Modification Method ^(a) 1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
8	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ^(a)
9	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
10	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
11	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^(a)
12	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
13	Cyanide	Distillation, Colorimetric Method ^(a)
14	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
15	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
16	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)

17 Endosulfan I...

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ลำดับที่	สารเคมี	วิธีวิเคราะห์
17	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
18	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
19	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
20	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
21	Formaldehyde	Distillation, Colorimetric Method ^(a)
22	Free Chlorine	DPD Ferrous Titrimetric Method ^(a)
23	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
24	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
25	Hexavalent Chromium	Colorimetric Method ^(a)
26	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
27	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
28	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(a)
29	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
30	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^(a) 2) Soxhlet Extraction Method ^(a)
31	pH	Electrometric Method ^(a)
32	Phenols	Distillation, Direct Photometric Method ^(a)
33	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a)
34	Sulfide	1) Iodometric Method ^(a) 2) Methylene Blue Method ^(a)
35	Temperature	Laboratory and Field Methods ^(a)
36	Total Dissolved Solids	Dried at 180 °C ^(a)
37	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method ^(a)
38	Total Suspended Solids	Dried at 103-105 °C ^(a)

39 Trivalent Chromium...

ลำดับที่	สารเคมี	วิธีการหา
39	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(a)
40	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)

แนบได้กับ จำนวน 122 รายการ

ลำดับที่	สารเคมี	วิธีการหา
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
2	Acetone	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
3	Aldin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
5	Antimony	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
6	Arsenic	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a)
7	Avazhie	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
8	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
10	Benzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
11	Benzo(b)fluoranthene	Mass Spectrometric Method ^(a)
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)

13 Benzoic acid...

ลำดับที่	สารเคมี	วิธีการหา
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
14	Benz(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
15	Benz(a,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
16	Beryllium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a)
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
20	Bromoform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
21	Butarol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
23	Cadmium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a)
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
25	Carbon disulfide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
27	Chlordane	Mass Spectrometric Method ^(a)
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
29	Chlorobenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
31	Chloroform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)

32 Chloronium...

ลำดับที่	สารเคมี	วิธีการตรวจ
32	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^(d) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(d) 1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^(b)
33	Chromium (III)	
34	Chromium (VI)	
35	Chrysene	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(a) Colorimetric Method ^(a) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(a) Distillation, Colorimetric Method ^(a)
36	Cyanide	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
37	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
38	DOD	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
39	DOE	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
40	DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
41	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(a)
42	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(a)
43	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
44	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
45	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
46	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
47	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
48	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
49	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)

ลำดับที่	สารเคมี	วิธีการตรวจ
50	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
51	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
52	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
53	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
54	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
55	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
56	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
57	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
58	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
59	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
60	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
62	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
63	Ethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
67	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
68	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	n-Hexane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	α -HCH	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
71	β -HCH	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
72	γ -HCH	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
73	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

ลำดับที่	สารเคมี	วิธีวิเคราะห์
74	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
75	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
76	Isochlorine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
77	Lead	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a)
78	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a)
79	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(a)
80	Methanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
81	Methoxy-chlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
82	Methyl bromide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
83	Methylene chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
84	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
85	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
86	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
87	Naphthalene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
88	Nickel	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a)
89	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
90	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)

91 N-Nitrosodi-n-propylamine...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
91	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
92	Polychlorinated Biphenyls PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) 1) Distillation, Direct Photometric Method ^(a) 2) Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
93	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
94	pH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
95	Phenanthrene	1) Distillation, Direct Photometric Method ^(a) 2) Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
96	Phenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
97	Pyrene	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a)
98	Selenium	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a)
99	Silver	3) Digestion, Inductively Coupled Plasma Method ^(a)
100	Styrene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
101	1,1,2,2-tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
102	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
103	Toluene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a)
104	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
105	TPH (C ₅ -C ₉)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)

106 TPH (C₁₀-C₁₄)...

ลำดับที่	สารเคมี	วิธีการตรวจ
106	TPH (C ₁₀ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
107	TPH (C ₁₆ -C ₃₀)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
108	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
109	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
110	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
111	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
112	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
113	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
114	1,2,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
115	Vanadium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a)
116	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
117	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
118	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
119	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
120	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
121	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^(a)
122	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a)

หมายเหตุ...

ภาคผนวก ๒ (ข้อมูลเฉพาะ) ส่วนที่ ๒.๒.๒

ลำดับที่	สารเคมี	วิธีการตรวจ
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^(a) 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^(a) 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(a) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a) Instrumental Analyzer Method ^(a) Absorption Sampling, Ion Chromatographic Method ^(a) 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^(a) 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^(a) Adsorption Sampling, Gas Chromatographic Method ^(a) Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ^(a) Absorption Sampling, Ion Chromatographic Method ^(a) Absorption Sampling, Ion Chromatographic Method ^(a) Absorption Sampling, Iodometric Method ^(a) 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^(a) 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^(a) 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(a) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(a) Ringelmann's Method ^(a) 1) Absorption Sampling, Phenolsulfonic acid Method ^(a) 2) Instrumental Analyzer Method ^(a)
2	Arsenic	
3	Carbon monoxide	
4	Chlorine	
5	Copper	
6	Cresol	
7	Dioxins/Furans	
8	Hydrogen Chloride	
9	Hydrogen Fluoride	
10	Hydrogen Sulfide	
11	Lead	
12	Mercury	
13	Opacity	
14	Oxides of Nitrogen	

15 Sulfur dioxide...

ลำดับที่	สารมลพิษ	วิธีการตรวจ
15	Sulfur dioxide	1) Adsorption Sampling, Barium-Thorium Titrimetric Method ⁽¹⁾ 2) Instrumental Analyzer Method ⁽²⁾
16	Sulfuric acid	Isokinetic Sampling, Barium-Thorium Titrimetric Method ⁽¹⁾
17	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽¹⁾
18	Xylene	Absorption Sampling, Gas Chromatographic Method ⁽¹⁾

สิ่งบ่งชี้มลพิษที่วัดได้โดยวิธีอื่น ๆ

ลำดับที่	สารมลพิษ	วิธีการตรวจ
1	Aldrin	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
2	Antimony	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾⁽⁵⁾
3	Arsenic	4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾ 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁷⁾ 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁷⁾
4	Barium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾⁽⁵⁾

4) Digestion...

ลำดับที่	สารมลพิษ	วิธีการตรวจ
5	Beryllium	4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾ 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾
6	Cadmium	5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾ 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁴⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
7	Chlordane	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾

3) Waste Extraction...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
9	Chromium (II)	3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,10) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(1,13) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,18) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(1,4,5,18) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(1,4,5,18) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^(1,4,5,18) 4) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,18) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,18) 6) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,18) 1) Waste Extraction, Colorimetric Method ^(1,18) 2) Alkaline Digestion, Colorimetric Method ^(8,18) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,13) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(4,18) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,13,18) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,18) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,18) 6) Digestion, Inductively Coupled Plasma Method ^(7,18)
10	Chromium (VI)	
11	Cobalt	

12 Copper...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,18) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,18) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,18) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,18) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,18) 6) Digestion, Inductively Coupled Plasma Method ^(7,18) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,2,20) 2) Soxhlet Extraction, Gas Chromatographic Method ^(11,20) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(11,20) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,20) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,20) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(11,20) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,20) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,20) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(11,20) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,20) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,20) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(11,20) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,20) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,20)
13	2,4-D	
14	DDD	
15	DDT	
16	DDT	
17	Dieldrin	

18 Endrin...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
18	Endrin	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
19	Heptachlor	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁶⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁶⁾⁽⁷⁾ 4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁶⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁷⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁾⁽⁵⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
21	Lindane	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁾⁽⁵⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁾⁽⁵⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾
23	Methoxychlor	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾

3) Soxhlet...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
24	Mirex	3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾
25	Molybdenum	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁶⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁶⁾⁽⁷⁾ 4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁶⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁷⁾ 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁶⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁶⁾⁽⁷⁾ 4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁶⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁷⁾ 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁾⁽⁵⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾
26	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁶⁾ 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁶⁾⁽⁷⁾ 4) Digestion, Flame Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁵⁾ 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁶⁾ 6) Digestion, Inductively Coupled Plasma Method ⁽¹⁾⁽⁷⁾ 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁾⁽⁴⁾⁽⁵⁾ 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁾⁽⁵⁾ 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾
27	Polychlorinated Biphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,4,4'-Trichlorobiphenyl 2,2',5,5'-Tetrachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾ 2) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽⁴⁾ 3) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²⁾⁽³⁾

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

ลำดับที่	สารเคมี	วิธีวิเคราะห์
28	2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'-Hexachlorobiphenyl 2,2',4,4',5,5'-Hexachlorobiphenyl 2,2',3,4,4',5,5'-Heptachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1.24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(1.24) 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(1.6.21) 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7.21) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.4.13) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.14) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.18) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.14) 6) Digestion, Inductively Coupled Plasma Method ^(7.14)
29	Selenium	
30	Silver	
31	Thallium	

32 Toxaphene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
32	Toxaphene	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.6.24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(1.6.24) 3) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.21) 1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1.2.28) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1.2.28) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.19) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.14) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1.2.28) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.18) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.14) 6) Digestion, Inductively Coupled Plasma Method ^(7.14)
33	Trichloroethylene	
34	Vanadium	
35	Vinyl chloride	
36	Zinc	

37...

ฉบับแก้ไขเพิ่มเติม 121 พฤษภาคม 2561

ลำดับที่	สารหลัก	วิธีการตรวจ
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
3	Alkalin	Soxhlet Extraction, Gas Chromatographic Method(11.24)
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
5	Antimony	1) Digestion, Flame Atomic Absorption Spectrometric Method(7.19) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method(7.14)
6	Arsenic	3) Digestion, Inductively Coupled Plasma Method(7.14) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method(7.12)
7	Atrazine	Soxhlet Extraction, Gas Chromatographic Method(11.24)
8	Baillum	1) Digestion, Flame Atomic Absorption Spectrometric Method(7.13) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method(7.14)
9	Benz(a)anthracene	3) Digestion, Inductively Coupled Plasma Method(7.14) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
11	Benzol(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
12	Benzol(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
13	Benzoic acid	Soxhlet Extraction, Gas Chromatographic Method(11.24)
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
16	Beryllium	1) Digestion, Flame Atomic Absorption Spectrometric Method(7.19)

2) Digestion...

ลำดับที่	สารหลัก	วิธีการตรวจ
17	Bis(2-chloroethyl)ether	2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method(7.14) 3) Digestion, Inductively Coupled Plasma Method(7.14)
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.23)
19	Bromodichloromethane	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.23)
20	Bromofom	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
22	Butyl benzyl phthalate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method(7.14) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method(7.14) 3) Digestion, Inductively Coupled Plasma Method(7.14)
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
27	Chlordane	Soxhlet Extraction, Gas Chromatographic Method(11.24)
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
29	Chlorobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method(11.21)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method(13.24)
32	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method(7.13)

2) Digestion...

ลำดับที่	สารเคมี	วิธีการตรวจ
33	Chromium (III)	2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,10) 3) Digestion, Inductively Coupled Plasma Method ^(1,10) 1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(1,7,8,10,18) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(1,7,8,10,18) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(1,7,8,10,18)
34	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,18)
35	Chrysene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12)
36	Cyanide	1) Extraction, Distillation, Titrimetric Method ^(2,20,20) 2) Extraction, Distillation, Colorimetric Method ^(2,20,20)
37	2,4-D	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
38	DDD	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
39	DDE	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
40	DDT	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
41	Dibenz[a,h]anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12)
42	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12)
43	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
44	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
45	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
46	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
47	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
48	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)

49 cis-1,2-Dichloroethylene...

ลำดับที่	สารเคมี	วิธีการตรวจ
49	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
50	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
51	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
52	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
53	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
54	Dieldrin	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
55	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
56	2,4-Dimethylphenol	Soxhlet Extraction, Gas Chromatographic Method ^(1,23)
57	2,4-Dinitrophenol	Soxhlet Extraction, Gas Chromatographic Method ^(1,23)
58	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic Method ^(1,23)
59	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic Method ^(1,23)
60	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
61	Endosulfan	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
62	Endrin	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
63	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
64	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
65	Fluorene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
66	Heptachlor	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
67	Heptachlor epoxide	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
68	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
69	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,20)
70	α-HCH	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
71	β-HCH	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)
72	γ-HCH	Soxhlet Extraction, Gas Chromatographic Method ^(1,20)

73 Hexachlorocyclopentadiene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
73	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,2)
74	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,2)
75	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,2)
76	Isophorone	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,2)
77	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,14) 3) Digestion, Inductively Coupled Plasma Method ^(2,14)
78	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
79	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁸⁾
80	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)
81	Methoxychlor	Soxhlet Extraction, Gas Chromatographic Method ^(1,28)
82	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)
83	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)
84	2-Methylphenol	Soxhlet Extraction, Gas Chromatographic Method ^(1,28)
85	2-Methylnaphthalene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
86	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)
87	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)
88	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(2,14)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
89	Nitrobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,28)
90	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
91	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
92	Polychlorinated Biphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,2',5,5'-Tetrachlorobiphenyl 2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'- Hexachlorobiphenyl 2,2',4,4',5,5'- Hexachlorobiphenyl 2,2',3,4,4',5,5'- Heptachlorobiphenyl Pentachlorophenol Phenanthrene	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(2,14) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)
93	Phenanthrene	Soxhlet Extraction, Gas Chromatographic Method ^(1,28)
94	Phenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
95	Pyrene	Soxhlet Extraction, Gas Chromatographic Method ^(1,28)
96	Selenium	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,27)
97	Silver	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,21) 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(2,14)
99	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(3,26)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
100	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
101	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
102	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
103	Toxaphene	Soxhlet Extraction, Gas Chromatographic Method ^(11.24)
104	TPH (C ₉ -C ₁₀)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
105	TPH (C ₁₀ -C ₁₂)	Soxhlet Extraction, Gas Chromatographic Method ^(11.24)
106	TPH (C ₁₂ -C ₁₅)	Soxhlet Extraction, Gas Chromatographic Method ^(11.24)
107	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
108	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
109	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
110	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
111	2,4,5-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic Method ^(11.24)
112	2,4,6-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic Method ^(11.24)
113	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
114	Vanadium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.19) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.19) 3) Digestion, Inductively Coupled Plasma Method ^(7.19)
115	Vinyl acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
116	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
117	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
118	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
119	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)

120 Xylene (Total)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
120	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(11.24)
121	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.19) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.19) 3) Digestion, Inductively Coupled Plasma Method ^(11.24)

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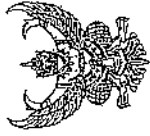
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ภาคผนวก ข

ใบอนุญาตเป็นผู้ตรวจวัดและวิเคราะห์สภาวะการทำงาน
เกี่ยวกับ ความร้อน แสงสว่าง เสียง และสารเคมี
อันตรายในบรรยากาศ





แบบ กว.บญ
จัดพิมพ์

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นผู้ให้บริการบริการสาธารณะด้วยความซื่อสัตย์สุจริตและมีอัตรา
ในบรรยากาศของสถานที่ทำงาน และสถานที่ที่ให้บริการสาธารณะมีอัตรา

ใบอนุญาตเลขที่ ๑๒๐๒-๐๓-๒๕๖๔-๐๐๐๓

อนุญาตให้... (ชื่อ) ...

เลขทะเบียนใบอนุญาต... (ชื่อ) ...
ตั้งอยู่เลขที่... (ชื่อ) ...
เป็นผู้ให้บริการบริการสาธารณะด้วยความซื่อสัตย์สุจริตและมีอัตรา
ในบรรยากาศของสถานที่ทำงาน และสถานที่ที่ให้บริการสาธารณะมีอัตรา
ใบอนุญาตเลขที่ ๑๒๐๒-๐๓-๒๕๖๔-๐๐๐๓

ให้นี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๕

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

(นายสมพงษ์ กางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแบบท้ายใบอนุญาต
และสถานที่ที่ให้บริการบริการสาธารณะด้วยความซื่อสัตย์สุจริตและมีอัตรา
ในบรรยากาศของสถานที่ทำงาน และสถานที่ที่ให้บริการสาธารณะมีอัตรา
ใบอนุญาตเลขที่ ๑๒๐๒-๐๓-๒๕๖๔-๐๐๐๓

- | | |
|---------------------|--------------------|
| ๑. นายบุญพงศ์ | โคตนา |
| ๒. นายเทพพงศ์ | เชยวัดเกาะ |
| ๓. นางสาวต๋อยรัก | ลีแท้ |
| ๔. นางสาวกนกวรรณ | เริ่มประจักษ์ไปดอย |
| ๕. นายกิตติศักดิ์ | เมืองงาม |
| ๖. นางสาวบุญญานันท์ | สารแสง |
| ๗. นายจ่อย | นันทา |
| ๘. นางสาวสมลักษณ์ | คิมทอง |

ให้นี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๕

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

(นายสมพงษ์ กางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กส. ๖๐๒
อธิบดีฯ

การสรรหาและผู้ครองแรงงาน

ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดและวิเคราะห์ผลการปฏิบัติงานที่เกี่ยวข้องกับระดับแสงสว่าง

ใบอนุญาตเลขที่ ๑๔๐๒-๐๓-๒๕๖๔-๐๐๑๓

อนุญาตให้.....บริษัท เพอสิติสแอนด์โซลูชั่น จำกัด

เลขทะเบียนนิติบุคคล.....๑๑๒๕๕๕๐๐๘๕๓๓

ตั้งอยู่ เลขที่ ๑๔/๖ ซอยร่มเกล้า ๑๕ แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎหมายว่าด้วยความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานในกรณีพิเศษ และขอเป็นตัวแทนขอใบอนุญาตให้ปฏิบัติงานในกรณีพิเศษร่วมกับหน่วยงานของรัฐ และเสีย พ.ศ. ๒๕๖๔ ไม่สามารถจะจัดและบริหารระดับความถี่ในการให้ใบอนุญาตให้ปฏิบัติงานเพื่อส่งเสริมความปลอดภัย ประชูปกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้ปฏิบัติงานเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ โดยมีเอกสาร จำนวน ๕ ราย

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๔

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

(นายสมพงษ์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรมอบหมายไปอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์ผลการปฏิบัติงานเกี่ยวกับแสงสว่าง

ของบริษัท เพอสิติสแอนด์โซลูชั่น จำกัด

ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๔-๐๐๑๓

- | | |
|------------------|--------------|
| ๑. นายปิยะชัย | บุษกรเกียรติ |
| ๒. นางสาวกมลดา | จอกสูงเนิน |
| ๓. นางสาวสุกัญญา | อยู่รัมย์ |
| ๔. นายภพ | พวงวงศ์ |
| ๕. นางสาวมรุตน์ | โธมมัทย์ |

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๔

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

(นายสมพงษ์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



เป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาพแวดล้อมทางกายภาพกับระดับเสียง

ใบอนุญาติเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๑

อนุญาตให้.....บริษัท.....ผลิตสิ่งแฉดส์นมไทย จำกัด

เลขาจะเป็นคนมีสติพอคิด.....๒๕๒๕ถึง๒๕๒๖อยู่คนเดียว

ด้วยที่ ๑๖๖ ของกรมที่ดินมา ๓๑.๕ แล้วส่งมาอยู่ ๒๒๒ของกรมที่ดิน

เป็นที่ติดต่อกันให้บริการด้านความปลอดภัย อย่างอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง

ที่กำหนดมาตรฐานในการบริหาร จัดการ และระเบียบในการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม

ในการทำงานเกี่ยวกับกรมขึ้น แรกเริ่ม พ.ศ. ๒๕๔๕ ในการตรวจวัดและวิเคราะห์ภัยจากสารอันตราย

เกี่ยวกับปริมาณเสียง ประกอบกับกฎกระทรวงการตั้งทะเบียนและกำหนดกฎหมายให้บริการ เพื่อส่งเสริมความ

ปลอดภัย อย่างอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย

อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีหลักการ จำนวน ๕ วิชาความปลอดภัย

ทั้งนี้ ตั้งแต่บัดนี้ที่ ๑๔ ธันวาคม ๒๕๖๔ ถึงวันที่ ๑๗ ธันวาคม ๒๕๖๔

รพีพร ณ สุณี และ สุชาภาภพ พ.ศ. ๒๕๕๖

✓

(นายสมพงษ์ ภาณุวงศ์)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

ภาษาเขียนด้วยตัวอักษรไทย

เป็นผู้ดูแลให้บริการตรวจวัดและวิเคราะห์ผลการดำเนินงานเกี่ยวกับเสียง

ប្រែប្រួលនៅថ្ងៃ ០៤/០៣/២០២០

๑. นายปิยะชัย นนทบุรี
๒. นางสาวกัญญาพร จอทองนิภา
๓. นางสาวสุภัคชญา อุ่นม
๔. นางกตพล นพพารัฐ
๕. นางสาวอรพรัญม โยมนต์

หนังสือตั้งแต่วันที่ ๒๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๗ ธันวาคม พ.ศ. ๒๕๖๕

[illegible]

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(นายสมรพจน์ กวางแก้ว)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน