

## ภาคผนวกที่ 7

### เอกสารการสอบเทียบความถูกต้องของเครื่องมือ



บริษัท ทีเอสพี-แลบ คอนซัลแตนท์ จำกัด  
TOPS-LAB Consultants CO., LTD.  
189 หมู่ที่ 3 ตำบลบางรักพัฒนา อำเภอบางบัวทอง จังหวัดนนทบุรี 11110  
189 Moo. 3 Bangrakphatthana Bangbua Thong Nonthaburi 11110  
Tel : (662) 159-0121 Fax : (662) 159-0122



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TOPS-LAB Consultants CO., LTD.  
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189 Moo. 3 Bangrakphatthana Bangbua Thong Nonthaburi 11110  
Tel : (662) 159-0121 Fax : (662) 159-0122

### TSP High Volume Sampler Calibration

Calibration Report No. TSP-6805011

TSP No.: 1941  
Date: 26-May-25  
Technical: C. Kunlapat  
Approval: K. Metawee  
Location: วิทยาลัยการอาชีพบางบาล อำเภอบางบาล จังหวัดสุพรรณบุรี

#### CONDITIONS

Sea Level Pressure (hPa): 1012.0 Corrected Pressure (mm Hg): 759.1  
Temperature (deg C): 35.0 Temperature (deg K): 308.0  
Seasonal SL Press. (hPa): 1000.7 Corrected Seasonal (mm Hg): 750.6  
Seasonal Temp. (deg C): 20.0 Seasonal Temp. (deg K): 293.0

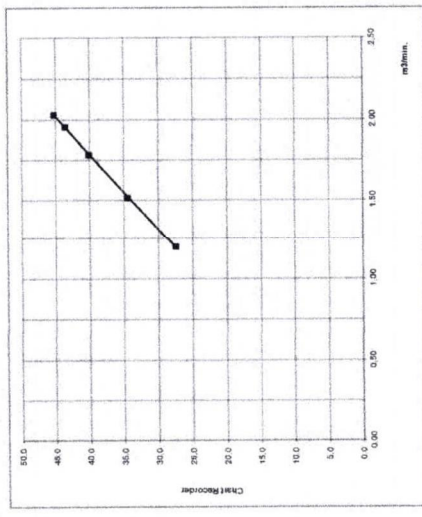
#### CALIBRATION ORIFICE

Make: Tisch Environmental, Inc  
Model: TE-5025A  
Serial#: 3092  
Qstd Slope: 1.29243  
Qstd Intercept: -0.01962  
Date Certified: 18-Jun-24

#### CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	2.41	1.196	27.90	27.43	Slope = 21.2161
2	3.89	1.515	35.00	34.41	Intercept = 2.1433
3	5.41	1.784	40.80	40.11	Corr. coeff. = 0.9999
4	6.51	1.956	44.26	43.51	
5	7.02	2.030	46.00	45.22	# of Observations: 5

Range of Chart at 40-60 CFM 49.70



Calibrated by : C. Kunlapat  
(Kunlapat Chuichoti)

Approved by : K. Metawee  
(Metawee Khumkham)

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### TSP High Volume Sampler Calibration

Calibration Report No. TSP-6805012

TSP No.: 1940  
Date: 26-May-25  
Technical: C. Kunlapat  
Approval: K. Metawee  
Location: วิทยาลัยการอาชีพบางบาล อำเภอบางบาล จังหวัดสุพรรณบุรี

#### CONDITIONS

Sea Level Pressure (hPa): 1012.0 Corrected Pressure (mm Hg): 759.1  
Temperature (deg C): 35.0 Temperature (deg K): 308.0  
Seasonal SL Press. (hPa): 1000.7 Corrected Seasonal (mm Hg): 750.6  
Seasonal Temp. (deg C): 20.0 Seasonal Temp. (deg K): 293.0

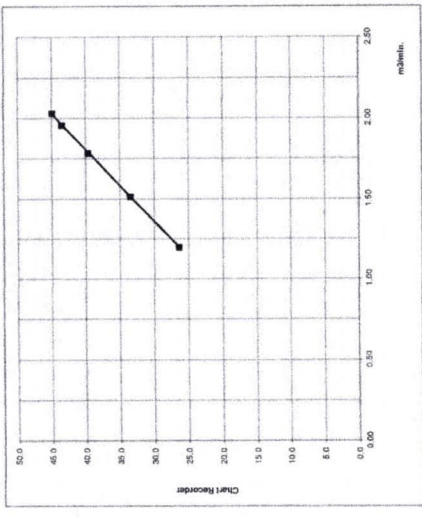
#### CALIBRATION ORIFICE

Make: Tisch Environmental, Inc  
Model: TE-5025A  
Serial#: 3092  
Qstd Slope: 1.29243  
Qstd Intercept: -0.01962  
Date Certified: 18-Jun-24

#### CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	2.41	1.196	26.79	26.34	Slope = 22.3657
2	3.89	1.515	34.00	33.42	Intercept = -0.4046
3	5.41	1.784	40.34	39.66	Corr. coeff. = 0.9999
4	6.51	1.956	44.12	43.37	
5	7.02	2.030	45.67	44.89	# of Observations: 5

Range of Chart at 40-60 CFM 49.70



Calibrated by : C. Kunlapat  
(Kunlapat Chuichoti)

Approved by : K. Metawee  
(Metawee Khumkham)

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## TSP High Volume Sampler Calibration

Calibration Report No. TSP-6805013

TSP No.: 1947

Date: 26-May-25

**Location:** บริเวณโรงเรียนวัดยางงาม

Technical: C.Kunlapat

Approval: K. Metawee

Approval: K. Metawee

## CONDITIONS

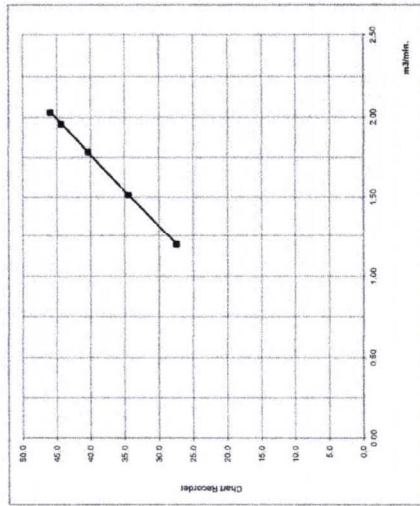
Sea Level Pressure (hPa):	1012.0	Corrected Pressure (mm Hg):	759.1
Temperature (deg C):	35.0	Temperature (deg K):	308.0
Seasonal SL Press. (hPa):	1000.7	Corrected Seasonal (mm Hg):	750.6
Seasonal Temp. (deg C):	20.0	Seasonal Temp. (degK):	293.0

**CALIBRATION ORIFICE**

Make: Tisch Environmental, Inc  
Model: TE-5025A  
Serial#: 3092  
Qstd Slope: 1.29243  
Qstd Intercept: -0.01962  
Date Certified: 18-Jun-24

## CALIBRATIONS

Plate or Test #	H <sub>2</sub> O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	2.41	1.196	27.89	27.42	Slope = 22.2575
2	3.89	1.515	35.00	34.41	Intercept = 0.7305
3	5.41	1.784	41.00	40.30	Corr. Coeff. = 0.9999
4	6.51	1.956	45.10	44.33	
5	7.02	2.030	46.77	45.98	# of Observations: 5



Calibrated by : *C. Kunlapat*  
(Kunlapat Chuichoti)

Approved by : *K. Metawee*  
(Metawee Khumkham)

## PM10 High Volume Sampler Verification

Verification Report No. PM-6805011

## SITE

PM-10 No. : 5095

Date: 26-May-25

**Location:** โรงพยาบาลส่งเสริมสุขภาพตำบลบ้านมะเกลือ

Test: C.Kunlapat

Approval: K. Metawee

Approval: K. Metawee

## CONDITIONS

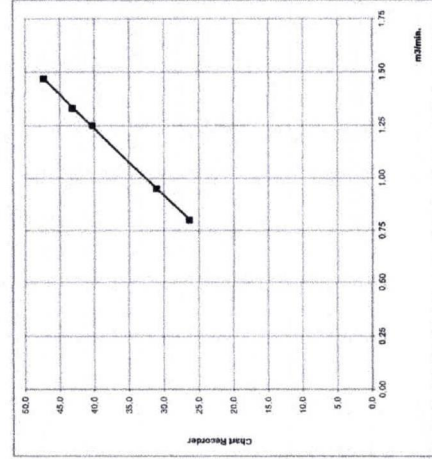
Sea Level Pressure (hPa):	1012.0	Corrected Pressure (mm Hg):	759.1
Temperature (deg C):	34.0	Temperature (deg K):	307.0
Seasonal SL Press. (hPa):	1005.8	Corrected Seasonal (mm Hg):	754.4
Seasonal Temp. (deg C):	21.0	Seasonal Temp. (deg K):	294.0

**CALIBRATION ORIFICE**

Make: Tisch Environmental, Inc  
Model: TE-5025A  
Serial#: 3092  
Slope: 1.29243  
Intercept: -0.01962  
Date Certified: 18-Jun-24

**TEST**

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	2.53	0.798	26.74	26.33	Slope (m) = 31.2961
2	3.61	0.950	31.48	31.00	Intercept (b) = 1.2958
3	6.32	1.252	40.90	40.27	Corr. coeff.(r) = 0.9999
4	7.14	1.330	43.75	43.08	SFR = 1.173
5	8.73	1.469	47.50	47.30	SSP = 59.75



Calibrated by : C. Kunlapat  
(Kunlapat Chuichoti)

Approved by : *K. M. Pance*  
(Metawee Khumkham)



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PM10 High Volume Sampler Verification

Verification Report No. PM-6805012

**SITE**

PM-10 No.: 2381 Date: 26-May-25  
Location: บ้านไร่เจริญวัฒนา Test: C.Kunlapat  
Approval: K.Metawee

**CONDITIONS**

Sea Level Pressure (hPa):	1012.0	Corrected Pressure (mm Hg):	759.1
Temperature (deg C):	34.0	Temperature (deg K):	307.0
Seasonal SL Press. (hPa):	1005.8	Corrected Seasonal (mm Hg):	754.4
Seasonal Temp. (deg C):	21.0	Seasonal Temp. (deg K):	294.0

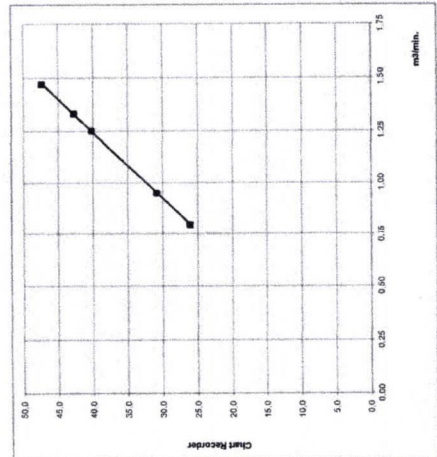
**CALIBRATION ORIFICE**

Make: Tisch Environmental, Inc  
Model: TE-5025A  
Serial#: 3092

Slope: 1.29243  
Intercept: -0.01962  
Date Certified: 18-Jun-24

**TEST**

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	2.53	0.798	26.45	26.04	Slope (m)= 31.5538
2	3.61	0.950	31.24	30.76	Intercept (b)= 0.7980
3	6.32	1.252	40.81	40.18	Corr. coeff. (r)= 0.9999
4	7.14	1.330	43.36	42.69	SFR = 1.173
5	8.73	1.469	47.22	47.30	SSP = 59.44
					# of Observations: 5



Calibrated by: C. Kunlapat  
(Kunlapat Chuichoti)

Approved by: K. Metawee  
(Metawee Khumkham)

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PM10 High Volume Sampler Verification

Verification Report No. PM-6805013

**SITE**

PM-10 No.: 1942 Date: 26-May-25  
Location: บ้านไร่เจริญวัฒนา Test: C.Kunlapat  
Approval: K.Metawee

**CONDITIONS**

Sea Level Pressure (hPa):	1012.0	Corrected Pressure (mm Hg):	759.1
Temperature (deg C):	34.0	Temperature (deg K):	307.0
Seasonal SL Press. (hPa):	1005.8	Corrected Seasonal (mm Hg):	754.4
Seasonal Temp. (deg C):	21.0	Seasonal Temp. (deg K):	294.0

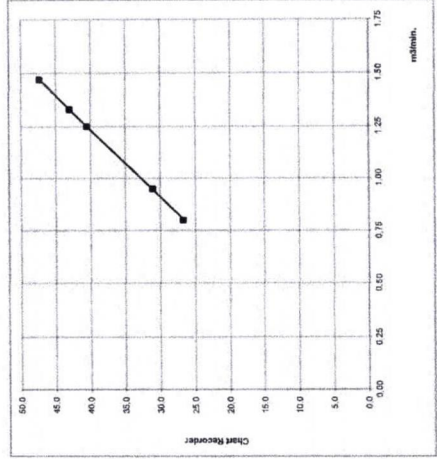
**CALIBRATION ORIFICE**

Make: Tisch Environmental, Inc  
Model: TE-5025A  
Serial#: 3092

Slope: 1.29243  
Intercept: -0.01962  
Date Certified: 18-Jun-24

**TEST**

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	2.53	0.798	27.10	26.68	Slope (m)= 30.8398
2	3.61	0.950	31.55	31.06	Intercept (b)= 1.9393
3	6.32	1.252	41.20	40.57	Corr. coeff. (r)= 0.9999
4	7.14	1.330	43.60	42.93	SFR = 1.173
5	8.73	1.469	45.30	47.30	SSP = 59.92
					# of Observations: 5



Calibrated by: C. Kunlapat  
(Kunlapat Chuichoti)

Approved by: K. Metawee  
(Metawee Khumkham)





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## Analyzer Performance Test

Calibration Report No.: 6805008 Page: 1/1

Calibrated Date: 26 May 2025

Calibrated For: บริษัท รวมผลโมโตเพาเวอร์ จำกัด

### Instruments Information

Analyzer Type: NO2 Analyzer Model: 42C	Manufacturer API S/N: 362
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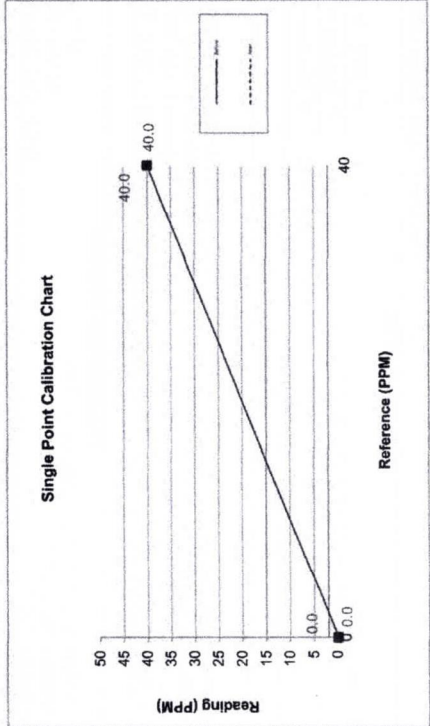
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model B22019 S/N: APPVD ZERO AIR Generator E07N199E15A0002 S/N: E80125123	NO Conc 54.81 PPM SO2 Conc 52.99 PPM CO Conc 4.469 PPM Expire Date: 6 November 2027

Environment: Temperature 30.0 °C Humidity: 39.0 %RH

### Calibration Report

Status	Reference (PPM)	Reading (PPM)	Drift (PPM)	Span	Reference (PPM)	Reading (PPM)	Drift%
Before	0.0	0.0	0.0	40.0	40.0	40.0	0.0
After	0.0	0.0	0.0	40.0	40.0	40.0	0.0



Calibrate By: C. Kunlapat

(Kunlapat Chulchoti)

Date : May 26, 2025

Approve By: M. Metawee

(Metawee Khumkham)

Date : May 26, 2025

## Analyzer Performance Test

Calibration Report No.: 6805009 Page: 1/1

Calibrated Date: 26 May 2025

Calibrated For: บริษัท รวมผลโมโตเพาเวอร์ จำกัด

### Instruments Information

Analyzer Type: NO2 Analyzer Model: 200A	Manufacturer API S/N: 615
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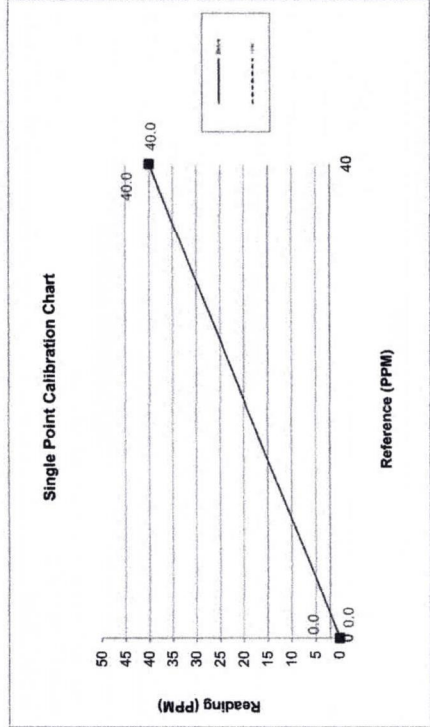
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model B22019 S/N: APPVD ZERO AIR Generator E07N199E15A0002 S/N: E80125123	NO Conc 54.81 PPM SO2 Conc 52.99 PPM CO Conc 4.469 PPM Expire Date: 6 November 2027

Environment: Temperature 30.0 °C Humidity: 39.0 %RH

### Calibration Report

Status	Reference (PPM)	Reading (PPM)	Drift (PPM)	Span	Reference (PPM)	Reading (PPM)	Drift%
Before	0.0	0.0	0.0	40.0	40.0	40.0	0.0
After	0.0	0.0	0.0	40.0	40.0	40.0	0.0



Calibrate By: C. Kunlapat

(Kunlapat Chulchoti)

Date : May 26, 2025

Approve By: M. Metawee

(Metawee Khumkham)

Date : May 26, 2025





## Analyzer Performance Test

Calibration Report No.: 6805010  
Page: 1/1  
Calibrated Date: 26 May 2025  
Calibrated For: บริษัท รวมผลไม้อิโศพาเวอร์ จำกัด

### Instruments Information

Analyzer Type: NO2 Analyzer	Manufacturer API
Model: T200	S/N: 2014

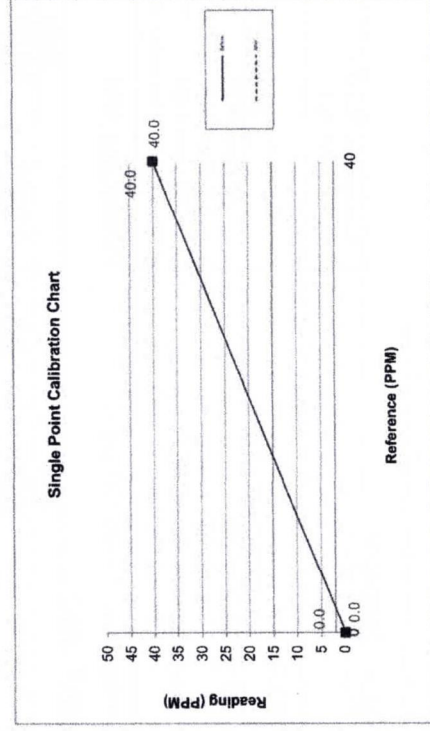
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model B22019	NO Conc 54.81 PPM
S/N: APPVD	SO2 Conc 52.99 PPM
ZERO AIR Generator E07N199E15A0002	CO Conc 4.469 PPM
S/N: EB0125123	Expire Date: 8 November 2027

Environment: Temperature 30.0 °C Humidity: 39.0 %RH

### Calibration Report

Status	Reference (PPM)	Reading (PPM)	Drift (PPM)	Reference (PPM)	Reading (PPM)	Drift%
Before	0.0	0.0	0.0	40.0	40.0	0.0
After	0.0	0.0	0.0	40.0	40.0	0.0



Calibrate By : C. Kunlapat (Kunlapat Chuichoti)  
Date : May 26, 2025  
Approve By : K. Meeanee (Metawee Khumkham)  
Date : May 26, 2025



## Analyzer Performance Test

Calibration Report No.: 6805008  
Page: 1/1  
Calibrated Date: 26 May 2025  
Calibrated For: บริษัท รวมผลไม้อิโศพาเวอร์ จำกัด

### Instruments Information

Analyzer Type: SO2 Analyzer	Manufacturer Thermo
Model: 43C	S/N: 297

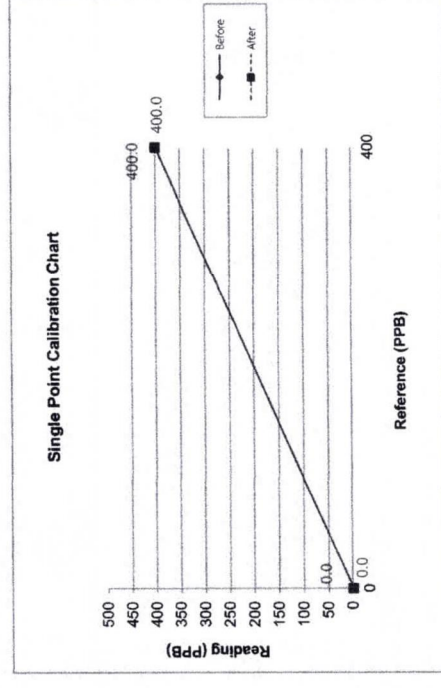
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model B22019	NO Conc 45.74 PPM
S/N: APPVD	SO2 Conc 44.9 PPM
ZERO AIR Generator E07N199E15A0002	CO Conc 4.490 PPM
S/N: EB0125123	Expire Date: 6 November 2027

Environment: Temperature 30.0 °C Humidity: 47.0 %RH

### Calibration Report

Status	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.0	0.0	400.0	400.0	0.0
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : C. Kunlapat (Kunlapat Chuichoti)  
Date : May 26, 2025  
Approve By : K. Meeanee (Metawee Khumkham)  
Date : May 26, 2025





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Tel : (662) 159-0121 Fax : (662) 159-0122

## Analyzer Performance Test

Calibration Report No.: 6805009

Calibrated Date: 26 May 2025

Calibrated For: บริษัท รวมผลไบโอเพาเวอร์ จำกัด

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### Instruments Information

Analyzer Type: SO2 Analyzer Model: 43C	Manufacturer Thermo S/N: 357
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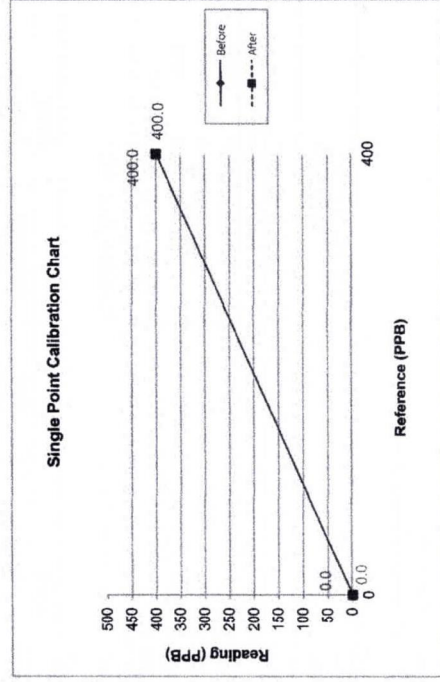
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model B22019 S/N: APPVD ZERO AIR Generator E07N199E15A0002 S/N: EB0125123	NO Conc 45.74 PPM SO2 Conc 44.9 PPM CO Conc 4.490 PPM Expire Date: 6 November 2027

Environment: Temperature 30.0 °C Humidity: 47.0 %RH

### Calibration Report

Status	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.0	0.0	400.0	400.0	0.0
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : C. Kunlapat

(Kunlapat Chuichoti)

Date : May 26, 2025

Approve By : K. Metawee

(Metawee Khumkham)

Date : May 26, 2025

## Analyzer Performance Test

Calibration Report No.: 6805006

Calibrated Date: 26 May 2025

Calibrated For: บริษัท รวมผลไบโอเพาเวอร์ จำกัด

Page: 1/1

### Instruments Information

Analyzer Type: SO2 Analyzer Model: M102E	Manufacturer Thermo S/N: 1116
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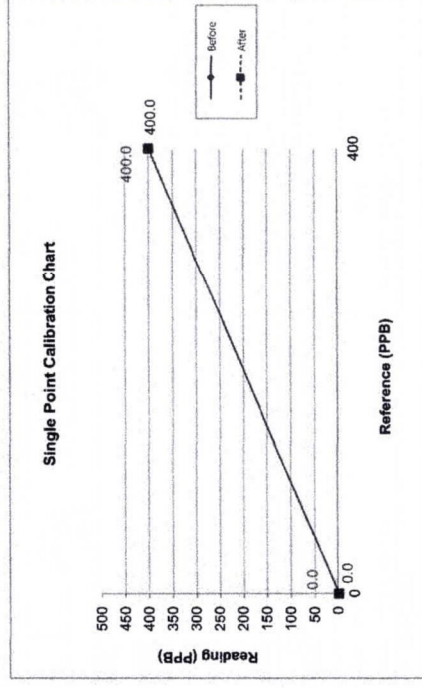
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model B22019 S/N: APPVD ZERO AIR Generator E07N199E15A0002 S/N: EB0125123	NO Conc 45.74 PPM SO2 Conc 44.9 PPM CO Conc 4.490 PPM Expire Date: 6 November 2027

Environment: Temperature 30.0 °C Humidity: 47.0 %RH

### Calibration Report

Status	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.0	0.0	400.0	400.0	0.0
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : C. Kunlapat

(Kunlapat Chuichoti)

Date : May 26, 2025

Approve By : K. Metawee

(Metawee Khumkham)

Date : May 26, 2025

## Certificate of Calibration

Certificate Number : SPR25010110-1 Page : 1 of 3


Customer : TOPS-LAB Consultants CO., LTD.  
 189 Moo. 3 Bangrakphatthana Bangbuathong Nonthaburi 11110

Equipment Name : Sound Level Meter  
 Manufacturer : Scarlet Tech  
 Model : ST-11D  
 Serial Number : 820952  
 ID. Number : TLC-S-029

Environmental Conditions  
 Ambient Temperature : 23 °C ± 3 °C Received Date : 10 Jan 2025  
 Relative Humidity : 50 % ± 15 % Calibration Date : 10 Jan 2025  
 Location of Calibration : In-Lab Recommend Due Date : 10 Jan 2026  
 Calibration Procedure : SP-CPE-04-01 Date of Issue : 11 Jan 2025

### 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. Nanthawat Wanasit Approved by :   
 Calibration Officer ( Mr. Prayoon Topart )  
 Authorized Signatory

## Calibration Report

Certificate Number : SPR25010110-1 Page : 2 of 3

### Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-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





## Result of Calibration

Certificate Number : SPR25010110-1

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A	Standard Setting	UUC Reading		Error		Uncertainty ( ± )
		Fast	Slow	Fast	Slow	
94		93.9	93.9	-0.1	-0.1	0.15
114		113.8	113.8	-0.2	-0.2	0.15

Unit : dB

Select C	Standard Setting	UUC Reading		Error		Uncertainty ( ± )
		Fast	Slow	Fast	Slow	
94		93.8	93.8	-0.2	-0.2	0.15
114		113.7	113.7	-0.3	-0.3	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 -

## Certificate of Calibration

Certificate Number : SPR25010109-6

Page : 1 of 3

Customer : TOPS-LAB Consultants CO., LTD.

189 Moo. 3 Bangrakphatthana Bangbuaathong Nonthaburi 11110

Equipment Name : Sound Level Meter

Manufacturer : Scarlet Tech

Model : ST-11D

Serial Number : 820954

ID. Number : TLC-S-031

Environmental Conditions

Ambient Temperature :  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 10 Jan 2025

Relative Humidity :  $50\% \pm 15\%$

Calibration Date : 16 Jan 2025

Location of Calibration : In-Lab

Recommend Due Date : 16 Jan 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 17 Jan 2025

### 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.Nanthawat Wanasit

Approved by : 

Calibration Officer

( Mr.Pootthipong A. )

Authorized Signatory

## Calibration Report

Certificate Number : SPR25010109-6

Page : 2 of 3



ID LINE : REC17025

### Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-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

69/29 Moo 1 Klongsi Klongluang Pathumthani 12120 Tel: (662) 193-2217-20 www.spmetrology.co.th www.สอบเทียบเครื่องมือวัด.com

## Result of Calibration

Certificate Number : SPR25010109-6

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A	Standard Setting	UUC Reading		Error		Uncertainty ( ± )
		Fast	Slow	Fast	Slow	
94		93.9	93.9	-0.1	-0.1	0.15
114		113.8	113.8	-0.2	-0.2	0.15

Select C	Standard Setting	UUC Reading		Error		Uncertainty ( ± )
		Fast	Slow	Fast	Slow	
94		93.8	93.8	-0.2	-0.2	0.15
114		113.7	113.7	-0.3	-0.3	0.15

Select Z	Standard Setting	UUC Reading		Error		Uncertainty ( ± )
		Fast	Slow	Fast	Slow	
94		93.8	93.8	-0.2	-0.2	0.15
114		113.7	113.7	-0.3	-0.3	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 -



Meter Console Information	
Console Model Number	XC-572V
Console Serial Number	0802003
DGM Model Number	CHNT
DGM Serial Number	L1500033350

Calibration Conditions			
Date	Time	15-May-24	10:00 AM
Calibration Reference No.		SE67AP0004	
Barometric Pressure		756	mm Hg
Calibration Meter Gamma		1.0000	unitless

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K <sub>1</sub>	0.386	
Console Leak Check		PASS


Calibration Data									
Run Time		Metering Console				Calibration Meter			
Elapsed (0)	DGM Orifice ΔH (P <sub>0</sub> )	Volume Initial (V <sub>0</sub> )	Volume Final (V <sub>20</sub> )	Outlet Temp Initial (t <sub>0</sub> )	Outlet Temp Final (t <sub>20</sub> )	Volume Initial (V <sub>0</sub> )	Volume Final (V <sub>20</sub> )	Outlet Temp Initial (t <sub>0</sub> )	Outlet Temp Final (t <sub>20</sub> )
(min)	mm H <sub>2</sub> O	m <sup>3</sup>	m <sup>3</sup>	°C	°C	m <sup>3</sup>	m <sup>3</sup>	°C	°C
15.00	13.0	0.6254	0.7971	24	24	146.38852	146.56290	25	25
10.00	25.0	0.8063	0.9573	24	24	146.57232	146.72808	25	25
7.00	50.0	0.9660	1.1149	24	24	146.73708	146.89179	25	25
6.00	80.0	1.4887	1.6596	25	25	147.27926	147.45522	25	25
5.00	120.0	1.3056	1.4811	25	25	147.08920	147.27138	25	25

Results								
Standardized Data				Dry Gas Meter				
Dry Gas Meter		Calibration Meter		Calibration Factor		Flowrate		ΔH @
(V <sub>gas</sub> )	(Q <sub>gas</sub> )	(V <sub>std</sub> )	(Q <sub>std</sub> )	Value (Y)	Variation (ΔY)	Std & Corr (Q <sub>stdcorr</sub> )	.0212 m <sup>3</sup> /min (ΔH@)	Variation (ΔΔH@)
m <sup>3</sup>	m <sup>3</sup> /min	m <sup>3</sup>	m <sup>3</sup> /min			m <sup>3</sup> /min	mm H <sub>2</sub> O	
0.169	0.011	0.170	0.011	1.011	-0.012	0.011	44.631	-0.696
0.148	0.015	0.152	0.015	1.026	0.002	0.015	47.923	2.596
0.147	0.021	0.161	0.022	1.031	0.007	0.022	47.836	2.508
0.168	0.028	0.172	0.029	1.022	-0.001	0.029	43.576	-1.752
0.174	0.035	0.178	0.036	1.026	0.003	0.036	42.673	-2.655
				1.023	Y Average		45.328	ΔH@ Average

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  $\pm 0.02$ .

Note: For ΔH<sub>0</sub>, orifice pressure differential that equates to 0.75cfm (0.0212m<sup>3</sup>/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is  $\pm 0.2$ inches (5.1mm) H<sub>2</sub>O.

Signature



Environmental System Integrator Co., Ltd.

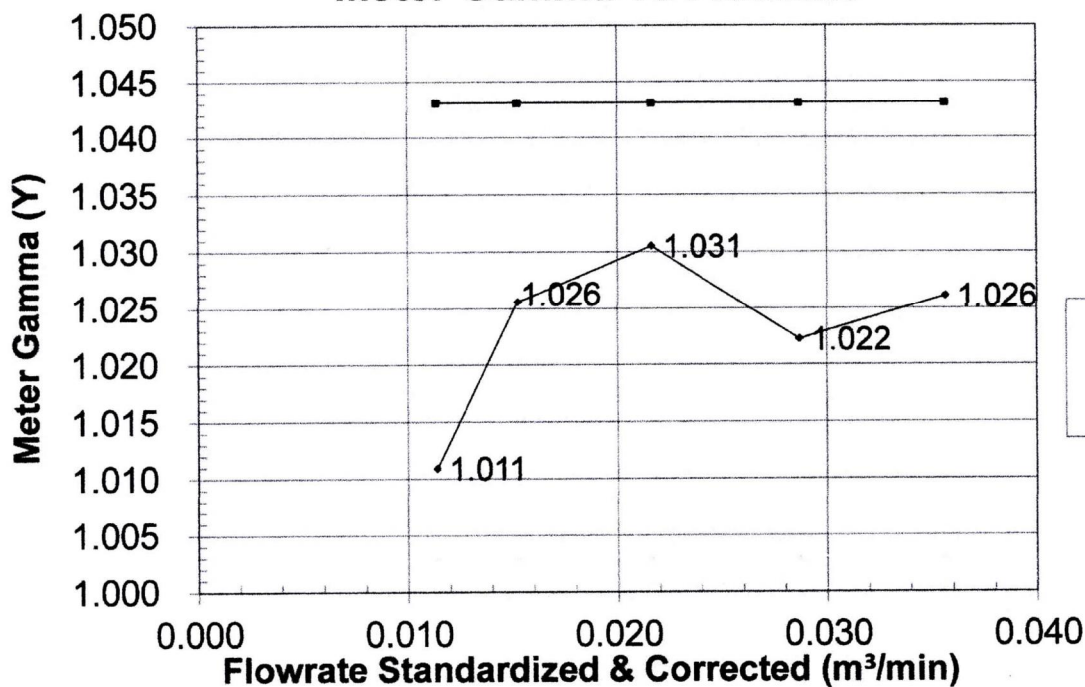
Date

15 May 24

Calibration Date: 15-5-2024

Calibration Reference No: SE67AP0004

## Meter Gamma vs Flowrate



• Gamma Y

■ Max Allow Y

■ Min Allow Y

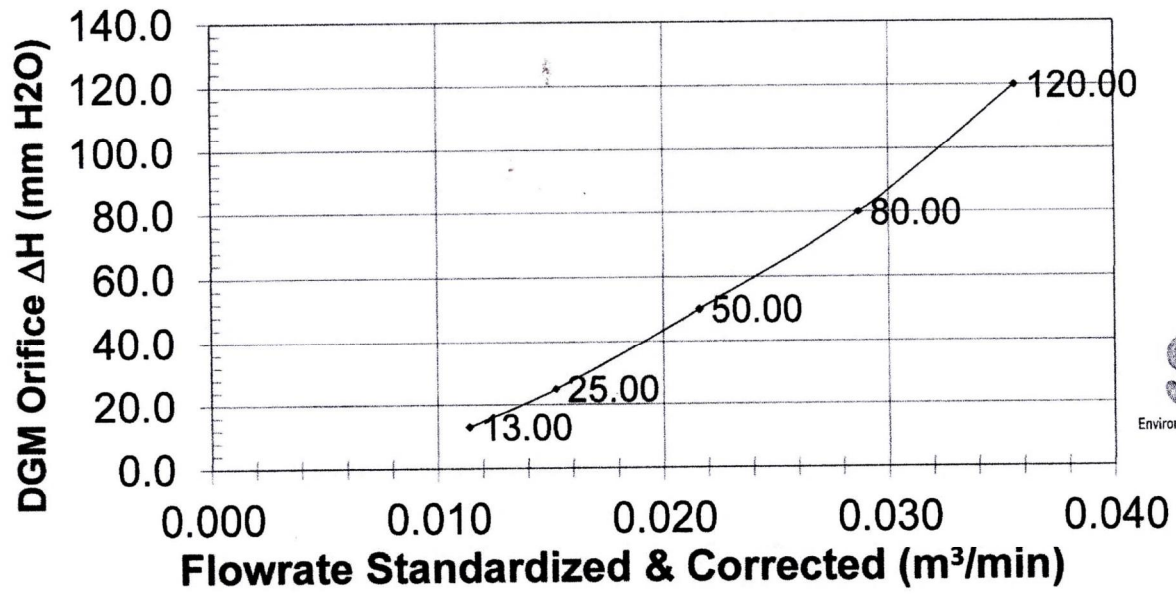
บริษัท เอ็นไวรอนเม้นทอล ซิสเต็ม อินทิเกรเตอร์ จำกัด  
ENVIRONMENTAL SYSTEM INTEGRATOR CO., LTD.

222/19 ถนนพหลโยธิน แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10710  
222/19 Phulphonthon Soi 2 Rd., Sathuhamong, Thawiwithong, Bangkok 10710  
E-mail : info@envi-system.com Website : www.envi-system.com  
โทรศัพท์ / TEL : 02-448-0771-2  
โทรสาร / FAX : 02-448-0773  
เลขประจำตัวผู้เสียภาษี 010555709241

Calibration Date: 15-5-2024

Calibration Reference No: SE87AP0004

## Meter Pressure vs Flowrate



Console Serial: 0802003

Console Model: XC-572V

THERMOCOUPLES SYSTEM CALIBRATION												
Sampling System Equipment Information					Calibration Conditions							
Console Model Number	XC-572V				Date	15-May-24 11:00 AM						
Console Serial Number	0802003				Calibration Reference No.	SE87AP0004						
DGM Model Number	CHNT				Barometric Pressure	756 mm Hg						
DGM Serial Number	L1500033350				Reference Thermometer	FLUKE 714						
Meter Box Model Number	JENCO 765				Serial Number	2959223						
Meter Box Serial Number	JC08846											
Results												
Console Thermocouple Simulator												
Channel and test point		Meter Box Channel Temperature Reading (°C)										
		-18.0	25.0	38.0	93.0	149.0	260.0	371.0	482.0	593.0	816.0	1038.0
Stack		-16	25	38	94	150	260	372	483	595	817	1041
Probe		-16	25	38	94	150						
Filter		-16	25	38	94	150						
Aux		-16	25	38	94	150						
Exit		-16	25	38								
Thermocouple of DGM												
Set Point	Reference Thermocouple	Probe Thermocouple						Difference				
30	30.0	29.9						0.03				
40	40.0	40.2						-0.06				
50	50.0	50.2						-0.06				
60	60.0	60.3						-0.09				
Stack		± 1.50% Absolute						± 3.0 °C				
Probe		± 3.0 °C						± 3.0 °C				
Filter		± 3.0 °C						± 2.0 °C				
Tolerance Range		Meter Exit						Signature				
Environmental System Integrator Co., Ltd.												



**PITOT TUBE CALIBRATION**

Environmental System Integrator Co., Ltd.  
Web Site : www.envi-system.com  
E-mail : info@envi-system.com

Sampling System Equipment Information		Calibration Conditions	
Console Model Number	XC-572V	Date	15-May-24
Console Serial Number	0802003	Calibration Reference No.	SE67AP0004
DGM Model Number	CHNT	Barometric Pressure	756
DGM Serial Number	L150003350	Pitot Tube Type	S
Pitot tube Number		size (OD)	3/8
		Standard Pitot Tube ID Number	160-12
		Cp (std)	0.99

Results			
"A" SIDE CALIBRATION			
RUN No.	Δp std mm H <sub>2</sub> O	Cp (s)	DEVIATION Cp(s)-Cp(A)
1	6.4	0.854	0.008
2	17.4	0.839	-0.006
3	31.8	0.844	-0.002
AVERAGE		0.846	0.001

Results			
"B" SIDE CALIBRATION			
RUN No.	Δp std mm H <sub>2</sub> O	Cp (s)	DEVIATION Cp(s)-Cp(B)
1	6.4	0.844	0.005
2	17.4	0.833	-0.006
3	31.8	0.840	0.001
AVERAGE		0.839	-0.001

[ CpA (SIDE A) - Cp (SIDE B) ] = 0.007 ( must be ≤ 0.01 )

Note: Average deviation must be < 0.01

Signature \_\_\_\_\_  
Environmental System Integrator Co., Ltd.

**NOZZLE CALIBRATION**

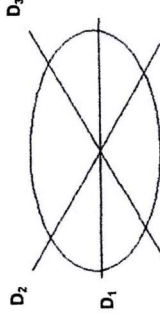
Environmental System Integrator Co., Ltd.  
Web Site : www.envi-system.com  
E-mail : info@envi-system.com

Sampling System Equipment Information		Calibration Conditions	
Console Model Number	XC-572V	Date	15-May-24
Console Serial Number	0802003	Calibration Reference No.	SE67AP0004
DGM Model Number	CHNT	Barometric Pressure	756
DGM Serial Number	L150003350	Calibration Method	Vernier 0-150mm
			US EPA Method

Calibration Data				Results	
Nozzle Diameter				(D <sub>1</sub> + D <sub>2</sub> + D <sub>3</sub> ) / 3	
Nozzle ID	Sizes	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	Davg
4	mm	3.02	3.02	3.01	3.017
5	mm	4.0	0.00	0.00	0.000
6	mm	4.8	4.79	4.79	4.790
7	mm	5.5	0.00	0.00	0.000
10	mm	8.0	0.00	0.00	0.000
12	mm	9.5	0.00	0.00	0.000
14	mm	11.1	11.17	11.16	11.167
16	mm	12.7	12.43	12.40	12.410

Where :

D<sub>1</sub>, D<sub>2</sub>, D<sub>3</sub> = There difference nozzle diameters , mm ; diameter must be within 0.025 mm  
ΔD = Maximum difference between any two diameters, must be ≤ 0.100 mm  
Davg = ( D<sub>1</sub> + D<sub>2</sub> + D<sub>3</sub> ) / 3



Signature \_\_\_\_\_  
Environmental System Integrator Co., Ltd.