

ประจำเดือนมิถุนายน พ.ศ. 2566



บริษัท เอ็นวีแล็บ จำกัด 540/540/1 ซอยสุขุมวิท 7 นม.-สุขุมวิท เขตปทุมวัน กรุงเทพฯ 10160  
Envilab Co., Ltd. 540/540/1 Soi Sukhumvit 7 Bangkhuae Bangkok Bangkok 10160  
Tel : 02-802-3577-8 Fax: 02-802-3773 E-mail : info@evltesting.com



02-802-3577-8 02-802-3773

### TSP High Volume Sampler Calibration

Verification Report No.

A6605 -TSP 01

☒ PM ☐ Onsite

Site: บริษัท เอ็นวีแล็บ จำกัด

UTM : 47P N1514475 E654269

Sampler: NTSP#18

Recorder: TEST Report

Date: 1 Jun 23

Technical: Sanayu J.

Approval: Wisan R.

### CONDITIONS

Barometric Press. (hPa): 1010.0

Temperature (deg C): 32.0

Average Press. (hPa): 1013.0

Average Temp. (deg C): 30.0

Corrected Pressure (mm Hg): 757.6

Temperature (deg K): 305.0

Corrected Avg. Press. (mm Hg): 759.8

Average Temp. (deg K): 303.0

### CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc

Model: TE-5028A

Serial#: 1328

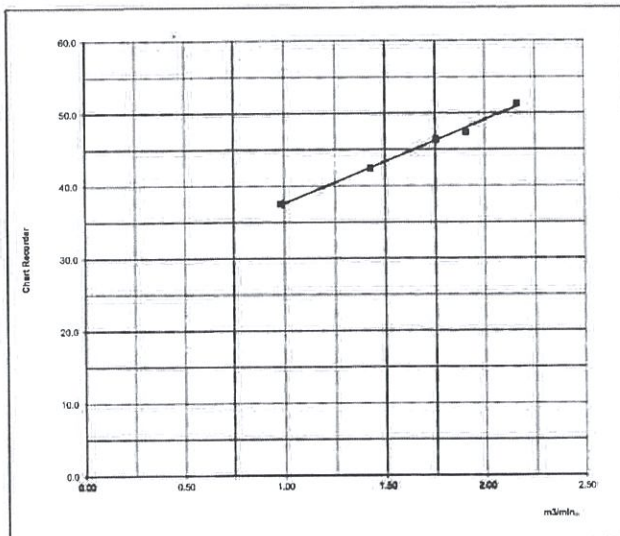
Qstd Slope: 1.63957

Qstd Intercept: -0.01202

Date Certified: 19 Jan 2023

### CALIBRATIONS

Plate or Test #	H <sub>2</sub> O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	12.80	2.161	52.0	51.32	Slope = 11.4871
2	9.94	1.905	48.0	47.37	Intercept = 26.0894
3	8.44	1.756	47.0	46.38	Corr. coeff. = 0.9975
4	5.56	1.427	43.0	42.44	# of Observations: 5
5	2.63	0.983	38.0	37.50	Range of Chart at 1.1 - 1.7 m <sup>3</sup> /min.: 40
					46



Calibrated by :

( Sanayu Jantason )  
1 June 2023

Approved by :

( Wisan Ritthikamon )  
1 June 2023

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FE-MNT-23 Rev.00/01/08/53



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Neediss Supply Instrument Co., Ltd.  
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Tel: 02-802-3980-2 Fax: 02-802-3988 E-mail: info@neediss.com



## SO<sub>2</sub> Analyzer Verification Test Report

Calibration Report No.: 6606009

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Calibrated Date: 1-Jun-23

☒ PM ☐ Onsite

### Instruments Information

<b>Analyzer Type:</b> SO2 Analyzer	<b>Manufacturer:</b> THERMO
<b>Model:</b> THERMO.43C	<b>S/N:</b> ESOTE43C071944

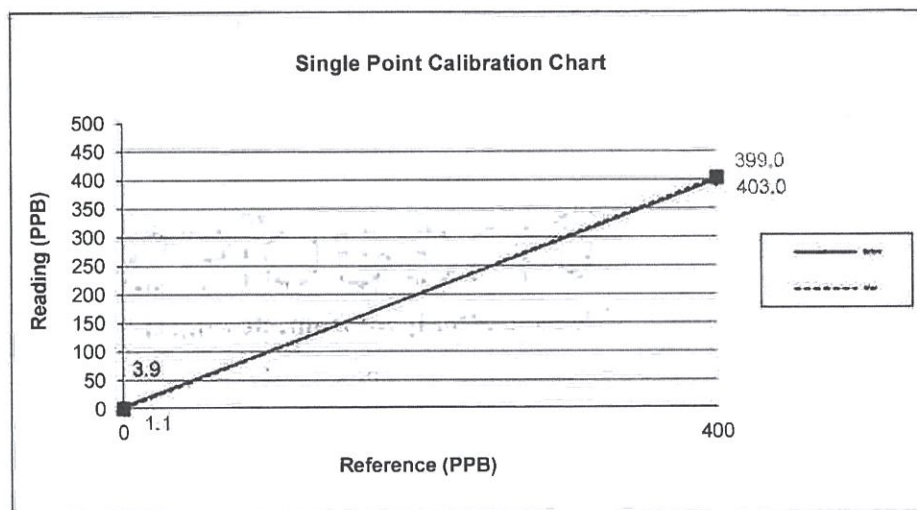
### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101	NO Conc 44.68 PPM
S/N: 792	SO2 Conc 45.34 PPM
ZERO AIR Generator ZAG7001	CO Conc 4500 PPM
S/N: 644	Expire Date: Feb 19,2024 EB0140762

Environment: Temperature 28.5 °CHumidity: 55 %RH

### Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	3.9	3.9	400.0	399	-0.3
After	0.0	1.1	1.1	400.0	403	0.8



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Tel 02-602 4788-2 Fax 02-602 0588 Email: info@neediss.com



## NOx Analyzer Verification Test Report

Calibration Report No.: 6606010

Page:1/2

Calibrated Date: 1-Jun-23

☒ PM ☐ Onsite

### Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer Model: 42C	Manufacturer THERMO S/N: ENOTE42C515373
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### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NO Conc 44.68 PPM SO2 Conc 45.34 PPM CO Conc 4500 PPM Expire Date: Feb 19,2024 EB0140762

Environment: Temperature 27.4 °C

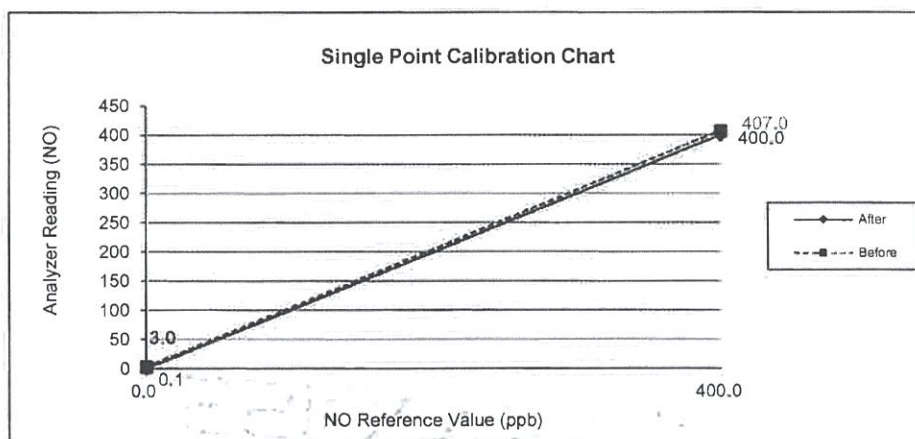
Humidity: 51 %RH

### Calibration Check ( Before adjust )

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	3.0	0.0	3.0	407	400.0	0.9
NO <sub>2</sub>	0.1	0.0	0.1	1.0	0.0	0.1
NOx	3.1	0.0	3.1	408	400.0	1.0

### Calibration Check ( After adjust )

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.1	0.0	0.1	400	400.0	0.0
NO <sub>2</sub>	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.1	0.0	0.1	400	400.0	0.0



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Envilab Co., Ltd. 540,540/1 Soi Bangknae 7 Bangknae Bangknae Bangkok 10160  
Tel : 02-802-3577-8 Fax : 02-802-3773 E-mail : info@evltesting.com



11-000-1 (Rev.01) 02/06/2019

## Verification Test Report

Report No.:

CONDO -SLM 04

☒ PM ☐ Onsite UTM : 47P N 1514455 E 654248

Calibrated Date: 1 June 2023

Site : บริษัทเอ็นวิลแล็บ จำกัด

Equipment: Sound Level Meter

Manufacturer: PULSAR

Model: 45

Serial : 0016

Environment: Temperature 25 °C Humidity 70 %RH

Reference Standard: Acoustic Calibrator Class 1 Model CB011,CESVA

Serial No.T252953

Date of Calibration : 02 December 2022

### Result of Test

Reference Standard (dB)	Instrument reading (dB)	Error (dB)	Adjust (dB)
93.92	93.93	0.01	93.92

Calibrated By:

( Sanayu Jantason )

Date:

1 June 2023

Approve By:

( Wisan Ritthikamon )

Date:

1 June 2023

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Envilab Co., Ltd. 540,540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160

## TSP High Volume Sampler Calibration

Verification Report No.

D6606 -TSP 01

☒ PM ☐ Onsite

Site: บริษัท เอ็นไวเลบ จำกัด

UTM : 47P N1514475 E654269

Sampler: NTSP#04

Recorder: ECRANG15315224

Date: 1 Jun 23

Technical: Sanayu J.

Approval: Wisan R.

### CONDITIONS

Barometric Press. (hPa): 1008.4

Temperature (deg C): 32.0

Average Press. (hPa): 1013.0

Average Temp. (deg C): 30.0

Corrected Pressure (mm Hg): 756.4

Temperature (deg K): 305.0

Corrected Avg. Press. (mm Hg): 759.8

Average Temp. (deg K): 303.0

### CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc

Model: TE-5028A

Serial#: 1328

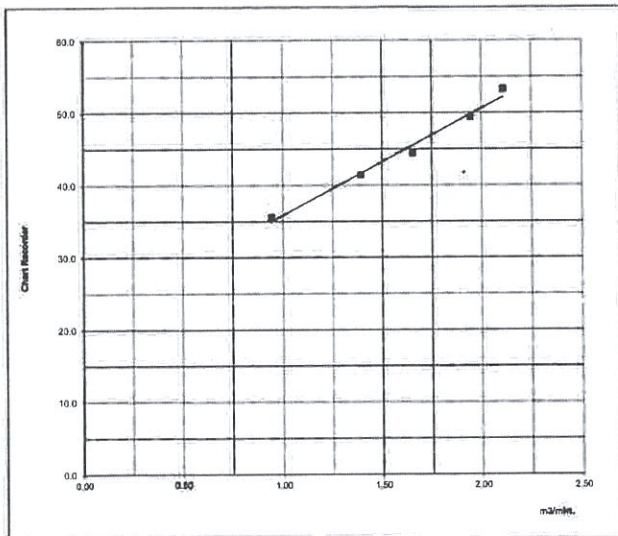
Qstd Slope: 1.63957

Qstd Intercept: -0.01202

Date Certified: 19 Jan 2023

### CALIBRATIONS

Plate or Test #	H <sub>2</sub> O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	12.21	2.109	54.0	53.25	Slope = 14.7492
2	10.41	1.948	50.0	49.30	Intercept = 21.0321
3	7.50	1.654	45.0	44.37	Corr. coeff.= 0.9922
4	5.32	1.395	42.0	41.42	# of Observations: 5
5	2.41	0.941	36.0	35.50	Range of Chart at 1.1 - 1.7 m <sup>3</sup> /min. 38 46



Calibrated by :

( Sanayu Jantason )  
1 June 2023

Approved by :

( Wisan Ritthikamon )  
1 June 2023

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FE-MNT-19 Rev.00.01/06/63



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## SO<sub>2</sub> Analyzer Verification Test Report

Calibration Report No.: 6606008

Page:1/1

Calibrated Date: 1-Jun-23

☒ PM ☐ Onsite

### Instruments Information

Analyzer Type: SO2 Analyzer	Manufacturer THERMO
Model: THERMO.43C	S/N: ESOTE43C103362

### Calibration System

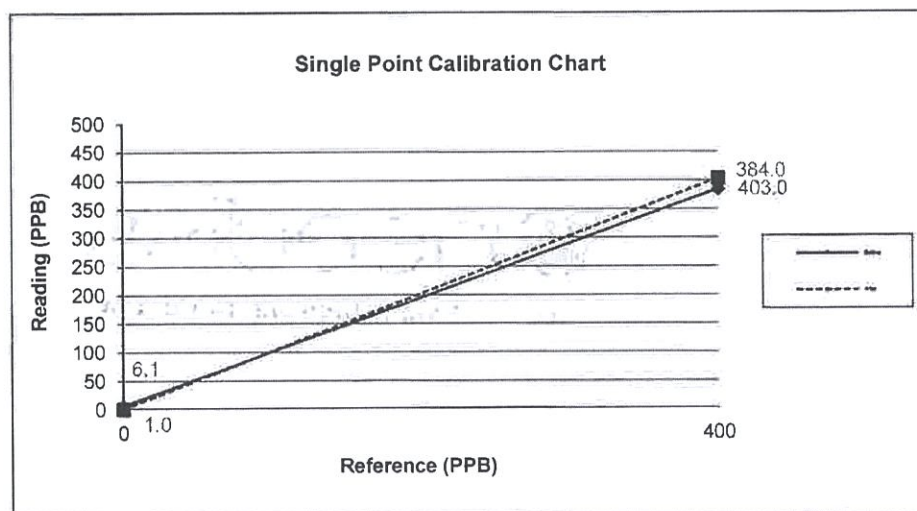
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101	NO Conc 44.68 PPM
S/N: 792	SO2 Conc 45.34 PPM
ZERO AIR Generator ZAG7001	CO Conc 4500 PPM
S/N: 644	Expire Date: Feb 19,2024 EB0140762

Environment: Temperature 28.4 °C

Humidity: 52 %RH

### Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	6.1	6.1	400.0	384	-4.0
After	0.0	1.0	1.0	400.0	403	0.8



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Tel. 02-602-3780-2 Fax 02-602-3785 E-mail: neediss.com



## NOx Analyzer Verification Test Report

Calibration Report No.: 6606002

Page:1/2

Calibrated Date: 1-Jun-23

☒ PM ☐ Onsite

### Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer Model: 42C	Manufacturer THERMO S/N: ENOTE42C304779
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### Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NO Conc 44.68 PPM SO2 Conc 45.34 PPM CO Conc 4500 PPM Expire Date: Feb 19,2024 EB0140762

Environment: Temperature 27.9 °C

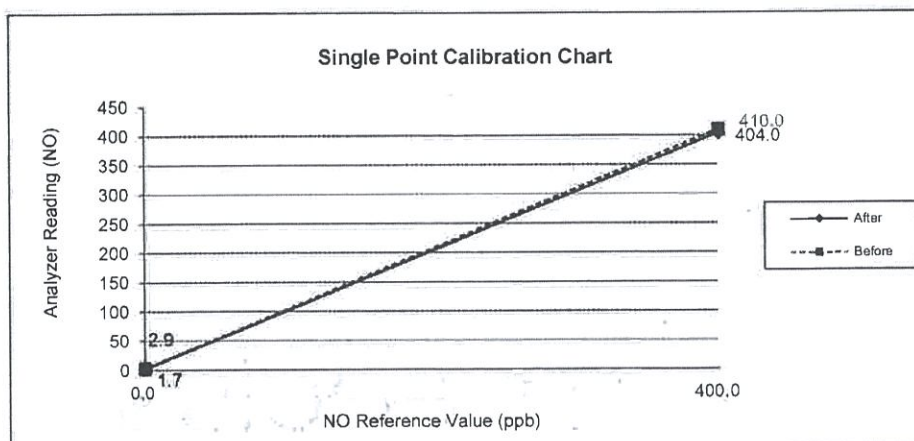
Humidity: 51 %RH

### Calibration Check ( Before adjust )

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	2.9	0.0	2.9	410	400.0	1.2
NO <sub>2</sub>	2.7	0.0	2.7	6.0	0.0	0.7
NOx	5.6	0.0	5.6	416	400.0	2.0

### Calibration Check ( After adjust )

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	1.7	0.0	1.7	404	400.0	0.5
NO <sub>2</sub>	0.6	0.0	0.6	5.0	0.0	0.6
NOx	2.3	0.0	2.3	409	400.0	1.1



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Tel : 02-802-3577-8 Fax: 02-802-3773 E-mail : info@evltesting.com



## Verification Test Report

Report No.:

CONDO -SLM 05

☒ PM ☐ Onsite UTM : 47P N 1514455 E 654248

Calibrated Date: 1 June 2023

Site : บริษัทเอ็นไวแล็บ จำกัด

Equipment: Sound Level Meter

Manufacturer: PULSAR

Model: 45

Serial : 0018

Environment: Temperature 25 °C Humidity 70 %RH

Reference Standard: Acoustic Calibrator Class 1 Model CB011,CESVA

Serial No.T252953

Date of Calibration : 02 December 2022

### Result of Test

Reference Standard (dB)	Instrument reading (dB)	Error (dB)	Adjust (dB)
93.92	93.94	0.02	93.92

Calibrated By:

( Sanayu Jantason )

Date:

1 June 2023

Approve By:

( Wisan Ritthikamon )

Date:

1 June 2023

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## Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 18, 2023	Rootsmeter S/N: 438320	Ta: 294 °K	
Operator: Jim Tisch		Pa: 750.1 mm Hg	
Calibration Model #: TE-5025A	Calibrator S/N: 0759		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3960	3.2	2.00
2	3	4	1	0.9950	6.4	4.00
3	5	6	1	0.8850	8.0	5.00
4	7	8	1	0.8450	8.8	5.50
5	9	10	1	0.6990	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)
0.9961	0.7135	1.4145	0.9957	0.7133	0.8854
0.9918	0.9968	2.0004	0.9915	0.9964	1.2521
0.9897	1.1183	2.2365	0.9893	1.1179	1.3999
0.9886	1.1700	2.3456	0.9883	1.1695	1.4683
0.9833	1.4067	2.8289	0.9829	1.4062	1.7708
QSTD	m=	2.03736	QA	m=	1.27576
	b=	-0.03733		b=	-0.02337
	r=	0.99997		r=	0.99997

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

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter 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



# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-200035-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

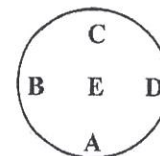
Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)
0.01	0.0001	0.00011
0.1	0.0001	0.00011
1	0.0000	0.00011
2	0.0001	0.00011
5	0.0000	0.00012
10	0.0000	0.00011
20	0.0000	0.00013
50	0.0001	0.00014
100	0.0000	0.00020
200	-0.0001	0.00038

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.11$ , providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g  
A B C D E  
-0.0001 0.0001 0.0000 -0.0001 0.0000 g



Repeatability

Load test : 200 g  
Stdev. : 0.00000 g

- o o o -



# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech\_cal@yahoo.com, calibratech\_cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-200035-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)
10	0.00	0.0082
20	0.00	0.0082
50	0.00	0.0082
100	0.00	0.0082
200	0.00	0.0083
500	0.00	0.0085
1000	0.00	0.0110
1500	0.00	0.012
2000	0.00	0.012
3000	0.00	0.023

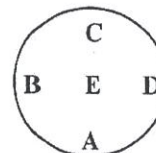
This result of calibration was found accurate as shown on date and place of calibration only.

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

Eccentric error

Load test : 1000 g

A	B	C	D	E	
0.00	-0.01	0.01	0.00	0.00	g



Repeatability

Load test : 2000 g

Stdev. : 0.000 g

- o0o -







## THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0123

MTC No. EEL. BP. 76/1165

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 $\mu$ Pa at 1000 HzAcoustic Output in dB re 20 $\mu$ 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 1
1/2 inch Bruel&Kjaer 4180	93.92	-0.08	$\pm 0.10$	$\pm 0.40$ dB

## 2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.0	0.0	$\pm 1.5$	$\pm 1.0\%$

## 3. Total distortion


Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.30	$\pm 0.50$	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

  
(Mr. Weerachai Deechaiyae)

Approved by :



Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 2 Dec. 2022

Date of Issue : 2 Dec. 2022

Ref : 2011265112805100001

End of Certificate

2 / 2

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.

FM.BL.MTC.002 Rev.4

## Head Office

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



Envilab Co., Ltd.

รับรองสำเนาถูกต้อง  
ผู้จัดการฝ่ายควบคุมคุณภาพ





# CALIBRATION LABORATORY CO., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



Supplement to Calibration Certificate No. Q22080016

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : INSTANTEL  
MODEL / TYPE : 721A2601/721A3301  
SERIAL NO. : UM14628/UM14628[EVMINMMATE4628]  
CLID. NO. : 252101368  
JOB CONTROL NO. : 220809080016

CUSTOMER : ENVILAB CO., LTD.  
540, 540/1 SOI BANGKHAE 7, BANGKHAE,  
BANGKHAE, BANGKOK 10160 THAILAND

DATE OF RECEIVED : 09 August 2022

DATE OF ISSUED : 23 August 2022

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Suwit Phuanbusabong  
Calibration Engineer



Approved By :

Mongkol Yotsoontorn  
Authorized Signatory  
23 August 2022

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q22080016A1

F3-012-04/01-12



page 1 of 3



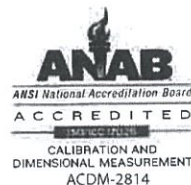
รับรองสำเนา  
ผู้จัดการฝ่ายควบคุมคุณภาพ



**CLC**  
Accredited  
ISO/IEC 17025

# CALIBRATION LABORATORY Co., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment

## CALIBRATION DATA

### VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	$\pm$ ( % of rdg. )
10	50 Hz	peak	10.000	10.107	-0.107	2.3
20	50 Hz		20.000	20.343	-0.343	1.8
30	50 Hz		30.000	30.581	-0.581	1.8

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 1 of 54

This report is valid for the above stated instrument/s only.

### End of Certificate ###

Certificate No. Q22080016

F3-011-04/01-12

page 3 of 3



รับรองสำเนา  
ผู้จัดการฝ่ายควบคุมคุณภาพ



# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-200066-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)
0.1	0.00000	0.000014
0.5	0.00002	0.000022
1	0.00000	0.000026
2	0.00001	0.000034
5	-0.00001	0.000043
10	0.00000	0.000053
50	0.00004	0.00011
100	-0.0001	0.00020
150	-0.0001	0.00038
200	-0.0002	0.00038

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

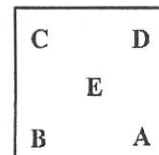
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.07$ , providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A B C D E

0.00000 0.00000 0.00001 0.00001 0.00000 g



Repeatability

Load test : 200 g

Stdev. : 0.000042 g

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# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-410024-1

Page : 2 of 2

UUC Condition As-Received : Good

Result of Calibration : Without Adjustment

Function : Temperature measurement

Reference Humidity @ 50 %R.H.

Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
25.01	25.0	0.0	0.46

Result of Calibration : Without Adjustment

Function : Humidity measurement

Reference Temperature @ 25 °C

Standard Humidity (%R.H.)	UUC Reading (%R.H.)	Correction (%R.H.)	Uncertainty (± %R.H.)
50.00	49	1	2.2

### Remark

UUC : Unit Under Calibration

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

This 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%

- 000 -



# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-420018-1

Page : 2 of 2

### Result of Calibration :

UUC Condition As-Received : Good

Function : pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer ( pH )	UUC Reading ( pH )	Correction ( pH )	Uncertainty ( ± pH )
4, 7	4.008	4.01	0.00	0.0097
	6.986	7.00	-0.01	0.011
7,10	6.986	7.00	-0.01	0.011
	10.010	10.01	0.00	0.014

### Remark

1 UUC : Unit Under Calibration

2 pH meter does not have voltage mode because the plug can not BNC socket

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

This 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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Cert.No.: 23TW79

Page.: 2 of 2

**Condition of this result of calibration**

**1. Reference Standard Instruments :**

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

<u>Instruments</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Burette	-	130BU10	21CG1389	25 Mar 2023
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

**2. Standard Material :-**

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

**Result :** Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: KC1A01TAF

<b>Titration Method</b> <b>(Azide Modification Method)</b>  (mg/L)	<b>DO Meter</b> <b>Reading</b>  (mg/L)	<b>Standard Deviation</b>  (mg/L)
8.14	8.16	0.0084

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency, The environmental impact control and present to organization it may concerned. Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

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ผู้จัดการฝ่ายควบคุมคุณภาพ

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech\_cal@yahoo.com, calibratech\_cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-400101-2

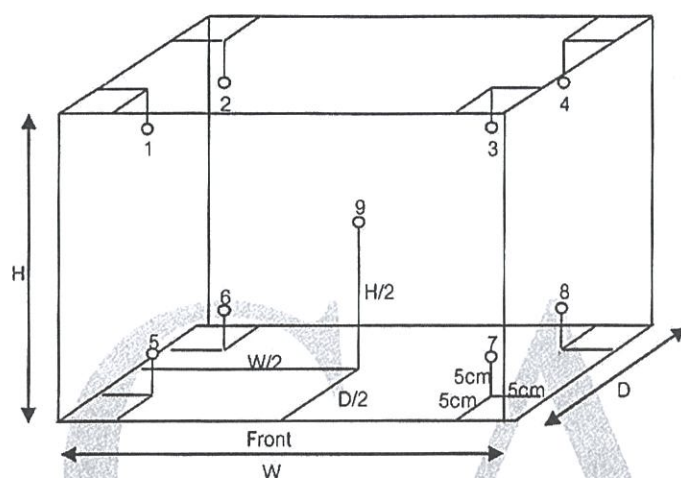
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.40 m

D = 0.56 m

H = 0.33 m

Capacity = 0.07 m<sup>3</sup>

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
35.0	35.3	35.3	35.00	35.12	35.14	35.10	35.08	35.00	34.89	34.84	35.09	0.30
37.0	37.3	37.3	36.96	37.11	37.12	37.08	37.06	36.98	36.81	36.81	37.07	0.30

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
35.0	35.3	35.3	0.28	0.03	0.3
37.0	37.3	37.3	0.29	0.04	0.4

Remark The uncertainty is not combine uniformity of the air chamber

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

This 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%

- o0o -





# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech-cal@yahoo.com, calibratech-cal@hotmail.com

## Certificate of Calibration

Certificate No. : 65-400577-1

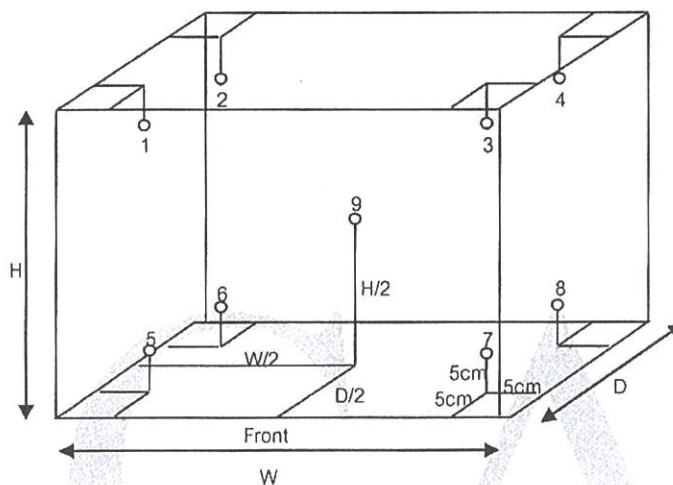
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.38 m

D = 0.35 m

H = 1.15 m

Capacity = 0.15 m<sup>3</sup>

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
4.0	4.0	4.0	3.9	3.9	4.1	3.5	4.1	4.1	4.1	3.8	4.2	0.56

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
4.0	4.0	4.0	0.7	0.1	0.7

Remark The uncertainty is not combine uniformity of the air chamber

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

This 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%

- o0o -

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-400156-2

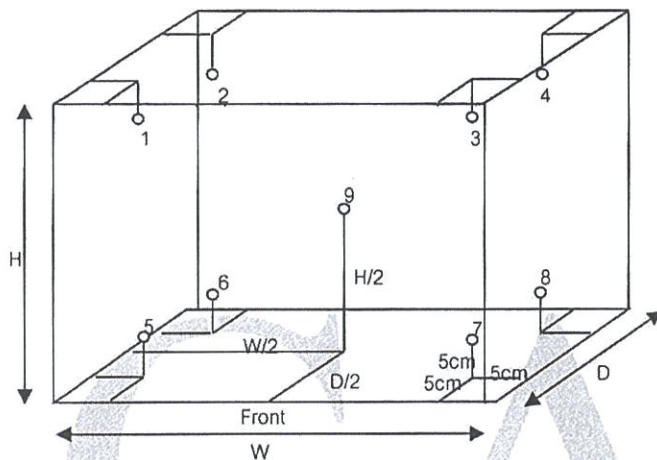
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.40 m

D = 0.33 m

H = 0.56 m

Capacity = 0.07 m<sup>3</sup>

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
104.0	103.5	103.5	104.3	104.3	104.3	104.2	104.3	104.1	103.7	104.0	104.3	0.70
110.0	109.5	109.5	110.3	110.3	110.3	110.3	110.3	110.1	109.7	110.0	110.3	0.71
180.0	179.0	179.0	179.4	180.1	180.3	180.1	180.6	179.9	179.2	179.6	180.4	0.95

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	103.5	103.5	0.7	0.1	0.8
110.0	109.5	109.5	0.8	0.1	1.0
180.0	179.0	179.0	1.4	0.2	1.5

**Remark** The uncertainty is not combine uniformity of the air chamber

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

This 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%

- o0o -

B





# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

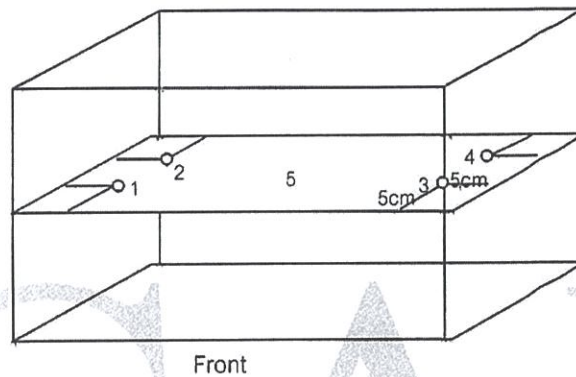
Certificate No. : 66-400056-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			No.							
			1	2	3	4	5			
95.0	95.0	95.0	95.41	95.41	95.68	95.62	95.57	0.22	0.33	0.10

Remark The uncertainty is not combine uniformity of the water bath

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

This 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%

- o0o -



# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech\_cal@yahoo.com, calibratech\_cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-300140-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume ( ml )	Measuring Volume ( ml )
30	29.98
50	50.12

Uncertainty of measurement with in  $\pm$  0.054 ml

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

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

- o0o -

D.





# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-300140-6

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume ( ml )	Measuring Volume ( ml )
500	499.57
1000	999.89

Uncertainty of measurement with in  $\pm$  0.17 ml

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

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

- o0o -

D.





**ENVILAB COMPANY LIMITED**  
ENVIRONMENTAL LABORATORY DIVISION

540,540/1 Soi Bangkae7, Bangkae, Bangkok 10160 TEL: +66-2802-3577-8 FAX: +66-2802-3773  
www.evltesting.com E-mail : info@evltesting.com



**ANALYSIS REPORT**

Page 1 of 1

Customer	: MKT/EVL Co.,Ltd	Report No.	: 23/0548
For	: บริษัท มิตรสิ่งแวดล้อมไทย จำกัด	Request Service No.	: 23/01638
Address	: เลขที่ 57/1 ซอยรามอินทรา 8 แขวงอนุสาวรีย์ เขตบางเขน กรุงเทพมหานคร 10220	Test Date	: 09/06/23
		Report Date	: 12/06/23
Email	: -	WO.	: HO2300039-E002

**SAMPLE DESCRIPTION/SAMPLING INFORMATION**

Sample Designated As***	: Wastewater	Sampling Time***	: 13:00
Sampling By***	: MNT/EVL Co., Ltd	Sampling Method***	: Grab Sampling
Sampling Date***	: 05/06/23	Received Date	: 05/06/23

SAMPLING LOCATION***	PARAMETER	SAMPLE*** DESCRIPTION	REFERENCE METHOD	RESULTS	UNIT
บริเวณบ่อพักน้ำสุดท้ายก่อนระบายออกสู่ ท่อน้ำทิ้งสาธารณะ	TDS	ใส	In house 2540 C	266	mg/l
น้ำประปา	TDS	ใส	In house 2540 C	228	mg/l

Reported By : Thunyaporn Ratanasopinsawat  
( Miss Thunyaporn Ratanasopinsawat )  
Analyst

Approved By : Phongsiri J.  
( Mr.Phongsiri Jittawimon )  
Lead Technical Management

**Remark :** 1. Tests under scope accreditation exclude the sampling method.  
2. The above results are valid inly for the analyzed samples as indicated in this report.  
3. No pare of this report shall be reproduced in any form without written consent from the Laboratory.  
4. Sampling was carried out by Customer. Environmental Laboratory Division was responsible for sample analysis only.  
5. Reference method : Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> ed., Part 2540 C,D,2017. (TDS Dried at 103-105 °C)  
6. Environmental Laboratory Division was responsible for information and data in this respond except sampling location , sampling date, sampling time, sample description, parameter and sample designated as that from customer and indicate with \*\*\*





บริษัท เอ็นวิลแล็บ จำกัด 540,540/1 ซอยปangkha 7 Bangkok Bangkok Bangkok 10160  
EnviLab Co., Ltd. 540,540/1 Soi Pangkha 7 Bangkok Bangkok Bangkok 10160  
Tel : 02-802-3572-5 Fax: 02-802-3573 E-mail : info@evltesting.com



Printed by EnviLab Co., Ltd. on 06/06/2023

## TSP High Volume Sampler Calibration

Verification Report No.

B6606 -TSP 01

<input checked="" type="checkbox"/> PM <input type="checkbox"/> Onsite	Site: บริษัท เอ็นวิลแล็บ จำกัด	Date: 1 Jun 23
	UTM: 47P N1514475 E654269	Technical: Sanayu J.
	Sampler: ETSP#07	Approval: Wisan R.
	Recorder: ECRANG15315224	

### CONDITIONS

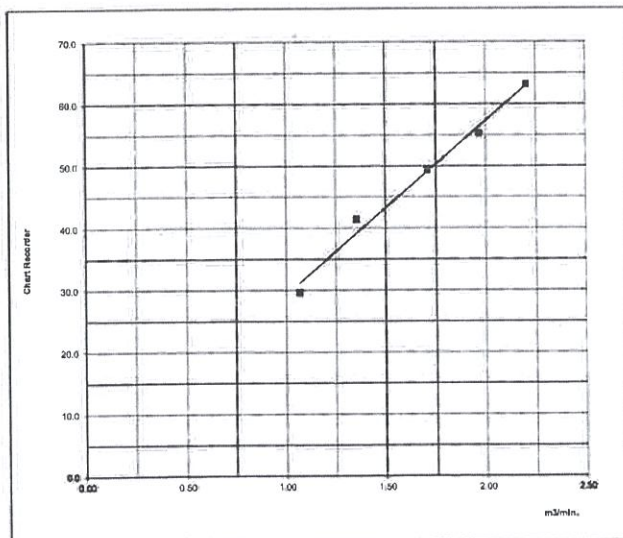
Barometric Press. (hPa): 1008.4	Corrected Pressure (mm Hg): 756.4
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg. Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

### CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc	Qstd Slope: 1.63957
Model: TE-5028A	Qstd Intercept: -0.01202
Serial#: 1328	Date Certified: 19 Jan 2023

### CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	13.34	2.204	64.0	63.11	
2	10.62	1.967	56.0	55.22	Slope = 28.0271 Intercept = 1.1718 Corr. coeff. = 0.9933  # of Observations: 5 Range of Chart at 1.1 - 1.7 m3/min: 33 49
3	8.01	1.710	50.0	49.30	
4	5.02	1.355	42.0	41.42	
5	3.12	1.070	30.0	29.58	



Calibrated by :

( Sanayu Jantason )  
1 June 2023

Approved by :

( Wisan Ritthikamon )  
1 June 2023

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www.evltesting.com

Environmental responsibility with accuracy measurement

FE-MNT-23 Rev 00:01/06/23



รับรองสำเนาถูกต้อง  
ผู้จัดการฝ่ายควบคุมคุณภาพ



**neediss**

บริษัท นีดีส ซัพพลาย อินสตรูमेंท์ จำกัด  
Neediss Supply Instrument Co., Ltd.  
535 ซอยบางนาแบริด 7 แขวงบางนาแบริด เขตคลองเตย กรุงเทพฯ 10150 535 Soi Bangnae 7 Bangkhoe Bangkok  
Tel 02-602-3780-2 Fax 02-602-3788 Email: info@neediss.com



## SO<sub>2</sub> Analyzer Verification Test Report

Calibration Report No.: 6606006

Page:1/1

Calibrated Date: 1-Jun-23

☒ PM ☐ Onsite

### Instruments Information

<b>Analyzer Type:</b> SO2 Analyzer	<b>Manufacturer</b> THERMO
<b>Model:</b> THERMO_43C	<b>S/N:</b> ESOTE43C069871

### Calibration System

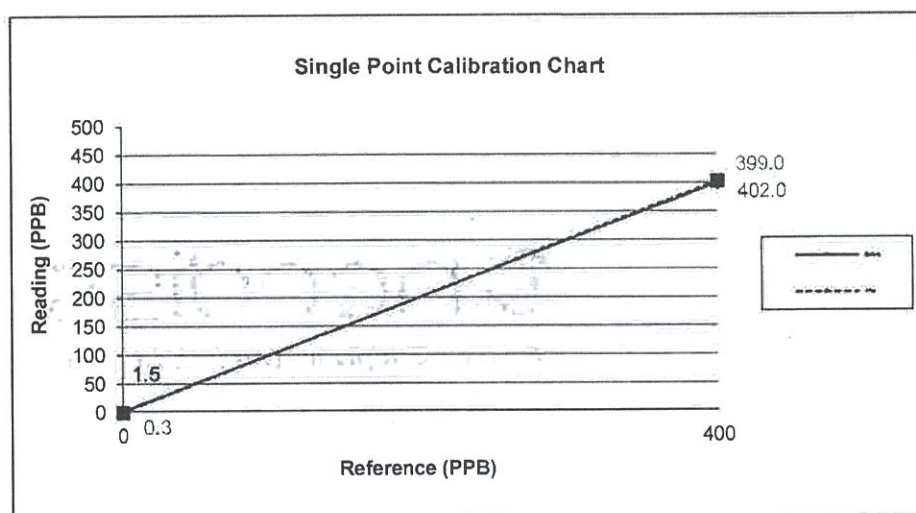
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101	NO Conc 44.68 PPM
S/N: 792	SO2 Conc 45.34 PPM
ZERO AIR Generator ZAG7001	CO Conc 4500 PPM
S/N: 644	Expire Date: Feb 19,2024 EB0140762

Environment: Temperature 28.3 °C

Humidity: 52 %RH

### Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	1.5	1.5	400.0	399	-0.3
After	0.0	0.3	0.3	400.0	402	0.5



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We know the best thing to save environment



กรมส่งเสริมการค้าระหว่างประเทศ

รับรองสำเนาถูกต้อง

Envilab Co., Ltd.

ผู้จัดการฝ่ายควบคุมคุณภาพ



**neediss**บริษัท นีดีส ซัพพลาย อินสตรูเมนต์ จำกัด  
Neediss Supply Instrument Co., Ltd.536 ซอยบางแค 7 แขวงบางแค เขตบางแค กรุงเทพฯ 10160 536 Soi Bangkhae 7 Bangkhae Bangkok Bangkok  
Tel: 02-607-3780-2 Fax: 02-607-0788 E-mail: info@neediss.com**NOx Analyzer Verification Test Report**

Calibration Report No.: 6606011

Page:1/2

Calibrated Date: 1-Jun-23

☒ PM ☐ Onsite**Instruments Information**

Analyzer Type: NO/NO2/NOx Analyzer Model: 42C	Manufacturer THERMO S/N: ENOTE42C304780
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**Calibration System**

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NO Conc 44.68 PPM SO2 Conc 45.34 PPM CO Conc 4500 PPM Expire Date: Feb 19,2024 EB0140762

Environment: Temperature 26.9 °C

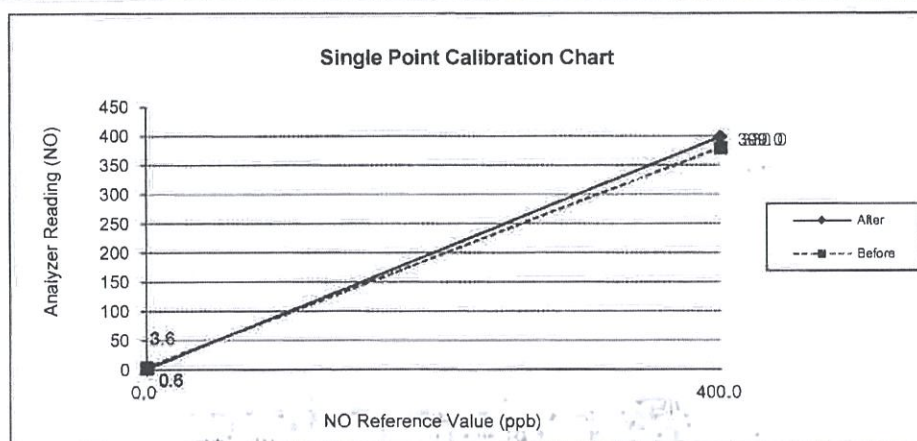
Humidity: 50 %RH

**Calibration Check ( Before adjust )**

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	3.6	0.0	3.6	380	400.0	-2.6
NO <sub>2</sub>	-0.3	0.0	-0.3	18.0	0.0	2.3
NOx	3.3	0.0	3.3	398	400.0	-0.3

**Calibration Check ( After adjust )**

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.6	0.0	0.6	399	400.0	-0.1
NO <sub>2</sub>	0.7	0.0	0.7	6.0	0.0	0.7
NOx	1.3	0.0	1.3	405	400.0	0.6



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Envilab Co., Ltd. ผู้จัดการฝ่ายควบคุมคุณภาพ



บริษัท เอ็นไวแล็บ จำกัด 540,540/1 ซอยบางเขน 7 แขวงบางเขน เขตบางเขน กรุงเทพฯ 10180  
Envilab Co., Ltd. 540,540/1 Soi Bangkhae 7 Bangkhae Bangkok Bangkok 10180  
Tel : 02-802-5577-8 Fax : 02-802-3773 E-mail : info@evltesting.com



www.evltesting.com

## Verification Test Report

Report No.:

CONDO -SLM 08

☒ PM

☐ Onsite UTM :

47P N 1514455 E 654248

Calibrated Date: 1 June 2023

Site : บริษัทเอ็นไวแล็บ จำกัด

Equipment: Sound Level Meter

Manufacturer: PULSAR

Model: 45

Serial : 0027

Environment: Temperature 25 °C Humidity 70 %RH

Reference Standard: Acoustic Calibrator Class 1 Model CB011,CESVA

Serial No.T252953

Date of Calibration : 02 December 2022

### Result of Test

Reference Standard (dB)	Instrument reading (dB)	Error (dB)	Adjust (dB)
93.92	93.94	0.02	93.92

Calibrated By:

( Sanayu Jantason )

Date:

1 June 2023

Approve By:

( Wisan Ritthikamon )

Date:

1 June 2023

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# Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 18, 2023	Rootsmeter S/N: 438320	Ta: 294 °K	
Operator: Jim Tisch		Pa: 750.1 mm Hg	
Calibration Model #: TE-5025A	Calibrator S/N: 0759		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3960	3.2	2.00
2	3	4	1	0.9950	6.4	4.00
3	5	6	1	0.8850	8.0	5.00
4	7	8	1	0.8450	8.8	5.50
5	9	10	1	0.6990	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H (Ta/Pa)}$ (y-axis)
0.9961	0.7135	1.4145	0.9957	0.7133	0.8854
0.9918	0.9968	2.0004	0.9915	0.9964	1.2521
0.9897	1.1183	2.2365	0.9893	1.1179	1.3999
0.9886	1.1700	2.3456	0.9883	1.1695	1.4683
0.9833	1.4067	2.8289	0.9829	1.4062	1.7708
<b>QSTD</b>	m=	<b>2.03736</b>	<b>QA</b>	m=	<b>1.27576</b>
	b=	<b>-0.03733</b>		b=	<b>-0.02337</b>
	r=	<b>0.99997</b>		r=	<b>0.99997</b>

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

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter 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

## Certificate of Calibration

Certificate No. : 66-200035-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)
0.01	0.0001	0.00011
0.1	0.0001	0.00011
1	0.0000	0.00011
2	0.0001	0.00011
5	0.0000	0.00012
10	0.0000	0.00011
20	0.0000	0.00013
50	0.0001	0.00014
100	0.0000	0.00020
200	-0.0001	0.00038

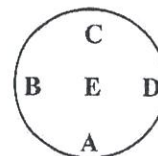
This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.11$ , providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A	B	C	D	E	
-0.0001	0.0001	0.0000	-0.0001	0.0000	g



Repeatability

Load test : 200 g

Stdev. : 0.00000 g

- o O -

*Handwritten signature*





# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

## Certificate of Calibration

Certificate No. : 66-200035-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)
10	0.00	0.0082
20	0.00	0.0082
50	0.00	0.0082
100	0.00	0.0082
200	0.00	0.0083
500	0.00	0.0085
1000	0.00	0.0110
1500	0.00	0.012
2000	0.00	0.012
3000	0.00	0.023

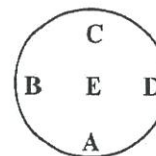
This result of calibration was found accurate as shown on date and place of calibration only.

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

Eccentric error

Load test : 1000 g

A	B	C	D	E	
0.00	-0.01	0.01	0.00	0.00	g



Repeatability

Load test : 2000 g  
Stdev. : 0.000 g

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0123

MTC No. EEL. BP. 76/1165

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 $\mu$ Pa at 1000 Hz

Acoustic Output in dB re 20 $\mu$ 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 1
1/2 inch Bruel&Kjaer 4180	93.92	-0.08	$\pm 0.10$	$\pm 0.40$ dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.0	0.0	$\pm 1.5$	$\pm 1.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.30	$\pm 0.50$	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

(Mr. Weerachai Deechaiyae)

Approved by :



Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 2 Dec. 2022

Date of Issue : 2 Dec. 2022

Ref : 2011265112805100001

End of Certificate

2 / 2

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

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FM.BL.MTC.002 Rev.4

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ผู้จัดการฝ่ายควบคุมคุณภาพ



# CAL

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Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



## Certificate of Calibration

**Certificate No. :** 66-200066-2

**Page : 1 of 2**

**Submitted by :** Envilab Co., Ltd.

540, 540/1 Soi Bangkhae7, Bangkhae, Bangkok 10160

**Equipment :** Electronic Balance

**Manufacturer :** METTLER TOLEDO **Model :** XSR205DU

**Serial No. :** B911363567 **ID No. :** ELABBALANCEN06

**Capacity :** 220 g **Resolution :** 0.00001g/81g, 0.0001g/220g

**Environment :** On site calibration was carried out at the B304 Balance Room, Envilab Co., Ltd.

**Ambient Temperature :** (24.6 to 24.9) °C

**Relative Humidity :** (57.0 to 67.8) %

**Air Pressure :** 1015.0 mbar

**Date of Received :** 01 March 2023

**Date of Calibration :** 01 March 2023

**Date of Issue :** 04 March 2023

**Calibrated by :** Akaradath Thippichai

**Calibration Method :** In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

**Reference Standard Instruments :** This certification is traceable to the International System of Units

Standard Weights

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
E261-E2624	C02222345	10 Nov 2023	National Institute of Metrology (Thailand), (NIMT)

Approved by :

( Surachai Promthong )

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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CAL-R0031-03



Envilab Co.,Ltd.

ใบรองค่าเพื่อลูกค้า  
ผู้จัดการฝ่ายควบคุมคุณภาพ

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



## Certificate of Calibration

**Certificate No. :** 66-200066-1

**Page : 1 of 2**

**Submitted by :** Envilab Co., Ltd.

540, 540/1 Soi Bangkhae7, Bangkhae, Bangkok 10160

**Equipment :** Electronic Balance

**Manufacturer :** Sartorius

**Model :** SECURA125-1S

**Serial No. :** 0034606552

**ID No. :** ELABBALANCEN05

**Capacity :** 120 g

**Resolution :** 0.0001 g

**Environment :** On site calibration was carried out at the B304 Balance Room, Envilab Co., Ltd.

**Ambient Temperature :** (21.7 to 22.0) °C

**Relative Humidity :** (47.0 to 47.1) %

**Air Pressure :** (1015.0 to 1016.0) mbar

**Date of Received :** 01 March 2023

**Date of Calibration :** 01 March 2023

**Date of Issue :** 04 March 2023

**Calibrated by :** Akaradath Thippichai

**Calibration Method :** In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

**Reference Standard Instruments :** This certification is traceable to the International System of Units

Standard Weights

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
E261-E2624	C02222345	10 Nov 2023	National Institute of Metrology (Thailand), (NIMT)

Approved by :

( Surachai Promthong )

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03



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