

ภาคผนวก จ

เอกสารสอบเทียบ



Analyzer Performance Test

Calibrated Date: 31 October 2023

Instruments Information

Analyzer Type : CO Analyzer
Model : 48C

Manufacturer : XXXXXXXXXX

Serial Number : XXXXXXXXXX

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

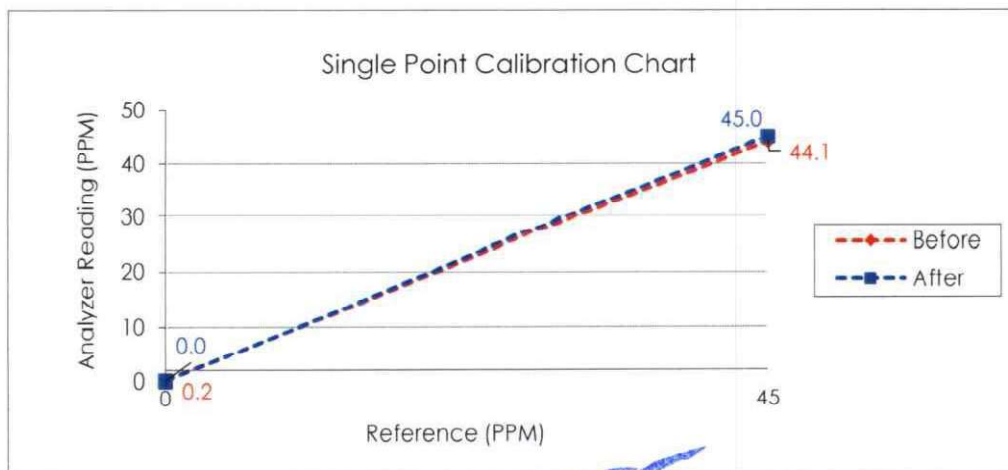
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

	Zero			Span		
	Reference (PPM)	Reading (PPM)	Drift (PPM)	Reference (PPM)	Reading (PPM)	Drift%
Before	0.0	0.2	0.2	45.0	44.1	-2.0
After	0.0	0.0	0.0	45.0	45.0	0.0



Certificate of Calibration

Calibration Certification Information

Cal. Date: July 29, 2021 **Rootsmeter S/N:** 438320 **Ta:** 296 °K
Operator: Jim Tisch **Pa:** 751.33 mm Hg
Calibration Model #: TE-5028A **Calibrator S/N:** 3945

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3350	4.1	1.50
2	3	4	1	1.0290	6.8	2.50
3	5	6	1	0.9360	8.1	3.00
4	7	8	1	0.8360	9.5	3.50
5	9	10	1	0.6570	16.4	6.00

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)
0.9898	0.7415	1.2218	0.9945	0.7450	0.7687
0.9863	0.9585	1.5774	0.9909	0.9630	0.9924
0.9845	1.0519	1.7280	0.9892	1.0569	1.0872
0.9827	1.1755	1.8664	0.9874	1.1810	1.1743
0.9735	1.4818	2.4437	0.9782	1.4888	1.5375
QSTD	m=	1.62970	QA	m=	1.02049
	b=	0.00443		b=	0.00279
	r=	0.99765		r=	0.99765

Calculations

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



Certificate of Calibration

Certificate Number : SPR23060536-2

Page : 1 of 3

Customer : TNP ENVIRONMENT CO.,LTD.

332/173 Moo.3, Bang Rak Phatthana, Bang Bua Thong, Nonthaburi
11110

Equipment Name : Sound Level Meter

Manufacturer : Scarlet Tech

Model : ST-25D

Serial Number : 10340943

ID. Number : TNP-F-S26

Environmental Conditions

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

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

Location of Calibration : In-Lab

Calibration Procedure : SP-CPE-04-01

Received Date : 30 Jun 2023

Calibration Date : 11 Jul 2023

Recommend Due Date : 11 Jul 2024

Date of Issue : 12 Jul 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.

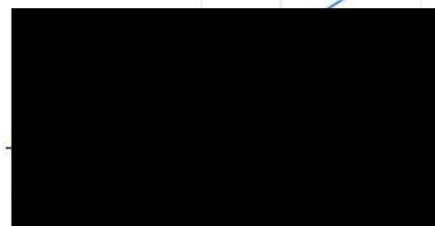
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by :



Calibration Officer

Approved by :



Authorized Signatory



Calibration Report

Certificate Number : SPR23060536-2

Page : 2 of 3

Reference Standards

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



Result of Calibration

Certificate No. : SPR23060536-2

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	94.1	94.1	0.1	0.1	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	94.2	94.2	0.2	0.2	0.15
114	114.1	114.1	0.1	0.1	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 –



Certificate of Calibration

Certificate Number : SPR23060536-3

Page : 1 of 3

Customer : TNP ENVIRONMENT CO.,LTD.

332/173 Moo.3, Bang Rak Phatthana, Bang Bua Thong, Nonthaburi
11110

Equipment Name : Sound Level Meter

Manufacturer : Scarlet Tech

Model : ST-25D

Serial Number : 10340945

ID. Number : TNP-F-S25

Environmental Conditions

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

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

Location of Calibration : In-Lab

Calibration Procedure : SP-CPE-04-01

Received Date : 30 Jun 2023

Calibration Date : 11 Jul 2023

Recommend Due Date : 11 Jul 2024

Date of Issue : 12 Jul 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.

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

Calibrated by : Mr.Karoon Pengsalung

Approved by :

Calibration Officer



Calibration Report

Certificate Number : SPR23060536-3

Page : 2 of 3

Reference Standards

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



Result of Calibration

Certificate No. : SPR23060536-3

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	114.2	114.2	0.2	0.2	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	114.2	114.2	0.2	0.2	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

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2401076-2

Page 3 of 3

UUC Range : (20 to 140) dB

Resolution : 0.1 dB

Results of Calibration: [] Without adjustment [☒] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.2 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	93.3 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.3 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





Certificate of Calibration

Certificate Number : SPR23060536-5

Page : 1 of 3

Customer : TNP ENVIRONMENT CO.,LTD.

332/173 Moo.3, Bang Rak Phatthana, Bang Bua Thong, Nonthaburi
11110

Equipment Name : Sound Level Meter

Manufacturer : Scarlet Tech

Model : ST-25D

Serial Number : 10340950

ID. Number : TNP-F-S27

Environmental Conditions

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

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

Location of Calibration : In-Lab

Calibration Procedure : SP-CPE-04-01

Received Date : 30 Jun 2023

Calibration Date : 11 Jul 2023

Recommend Due Date : 11 Jul 2024

Date of Issue : 12 Jul 2023

Method of Calibration

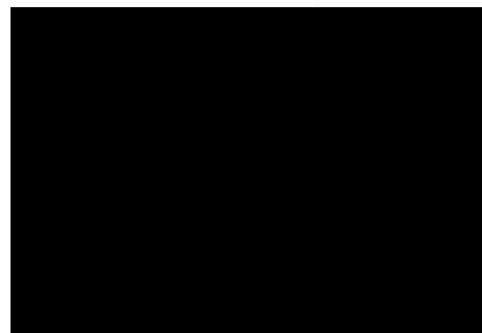
This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical 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.

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





Calibration Report

Certificate Number : SPR23060536-5

Page : 2 of 3

Reference Standards

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



THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Raiking 30 Puttamonthon 5 Rd., Sampran, Nakhon Pathom 73210

Tel. 0-3439-7682-5 Fax: 0-3439-7687

www.thaical.com E-mail : info@thaical.com, lab@thaical.com



CALIBRATION CERTIFICATE

Certificate No.S2103796S

page 1 of 2

Customer : TNP ENVIRONMENT CO., LTD.
332/173 Moo 3 Tambon Bang Rak Phatthana,
Amphoe Bang Bua Thong, Nonthaburi 11110

Equipment : Non-automatic weighing instrument (Electronic instrument)

Manufacturer : Citizon **Order No. :** 64S1167-1

Model : CY204 **Ambient temperature :** $(30.2 \pm 5.0) ^\circ\text{C}$

Accuracy class : - **Relative humidity :** $(35.5 \pm 10.0) \%$

Capacity : 220 g **Received date :** 24-Mar-2021

Resolution : 0.0001 g **Date of calibration :** 24-Mar-2021

Serial No. : 16405757 **Date of issue :** 25-Mar-2021

ID No. : LAB01 **Condition of the balance :** Good working conditions

Place of calibration : ห้องเครื่องชั่ง

Calibration method

This instrument was calibrated according to the EURAMET Calibration Guide No. 18.

Condition of reference standard weight

<u>Instrument</u>	<u>Nominal value</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due-date</u>	<u>Density (kg/m³)</u>
1 Standard weight set	1 mg to 2 kg	15885+15849	M2010001S	8-Oct-2021	7950

Traceability of the reference standard weight

This certificate is traceable to SI unit through Mass Calibration Laboratory Thai Calibration Services Co., Ltd., NSC-ONSC accredited no. Calibration 0189.

This calibration certificate may not be reproduced other than in full,
except with the prior written approval of the head of TCS calibration laboratory.



THAI CALIBRATION SERVICES CO., LTD.

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www.thaical.com E-mail : info@thaical.com, lab@thaical.com



CALIBRATION CERTIFICATE

Certificate No.S2103796S

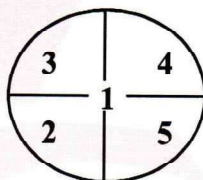
page 2 of 2

The repeatability of indication

Nominal Value (g)	Standard Deviation of reading (g)	Maximum difference between successive reading (g)	n
200	0.00005	0.0001	5

The effect of eccentric application of a load on the indication (test load : 100 g)

Position	Balance Reading (g)
Point 1	100.0002
Point 2	100.0002
Point 3	100.0002
Point 4	100.0005
Point 5	100.0002
Eccentric Value	0.0003



The error of indication

Nominal Value (g)	Value of Reference Standard Weight (g)	Balance Reading (g)	Correction (g)	Uncertainty (±) (g)	k
Unload	0.0000	0.0000	0.0000	0.00016	2.32
0.1	0.1000	0.1000	0.0000	0.00016	2.32
0.2	0.2000	0.2000	0.0000	0.00016	2.32
0.5	0.5000	0.5000	0.0000	0.00016	2.32
1	1.0000	1.0000	0.0000	0.00016	2.28
2	2.0000	2.0000	0.0000	0.00016	2.28
5	5.0000	5.0007	-0.0007	0.00016	2.25
10	10.0000	10.0010	-0.0010	0.00017	2.25
20	20.0000	20.0009	-0.0009	0.00017	2.20
50	50.0000	50.0005	-0.0005	0.00019	2.10
100	100.0000	100.0003	-0.0003	0.00025	2.00
200	199.9998	200.0004	-0.0006	0.00043	2.00

Remark : Adjustment, External weight nominal value 200 g, Standard weight of Lab

Uncertainty of measurement

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor (k), which for a normal distribution corresponds to a coverage probability of approximately 95% (confidence level).

This report will certify of the calibrated equipment only.

--End--

ENVIR SERVICE CO., LTD.

42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230

Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 17 September 2023

Instruments Information

Analyzer Type : SO2 Analyzer

Model : 43C

Manufacturer : Thermo Environmental

Serial Number : 0411405899

Calibrator Unit

Dilutor Model : Dasibi Model 5008

Serial Number : 705

ZERO AIR Generator : API MODEL 701

Serial Number : 1924

Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM

Sulphur Dioxide (SO2) 55.11 PPM

Carbon Monoxide (CO) 4,535 PPM

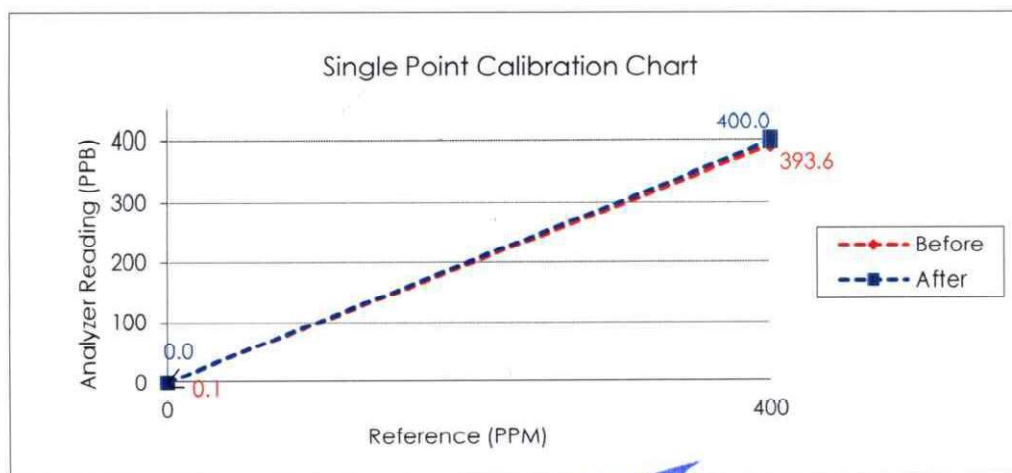
Cylinder number EB0129027

Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.1	0.1	400.0	393.6	-1.6
After	0.0	0.0	0.0	400.0	400.0	0.0



Analyzer Performance Test

Calibrated Date: 18 September 2023

Instruments Information

Analyzer Type : NO-NO₂-NO_x Analyzer

Manufacturer : Thermo Environmental

Model : 42C

Serial Number : 0413406269

Calibrator Unit

Dilutor Model : Dasibi Model 5008

Serial Number : 705

ZERO AIR Generator : API MODEL 701

Serial Number : 1924

Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM

Sulphur Dioxide (SO₂) 55.11 PPM

Carbon Monoxide (CO) 4,535 PPM

Cylinder number EB0129027

Expire Date: 29 Oct. 2027

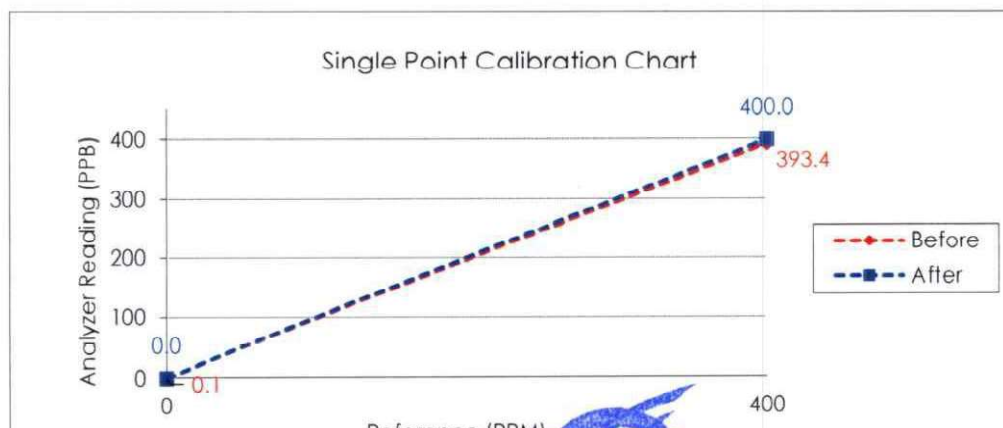
Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report (Before Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	393.4	-1.7
NO _x	0.0	0.0	0.0	400.0	394.6	-1.3

Calibration Report (After Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	400.0	0.0
NO _x	0.0	0.0	0.0	400.0	400.0	0.0





CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammasop31, Salathammasop Rd.,

Salathammasop, Thawewatthana, Bangkok 10170 Thailand

Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com



CERTIFICATE OF CALIBRATION

Certificate No. : 20-1357-001

Issue Date : 30 December 2020

Work Order No. : 20/1357

Customer Name : TNP ENVIRONMENT CO., LTD.
332/173 Moo 3 Tambon Bang Rak Phatthana,
Amphoe Bang Bua Thong, Nonthaburi 11110

Date of Received : 28 December 2020

Date of Calibration : 28 December 2020

Instrument Details : Description : Temperature Controlled Enclosures [Hot Air Oven]
Manufacturer : memmert
Model : UF75
Serial No. : B320.0251
ID No. : N/A
Resolution : 0.1 °C
Location : Service Room

Calibration Method : This instrument was calibrated by insert standard thermometer into the chamber according to calibration procedure no. CWI-T-10 follow up to TLAS G-20-1/02-08 (E) : Guidelines for Calibration and Checks of Temperature Controlled Enclosures.

Environmental Conditions :

Temperature : Area Monitoring between 15°C to 40°C
Humidity : Area Monitoring between 30%RH to 85%RH
Line Voltage : Area Monitoring 220 VAC \pm 10%

Traceability of Measurement :

This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Mr. Kritsada Kaewwangpa
Calibration Engineer

Approved by :

This certificate may not be reproduced other than in full except with the prior written approval of Crystal Calibration Sales and Service co., Ltd.

Crystal Calibration Sales and Service Co., Ltd.

45/48 Salathommasop 31, Salathommasop Rd., Salathommasop, Thawewatthana, Bangkok 10170

Phone : 0-2408-8474 Fax : 0-2408-8477 <http://www.crystalcal.com> Email : info@crystalcal.com



PAGE 1/3



CERTIFICATE OF CALIBRATION

Issue Date : 30 December 2020

Certificate No. : 20-1357-001

Work Order No. : 20/1357

Details of Calibration

1. Reference Standards Instrument

Instrument	Model	Serial No./Ins No.	Certificate No.	Due Date
Data Acquisition unit	34972A	MY49024826	20-1162-015	25 November 2021
Sensor type	RTD	RTD# 101-109	20-1162-015	25 November 2021

2. Certificate traceable

: This certificate traceable to The International System of Unit refer to
Crystal Calibration Sales and Service Co., Ltd. , NAC Calibration No. 0260

3. Condition of item

: New

4. Calibration site

: On - Site

5. Result of Calibration

: Without adjustment

6. Evaluate Condition

: **Time Constant** : - Hour 33 Minute At cal. point 104 °C
Air vent : Off
Fan speed status : Open Fan Speed 100 %

7. Calibration note

: The results reported in this certificate refer to the condition of instrument on the process
into the steady state of chamber

8. Sensors Installation Diagram

: When ; Sensor installation location in Chamber @ Working Space

A = Distance between sensor and wall of chamber is 5 cm

9. Dimensions of chamber

: W = 0.4 m ; D = 0.33 m ; H = 0.56 m

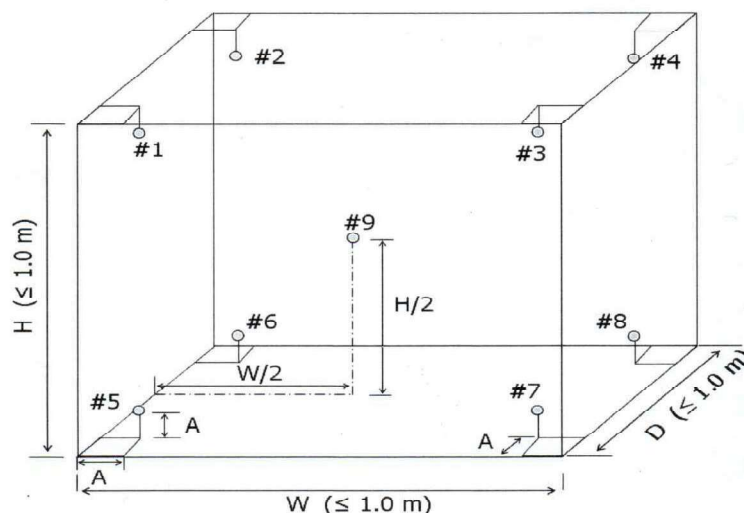


Diagram of Chamber



CERTIFICATE OF CALIBRATION

Issue Date : 30 December 2020

Certificate No. : 20-1357-001

Work Order No. : 20/1357

Result of Temperature Distribution and Performance Check

Table1 : Reporting of Temperature Distribution

Calibration point (°C)	Average Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.01	103.74	103.91	103.78	103.69	103.59	103.47	103.98	103.85	0.24
180.0	179.82	179.37	179.57	179.41	179.90	179.15	179.02	179.88	179.74	0.65

Table 2 : Reporting of Performance check

Indicator Set Point (°C)	Indicator Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
	MAX	MIN	Average			
104.0	104.0	104.0	104.0	0.06	0.43	0.64
180.0	180.0	179.9	180.0	0.21	0.79	1.14

Note

The reference sensor is preferably located of the geometric center of chamber

The measured temperature data readout by software "Benchlink Datalogger 3"

The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.

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 time.

Indicating Temperature - the average reading of indicating device that forms the integral part of the enclosure.

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

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%.



THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Raiking 30 Puttamonthon 5 Rd., Sampran, Nakhon Pathom 73210

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www.thaical.com E-mail : info@thaical.com, lab@thaical.com



CALIBRATION CERTIFICATE

Certificate No.S2103796S

page 1 of 2

Customer : TNP ENVIRONMENT CO., LTD.
332/173 Moo 3 Tambon Bang Rak Phatthana,
Amphoe Bang Bua Thong, Nonthaburi 11110

Equipment : Non-automatic weighing instrument (Electronic instrument)

Manufacturer : Citizon **Order No. :** 64S1167-1

Model : CY204 **Ambient temperature :** $(30.2 \pm 5.0) ^\circ\text{C}$

Accuracy class : - **Relative humidity :** $(35.5 \pm 10.0) \%$

Capacity : 220 g **Received date :** 24-Mar-2021

Resolution : 0.0001 g **Date of calibration :** 24-Mar-2021

Serial No. : 16405757 **Date of issue :** 25-Mar-2021

ID No. : LAB01 **Condition of the balance :** Good working conditions

Place of calibration : ห้องเครื่องชั่ง

Calibration method

This instrument was calibrated according to the EURAMET Calibration Guide No. 18.

Condition of reference standard weight

<u>Instrument</u>	<u>Nominal value</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due-date</u>	<u>Density (kg/m³)</u>
1 Standard weight set	1 mg to 2 kg	15885+15849	M2010001S	8-Oct-2021	7950

Traceability of the reference standard weight

This certificate is traceable to SI unit through Mass Calibration Laboratory Thai Calibration Services Co., Ltd., NSC-ONSC accredited no. Calibration 0189.

This calibration certificate may not be reproduced other than in full,
except with the prior written approval of the head of TCS calibration laboratory.



THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Raiking 30 Puttamonthon 5 Rd., Sampran, Nakornpatom 73210

Tel. 0-3439-7682-5 Fax: 0-3439-7687

www.thaical.com E-mail : info@thaical.com, lab@thaical.com



CALIBRATION CERTIFICATE

Certificate No.S2103796S

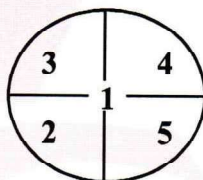
page 2 of 2

The repeatability of indication

Nominal Value (g)	Standard Deviation of reading (g)	Maximum difference between successive reading (g)	n
200	0.00005	0.0001	5

The effect of eccentric application of a load on the indication (test load : 100 g)

Position	Balance Reading (g)
Point 1	100.0002
Point 2	100.0002
Point 3	100.0002
Point 4	100.0005
Point 5	100.0002
Eccentric Value	0.0003



The error of indication

Nominal Value (g)	Value of Reference Standard Weight (g)	Balance Reading (g)	Correction (g)	Uncertainty (±) (g)	k
Unload	0.0000	0.0000	0.0000	0.00016	2.32
0.1	0.1000	0.1000	0.0000	0.00016	2.32
0.2	0.2000	0.2000	0.0000	0.00016	2.32
0.5	0.5000	0.5000	0.0000	0.00016	2.32
1	1.0000	1.0000	0.0000	0.00016	2.28
2	2.0000	2.0000	0.0000	0.00016	2.28
5	5.0000	5.0007	-0.0007	0.00016	2.25
10	10.0000	10.0010	-0.0010	0.00017	2.25
20	20.0000	20.0009	-0.0009	0.00017	2.20
50	50.0000	50.0005	-0.0005	0.00019	2.10
100	100.0000	100.0003	-0.0003	0.00025	2.00
200	199.9998	200.0004	-0.0006	0.00043	2.00

Remark : Adjustment, External weight nominal value 200 g, Standard weight of Lab

Uncertainty of measurement

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor (k), which for a normal distribution corresponds to a coverage probability of approximately 95% (confidence level).

This report will certify of the calibrated equipment only.

--End--



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 29 January, 2024

Certification No. 043/24

Page : 1 of 6

Object : Vantage Pro2 Weather Station

Manufacturer : Davis Instruments

Mode No. : 6152CM ID No. : TNP-F-W01

Mfg Code : Display BF200121006 Transmitter BF200121006

Customer : TNP ENVIRONMENT CO.,LTD.
332/173 Moo 3 T.Bang Rak Phatthana,
A.Bang Bua Thong, Nonthaburi 11110.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1015.6 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425

N.I.S.T. Test Reference Number 731/241460 : 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

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No. 0188



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 043/24

29 January, 2024

Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.0	0.00
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	12.9	0.11
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.1	-0.08

Wind Aloft Plotting Board.	
US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 043/24

29 January, 2024

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
1017.29	1018.6	-1.31
1017.46	1018.7	-1.24
1015.43	1016.5	-1.07
1015.35	1016.4	-1.05
1014.69	1015.9	-1.21
1014.15	1015.5	-1.35
1014.06	1015.3	-1.24
1013.82	1015.2	-1.38
1014.18	1015.3	-1.12
1014.60	1015.7	-1.10
1014.86	1016.0	-1.14
1014.94	1016.1	-1.16
1015.15	1016.5	-1.35
1015.61	1016.6	-0.99
1015.74	1016.8	-1.06
1015.34	1016.4	-1.06
1018.16	1019.3	-1.14
1017.76	1019.0	-1.24
1014.42	1015.5	-1.08
1015.46	1016.6	-1.14

Average

-1.17



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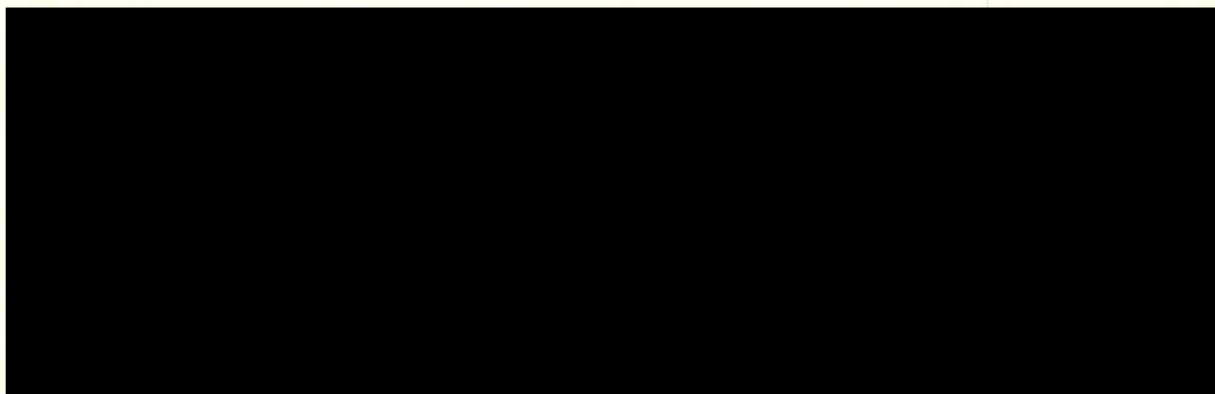
The Result of Calibration

Certification No. 043/24

29 January, 2024

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.1	45.1	0.0
30.5	30.4	0.1
15.2	15.3	-0.1





THAI METEOROLOGICAL DEPARTMENT

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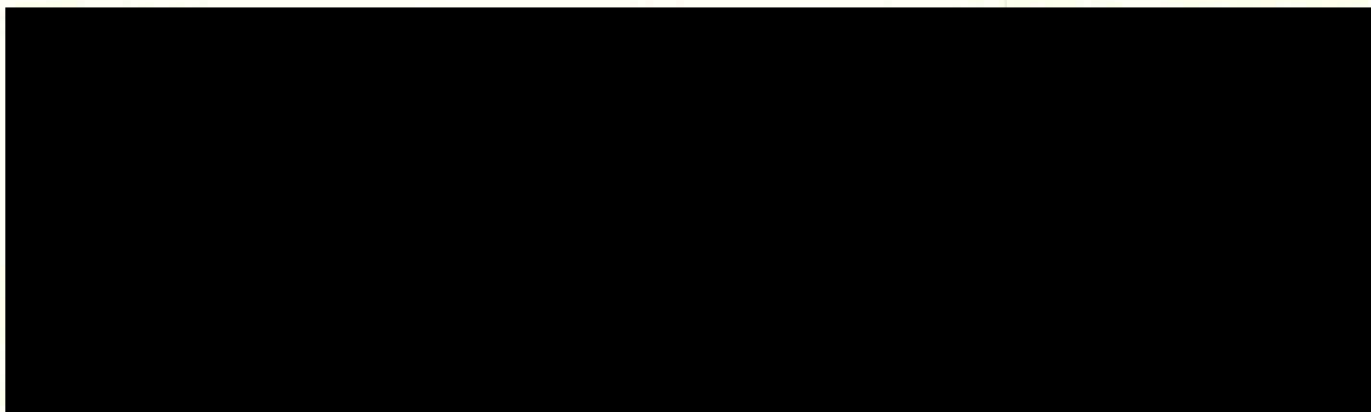
The Result of Calibration

Certification No. 043/24

29 January, 2024

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading	Correction
	% R.H.	% R.H.
45.2	44	1.20
62.8	60	2.80
92.6	89	3.60





Date of Issue 29 January, 2024

Certification No. 043/24

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING
BUCKET Product No. 6152CM Mfg. Code. BF200121006 ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)



วิศวกรชำนาญการ



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 19 February, 2024

Certification No. 186/24

Page : 1 of 6

Object : Vantage Pro2 Weather Station

Manufacturer : Davis Instruments

Mode No. : 6152CM ID No. : TNP-F-W02

Mfg Code : Display BF210628045 Transmitter BF210628045

Customer : TNP ENVIRONMENT CO.,LTD.
332/173 Moo 3 T.Bang Rak Phatthana,
A.Bang Bua Thong, Nonthaburi 11110.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.3 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425

N.I.S.T. Test Reference Number 731/241460 : 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

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

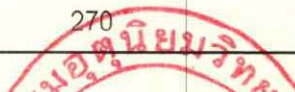
Certification No. 186/24

19 February, 2024

Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.0	0.00
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
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.	
US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 186/24

19 February, 2024

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
1009.59	1009.5	0.09
1009.45	1009.4	0.05
1010.10	1010.0	0.10
1010.94	1010.9	0.04
1011.46	1011.4	0.06
1011.84	1011.9	-0.06
1012.06	1012.2	-0.14
1013.04	1013.2	-0.16
1013.18	1013.3	-0.12
1012.89	1013.0	-0.11
1013.20	1013.3	-0.10
1013.44	1013.5	-0.06
1013.81	1013.9	-0.09
1014.19	1014.3	-0.11
1015.96	1016.0	-0.04
1016.23	1016.3	-0.07
1015.64	1015.8	-0.16
1015.23	1015.3	-0.07
1012.87	1013.0	-0.13
1013.63	1013.7	-0.07

Average

-0.06



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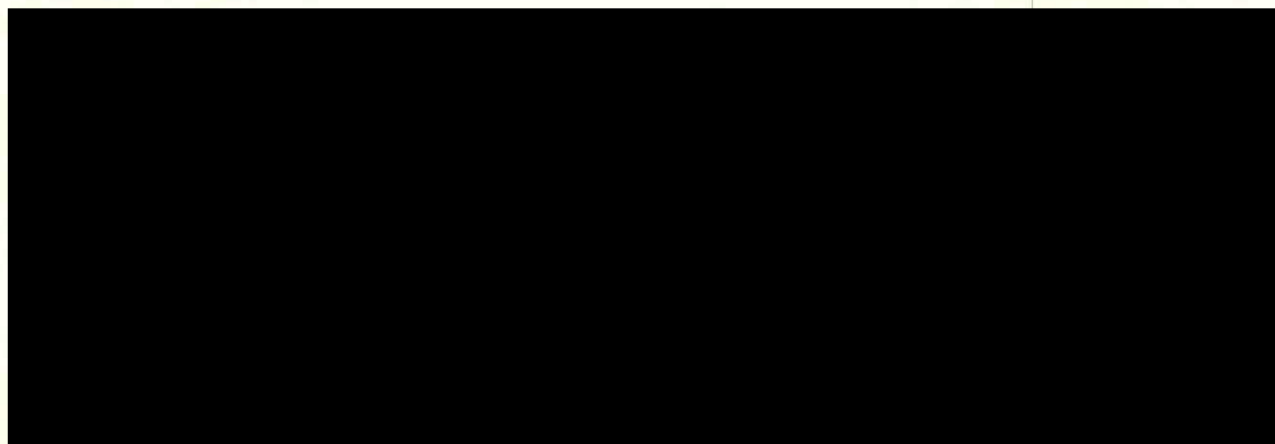
The Result of Calibration

Certification No. 186/24

19 February, 2024

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.5	0.0
30.2	30.2	0.0
15.4	15.5	-0.1





THAI METEOROLOGICAL DEPARTMENT

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

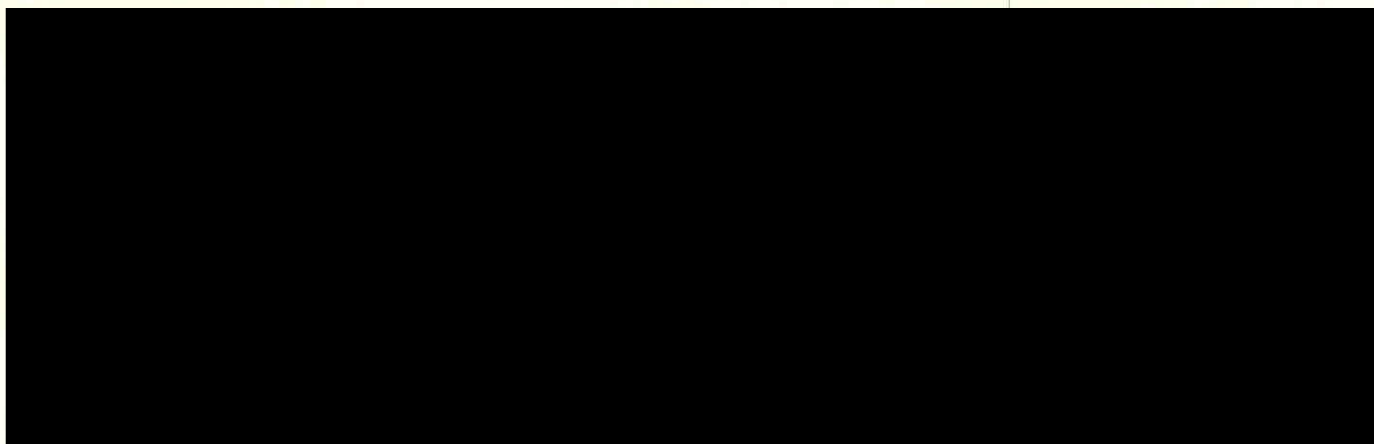
The Result of Calibration

Certification No. 186/24

19 February, 2024

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading	Correction
	% R.H.	% R.H.
45.6	46	-0.40
65.2	67	-1.80
91.5	95	-3.50





Date of Issue 19 February, 2024

Certification No. 186/24

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING
BUCKET Product No. 6152CM Mfg. Code. BF210628045 ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)





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 24 October, 2023

Certification No. 371/23

Page : 1 of 2

Object : WIRELESS ANEMOMETER

Manufacturer : SCARLET

Type : WL-21

Serial No. : Wireless Receiver 2206DR0086 ID No. : TNP-F-W06
Wind Sensor 2205DT0025

Customer : TNP ENVIRONMENT CO.,LTD.
332/173 Moo 3 T.Bang Rak Phatthana,
A.Bang Bua Thong, Nonthaburi 11110.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1002.2 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : 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



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 371/23

24 October, 2023

Page : 2 of 2

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.00	-	-	-	7.0	0.00
9.02	-	-	-	9.0	-0.08
11.01	-	-	-	10.9	0.11
13.01	-	-	-	12.9	0.11
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.1	-0.18
-	0.754	0.751	25.03	25.2	-0.17
-	1.083	1.083	30.03	30.3	-0.27

Wind Aloft Plotting Board.	
US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

**SMART TECH CALIBRATION & SERVICES CO., LTD.**

14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND

Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com



Certificate of Calibration

Certificate No. STCR-2401076-2

Work Order No. STCR-2401076

Page 1 of 3

Customer Name : TNP Environment Co., Ltd.
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,
Bang Bua Thong District, Nonthaburi Province 11110

Equipment Name : Sound Level Meter
Manufacturer : Pulsar
Model : 44
Serial Number : PN2352
Control Number : TNP-F-S21
Received Date : Jan 13, 2024
Calibration Date : Jan 15, 2024
Recommended Due Date : Jan 15, 2025
Calibration Method : Calibration Procedure No. CPE-04-01

Environmental Conditions

Ambient Temperature : $(25 \pm 2) ^\circ\text{C}$
Ambient Relative Humidity : $(50 \pm 15) \% \text{RH}$
Calibration Place : Permanent Calibration Laboratory

Condition as received : Normal
Calibration Result : See data attached

1. 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%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Jan 16, 2024

Approved by :

Calibrated by : S. Sompoch

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2401076-2

Page 2 of 3

Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2401076-2

Page 3 of 3

UUC Range : (20 to 140) dB

Resolution : 0.1 dB

Results of Calibration: [] Without adjustment [☒] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.2 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	93.3 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.3 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



Site Information

Location : TNP Environment Co.,Ltd.	Date : 21-Nov-23
Serial : TNP-F-10-PM10	Tech : Mr.Nattachai Triprawat

Site Conditions

Barometric Pressure (mmHg) : 760	Corrected Pressure (mmHg) : 760
Temperature (deg C) : 29	Temperature (deg K) : 302
Average Press.(mmHg) : 760	Corrected Average (mmHg) : 760
Average Temp.(deg C) : 29	Average Temp.(deg K) : 302

Calibration Orifice

Make : Tish Environment	Slope : 1.69297
Model : TE-5028A	Intercept : -0.02707
Serial : 3945	Calibration Due Date : October 1, 2023

Calibration Data

Plate or Test #	H2O (in)	Qa (m3/min)	I (Chart)	IC (Corrected)	Linear Regression	
1	6.80	0.980	60.00	39.08	Slope	: 60.1931
2	5.50	0.889	55.00	34.67	Intercept	: -19.3542
3	4.50	0.806	47.00	29.63	Corr. Coeff	: 0.9982
4	3.60	0.722	38.00	23.95	# of Observations	: 5
5	3.00	0.661	32.00	20.17		

Calibrate By

Approved By

Calibration Certificate

Part Number: 721A0201

Description: Micromate ISEE Linear Microphone

Serial Number: UL6861

Calibration Date: **NOV 17 2023**

Calibration Reference Equipment: 714J7402

The equipment identified above meet or exceeds the International Society of Explosives Engineers (ISEE) 2017 Performance Specification for Blasting Seismographs.

Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications.

Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.

The environment in which this product was calibrated is maintained within the operating specifications of the instrument.

Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.



Instantel®

309 Legget Drive, Ottawa, Ontario, K2K 3A3, (613) 592-4642

Microphone Stand Assembly (Part No. 720A6001)

Explanation

The Microphone Stand Assembly provides increased flexibility for various heights dependent on assembly, as follows:

Number of Sections	Assembled Height
• 3 Sections	33.25" (84.46 cm),
• 2 Sections	22.25" (56.52 cm)
• 1 Section	13.25" (22.02 cm) (Requires optional Ground Spike, Part No. 1100241)

If height is required beyond the three combined sections, additional sections may be ordered or used from another existing microphone stand assembly.

Package Contents

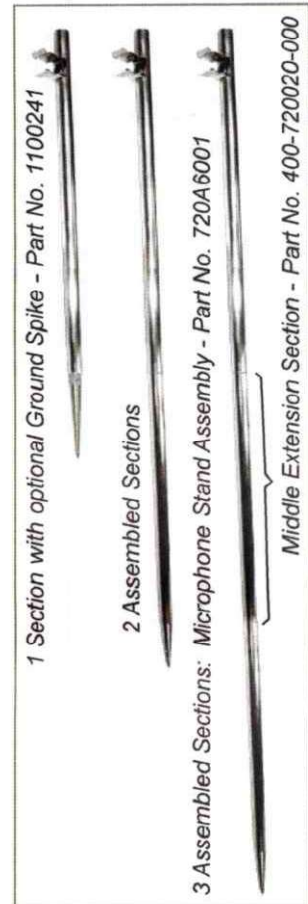
Microphone Stand Assembly Part No. 720A6001

Tools and Materials Required

- Microphone Stand Assembly, Part No. 720A6001.
- Optional Microphone Stand Assembly Extension Section, Part No. 400-720020-000, for extended length installations.
- Optional Geophone Spike, 3" (75 mm), Part No. 1100241, for short length installations.
- Rubber mallet, as required.

Installation

1. Determine the required height and assemble the Microphone Stand by firmly hand-tightening the sections together. Do not use tools, such as a pliers or vice grips, to tighten the sections as this may damage the threads.
2. Locate the Microphone Stand Assembly and ensure that the clip will allow you to insert the microphone oriented towards the event to be recorded.
3. Firmly push the Microphone Stand Assembly into the ground using your hand, or if the ground is too solid, use a rubber mallet and strike the top of the stand, being careful not to damage in the microphone clip. DO NOT use a metal hammer as it will damage the stand.
4. Install the microphone into the clip.



Use your hand or a rubber mallet to install the Microphone Stand; clip on the microphone.

NOTE: DO NOT use a metal hammer as it will damage the microphone stand.



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www.instantel.com

Calibration Certificate

Part Number: 721A0201

Description: Micromate ISEE Linear Microphone

Serial Number: UL6862

Calibration Date: **NOV 17 2023**

Calibration Reference Equipment: 714J7402

The equipment identified above meet or exceeds the International Society of Explosives Engineers (ISEE) 2017 Performance Specification for Blasting Seismographs.

Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications.

Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.

The environment in which this product was calibrated is maintained within the operating specifications of the instrument.

Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.



Instantel®

309 Legget Drive, Ottawa, Ontario, K2K 3A3, (613) 592-4642

Microphone Stand Assembly (Part No. 720A6001)

Explanation

The Microphone Stand Assembly provides increased flexibility for various heights dependent on assembly, as follows:

Number of Sections	Assembled Height
• 3 Sections	33.25" (84.46 cm),
• 2 Sections	22.25" (56.52 cm)
• 1 Section	13.25" (22.02 cm) (Requires optional Ground Spike, Part No. 1100241)

If height is required beyond the three combined sections, additional sections may be ordered or used from another existing microphone stand assembly.

Package Contents

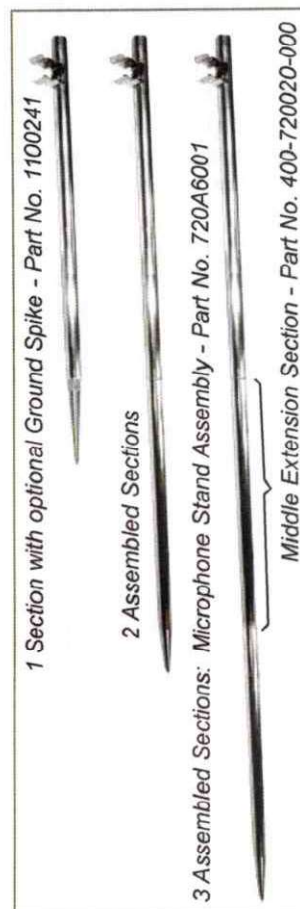
Microphone Stand Assembly Part No. 720A6001

Tools and Materials Required

- Microphone Stand Assembly, Part No. 720A6001.
- Optional Microphone Stand Assembly Extension Section, Part No. 400-720020-000, for extended length installations.
- Optional Geophone Spike, 3" (75 mm), Part No. 1100241, for short length installations.
- Rubber mallet, as required.

Installation

1. Determine the required height and assemble the Microphone Stand by firmly hand-tightening the sections together. Do not use tools, such as a pliers or vice grips, to tighten the sections as this may damage the threads.
2. Locate the Microphone Stand Assembly and ensure that the clip will allow you to insert the microphone oriented towards the event to be recorded.
3. Firmly push the Microphone Stand Assembly into the ground using your hand, or if the ground is too solid, use a rubber mallet and strike the top of the stand, being careful not to damage in the microphone clip. DO NOT use a metal hammer as it will damage the stand.
4. Install the microphone into the clip.



Use your hand or a rubber mallet to install the Microphone Stand; clip on the microphone.

NOTE: DO NOT use a metal hammer as it will damage the microphone stand.



The World's Most Trusted Vibration Monitors

www.instantel.com

Calibration Certificate

Part Number: 721A0201

Description: Micromate ISEE Linear Microphone

Serial Number: UL6863

Calibration Date: **NOV 17 2023**

Calibration Reference Equipment: 714J7402

The equipment identified above meet or exceeds the International Society of Explosives Engineers (ISEE) 2017 Performance Specification for Blasting Seismographs.

Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications.

Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.

The environment in which this product was calibrated is maintained within the operating specifications of the instrument.

Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.



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Package Contents

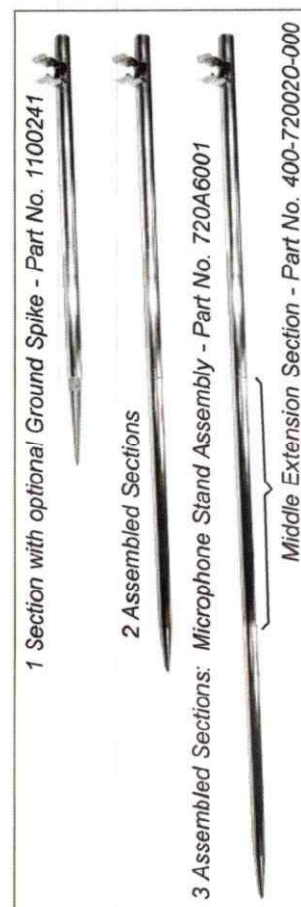
Microphone Stand Assembly Part No. 720A6001

Tools and Materials Required

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Certificate of Calibration

Certificate Number : SPR21070188-1

Page : 1 of 3

Customer : TNP ENVIRONMENT CO.,LTD.

332/173 Moo.3, Bang Rak Phatthana, Bang Bua Thong, Nonthaburi
11110

Equipment Name : Vibration Meter

Manufacturer : Instantel

Model : 721A2501/721A2901

Serial Number : UM13538

ID. Number : TNP-F-V01

Environmental Conditions

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

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

Location of Calibration : In-Lab

Calibration Procedure : In-House Method

Received Date : 12 Jul 2021

Calibration Date : 16 Jul 2021

Recommend Due Date : 16 Jul 2022

Date of Issue : 17 Jul 2021

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. Munin Khumpum

Calibration Officer



Calibration Report

Certificate Number : SPR21070188-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Vibration Calibrator	VC-02	2007014	AV-0050-20	10 Dec 2021

Traceability

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



Result of Calibration

Certificate No. : SPR21070188-1

Page : 3 of 3

Results of Calibration : (★) Without () After Adjustment

Velocity Performance Test

Unit : mm/s_{pk}

Frequency (Hz)	STD Reading	UUC. Reading	Error	Uncertainty (±)
80.0	1.003	1.046	0.043	0.012
80.0	2.000	2.058	0.058	0.023
80.0	3.002	3.072	0.070	0.035
80.0	4.000	4.121	0.121	0.046
80.0	5.001	5.234	0.233	0.058
80.0	6.000	6.315	0.315	0.069
80.0	7.001	7.443	0.442	0.081
80.0	8.002	8.558	0.556	0.092
80.0	9.001	9.692	0.691	0.10
80.0	10.003	10.723	0.720	0.12

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 $k = 2$, providing a level of confidence approximately 95%

- End of Certificate -

Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM22048

Calibration Date: **NOV 17 2023**

Calibration Reference Equipment: 714J7402

Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications.

Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.

The environment in which this product was calibrated is maintained within the operating specifications of the instrument.

Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.



309 Legget Drive, Ottawa, Ontario, K2K 3A3, (613) 592-4642

Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM22049

Calibration Date:

NOV 17 2023

Calibration Reference Equipment: 714J7402

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Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM22200

Calibration Date: **NOV 17 2023**

Calibration Reference Equipment: 714J7402

Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications.

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