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## ADVANTAGE CENTER CO., LTD.

59/494 M.6, Frakham Road, T.Kukhot, Lumlookkar, Pathumthani 12130 Thailand.

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pomsak2008@yahoo.co.th



# CALIBRATION LABORATORY

Certificate No. RA-2503022-3

Job No.: RA-2503022

## Certificate of Calibration

### FOR

**Equipment Name :** Temperature Monitors

**Manufacturer :** Quest Technologies

**Model :** TEMP II

**Serial Number :** JUB090006

**Customer Code :** N/A

**Location of Calibration :** In Lab

**Customer Name :** Smile Laboratory Co.,Ltd.

563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Calibration Procedure :** CPT-04-11

**Received Date :** Feb 7, 2025

**Calibration Date :** Feb 10, 2025

**Recommended Due Date :** N/A

#### Environmental Conditions

**Ambient Temperature :**  $(25 \pm 2) ^\circ\text{C}$

**Relative Humidity :**  $(50 \pm 15) \% \text{RH}$

**Result :** No Adjustment (See data attached in page 3 to the end of certificate)

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, Advantage Center Co., Ltd.

**Calibrated by :** C. Thachthana

**Appro**

**Date of Issue :**



Certificate No.: RA-2503022-3

## Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Data Logger	ID.ACCL0200	EL58629/24	Nov 7, 2025	PCAL

## Traceability

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

- PCAL : Professional Calibration & Services Co., Ltd.



Certificate No. : RA-2503022-3

## Result of Calibration

Temperature measurement

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty of Measurement (±°C)
30.019	29.9	0.119	0.50
32.034	31.9	0.134	0.50
34.029	33.9	0.129	0.50
36.028	35.9	0.128	0.50
38.035	37.9	0.135	0.50

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





GIIC Calibration Laboratory

700/20-21 Phaholyothin Rd., Samsennai, Phayathai,  
Bangkok 10400 Thailand

**Tel** : +66 (02) 615 4999

**Fax** : +66 (02) 615 4644

**E-mail** : cal@giic.co.th



CERTIFICATE No.: CAL00492-24

PAGE :

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OF :

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## Certificate of Calibration

Equipment : DIGITAL LIGHT METER

Manufacturer : KEPLER

Model / Type : KLM-25L

Serial No. : 230203565

ID No. : -

Customer : Smile Laboratory Co.,Ltd.

563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok, 10160

C.S.R. No. : L0000513-24

Received Date : 09 April 2024

Calibration Date : 09 April 2024

Calibrated By : MR. TONTRAKARN SRIKACHA

Approved By : MR. NATTAPOL KINGKAEW

Issue Date : 09 April 2024

The uncertainties are for a level of confidence of approximately 95%.

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.





## CALIBRATION REPORT

### Condition of this calibration result :

1. Environment :            Temperature            :  $(23 \pm 3) ^\circ\text{C}$   
   Relative Humidity :  $(50 \pm 15) \%$

### 2. Reference / Procedure Used :

- This Instrument was calibrated by substitution with reference illuminance meter, the Instrument and reference illuminance meter were mounted with the plane of its diffuser vertical and normal to the direction of measurement. Calibration was illuminated by the luminous standard lamp (operated at colour temperature 2856K) according to GIIC Calibration Laboratory calibration procedure No.GIICLAB-CP-L01.

### 3. Reference Standard Instrument :

Instrument	Model	Serial No	Certificate No	Due Dated
Illuminance meter	PMA2200 / PMA2130	25531 / 025000	TP-1021-23	8 Jun 24

### 4. This Certification is traceable to the SI unit through :

- The National Institute of Metrology (Thailand) .

### 5. Uncertainty :

- The reported uncertainty of measurement was estimated and based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.



## CALIBRATION REPORT

All data shown below were as received value : Without adjustment

### Calibration result :

Function: Illuminance Measurement

L9

<sup>1</sup> UUC Range (lux)	Standard Setting (lux)	<sup>1</sup> UUC Reading (lux)	Error (lux)	Uncertainty of measurement ± (lux)
AUTO RANGE	0	0.00	0.00	0.60
	50	50.6	0.6	1.6
	250	249.4	-0.6	6.5
	500	497	-3	13
	1000	996	-4	26
	1500	1493	-7	36
	2000	1990	-10	48
	3000	2970	-30	72
	4000	3958	-42	96
	5000	4950	-50	0.12 klux

<sup>1</sup>UUC = Unit Under Calibration

This result of calibration was found accurated as show on data and place of calibration for the calibrated item only.

- END -

Request No. 21-67/0517

MTC No. EEL. BP. 14/0767

## CALIBRATION CERTIFICATE

Submitted by : Smile Laboratory Co.,Ltd.

Address : 563/1, Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok, 10160, Thailand.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.  
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

### Instrument Calibrated :

Description : Acoustic Calibrator

Manufacturer : Quest Technologies

Model : QC-20

Serial No. : QF4090085

### Ambient Environment

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

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

Ambient Pressure :  $(101.325 \pm 1.500) \text{ kPa}$

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.  
2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.  
3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.  
4. Digital Multimeter Agilent 34401A S/N MY44005560.  
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.  
6. Audio Analyzer Keithley 2015-P S/N 4106495.  
7. Condenser Microphone Bruel&Kjaer 4180 S/N 2633526.

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

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

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

Date of Receipt : 8 Jul. 2024

Date of Calibration : 12 Jul. 2024

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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

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Request No. 21-67/0517

MTC No. EEL. BP. 14/0767

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 Brüel&Kjaer 4180	93.80	-0.20	$\pm 0.10$	$\pm 0.40$ dB

### 2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	1000.6	0.6	$\pm 1.5$	$\pm 1.0\%$

### 3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	2.50	$\pm 0.60$	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Date of Calibration : 12 Jul. 2024

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0517

MTC No. EEL. BP. 14/0767

Nominal Output of Unit Under Test = 114 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 Brüel&Kjaer 4180	113.74	-0.26	$\pm 0.10$	$\pm 0.40$ dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	1000.6	0.6	$\pm 1.5$	$\pm 1.0\%$

3. Total Distortion

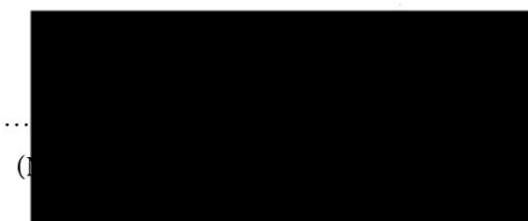
Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	0.50	$\pm 0.50$	$\pm 3.0\%$

Note : 1. No adjustment.

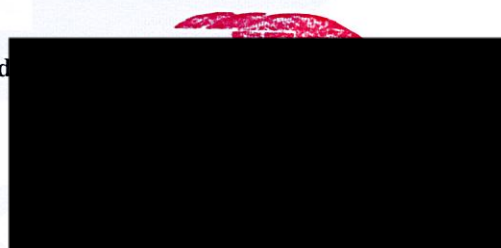
2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :



Approved



Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 12 Jul. 2024

Date of Issue : 15 Jul. 2024

Ref : 2011267070802505001

End of Certificate

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# CALIBRATION LABORATORY

Certificate No. RA-2409078-29

## Certificate of Calibration

Job No. RA-2409078

### FOR

**Equipment Name :** Noise Dosimeter

**Manufacturer :** SCARLET TECH

**Model :** ST-130

**Serial Number :** 230600133

**Customer Code :** N/A

**Location of Calibration :** In Lab

**Customer Name :** Smile Laboratory Co., Ltd.

563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Calibration Procedure :** CPE-04-01

**Received Date :** Aug 3, 2024

**Calibration Date :** Aug 3, 2024

**Recommended Due Date :** N/A

#### CONDITION AS RECEIVED : Normal

#### Environmental Conditions

**Ambient Temperature :**  $(25 \pm 2) ^\circ\text{C}$

**Relative Humidity :**  $(50 \pm 15) \% \text{RH}$

**Result :** No Adjustment (See data attached in page 3 to the end of certificate)

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, Advantage Center Co., Ltd.

**Calibrated by :** B. Pradit

**Approved**

**Date of Issue :** Aug 3, 2024

**Laboratory Management**

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Certificate No.: RA-2409078-29

## Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	170603302	EEL.BP.108/1066	Oct 30, 2024	TISTR

## Traceability

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

- TISTR : Thailand Institute of Scientific and Technological Research



Certificate No. : RA-2409078-29

## Result of Calibration

Calibration Range : 94 dB, 114 dB

Function : Measurement @ 1 kHz

Select A Fast response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.6	-0.04	0.88
114.52 dB	114.6	-0.08	0.88

Select A Slow response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.6	-0.04	0.88
114.52 dB	114.6	-0.08	0.88

Select C Fast response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.6	-0.04	0.88
114.52 dB	114.6	-0.08	0.88

Select C Slow response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.6	-0.04	0.88
114.52 dB	114.6	-0.08	0.88

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -







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## ADVANTAGE CENTER CO., LTD.

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# CALIBRATION LABORATORY

Certificate No. RA-2409078-16

## Certificate of Calibration

Job No. RA-2409078

### FOR

Equipment Name : Sound Level Meter

Manufacturer : SCARLET TECH

Model : ST-21D

Serial Number : 821044

Customer Code : N/A

Location of Calibration : In Lab

Customer Name : Smile Laboratory Co., Ltd.

563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

Calibration Procedure : CPE-04-01

Received Date : Jul 15, 2024

Calibration Date : Jul 18, 2024

Recommended Due Date : N/A

CONDITION AS RECEIVED : Normal

#### Environmental Conditions

Ambient Temperature :  $(25 \pm 2) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 15) \% \text{RH}$

Result : No Adjustment (See data attached in page 3 to the end of certificate)

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, Advantage Center Co., Ltd.

Calibrated by : C. Thachthana

App

Date of Issue : Jul 18, 2024

Laboratory Management

Page 1 of 3

Certificate No.: RA-2409078-16

## Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	170603302	EEL.BP.108/1066	Oct 30, 2024	TISTR

## Traceability

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

- TISTR : Thailand Institute of Scientific and Technological Research



Certificate No. : RA-2409078-16

## Result of Calibration

Calibration Range : 94 dB, 114 dB

Function : Measurement @ 1 kHz

Select A Fast response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.5	0.06	0.88
114.52 dB	114.6	-0.08	0.88

Select A Slow response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.5	0.06	0.88
114.52 dB	114.6	-0.08	0.88

Select C Fast response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.5	0.06	0.88
114.52 dB	114.6	-0.08	0.88

Select C Slow response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.56 dB	94.5	0.06	0.88
114.52 dB	114.6	-0.08	0.88

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -







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# CALIBRATION LABORATORY

Certificate No. RS-2502017-20

## Certificate of Calibration

Job No. RS-2502017

### FOR

**Equipment Name :** Sound Level Meter

**Manufacturer :** SCARLET TECH

**Model :** ST-11D

**Serial Number :** 820265

**Customer Code :** N/A

**Location of Calibration :** In Lab

**Customer Name :** Smile Laboratory Co., Ltd.

563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Calibration Procedure :** CPE-04-01

**Received Date :** Jan 1, 2025

**Calibration Date :** Jan 17, 2025

**Recommended Due Date :** N/A

**CONDITION AS RECEIVED :** Normal

#### Environmental Conditions

**Ambient Temperature :**  $(25 \pm 2) ^\circ\text{C}$

**Relative Humidity :**  $(50 \pm 15) \% \text{RH}$

**Result :** No Adjustment (See data attached in page 3 to the end of certificate)

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, Advantage Center Co., Ltd.

**Calibrated by :** B. Pradit

**Appr**

**Date of Issue :** Feb 25, 2025

**Laboratory Management**

Page 1 of 3





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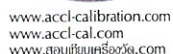
## Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	170603302	EEL.BP. 32/1167	Nov 14, 2025	TISTR

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

- TISTR : Thailand Institute of Scientific and Technological Research





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pornsak2008@yahoo.co.th

## Result of Calibration

**Function :** Measurement @ 1 kHz

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.5	-0.08	0.88
114.32 dB	114.5	-0.18	0.88

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.5	-0.08	0.88
114.32 dB	114.5	-0.18	0.88

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.4	0.02	0.88
114.32 dB	114.5	-0.18	0.88

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.4	0.02	0.88
114.32 dB	114.5	-0.18	0.88

UUC = Unit Under Calibration

ACCL  
LMOI

# CERTIFICATE OF CALIBRATION

NO. 20241212035

Name of Product:	Sound Level Meter
Model:	ST-11D
Serial Number:	820384
Specification:	Class 1
Conclusion:	Pass
Date of calibration:	2024-12-13
Due Date:	2025-12-12

Calibration

- This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
- This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type & serial No. of Microphone: AWA14425-54570

3. Adjustments to indicated sound levels:

Type of Calibrator B&K 4231 Sound

Pressure Level 94.0 dB

4. Measuring up limit: 140 dBA

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
10	-71.0	-14.6	0.2	1000	0.0	0.0	-0.1
20	-50.3	-6.4	-0.4	2000	0.1	0.0	0.0
31.5	-39.4	-2.2	0.1	4000	1.3	-0.1	0.0
63	-26.1	-0.8	-0.1	8000	1.2	-0.8	0.0
125	-16.3	-0.2	-0.2	12500	-5.7	-7.2	0.1
250	-8.6	0.1	0.0	16000	-11.7	-13.4	0.2
500	-3.2	0.1	0.0	20000	-23.9	-25.8	-0.3

## 6. Self-generated noise

Microphone replaced by electrical input signal device

8.8 dB(A)	8.4 dB(C)	15.9 dB(Z)
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## 7. F&S Weighting

Rate of the F weighting decrease ( dB/s )	35.1
Rate of the S weighting decrease ( dB/s )	4.4
Deviation of F&S	-0.1

## 8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level 0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

## 9. Tone burst response ( A Weighting ) :

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.1	-26.9	-26.9	-7.0
0.25	-27.2	/	-36.0	-7.0

## 10. Peak C sound level ( 500Hz ) :

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.4	2.4	2.3	2.4

## 11. Overload indication: Pass

## 12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.



Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
L <sub>Aeq,T</sub>	103.2	103.2	0.0
L <sub>5</sub>	110.8	110.8	0.0
L <sub>10</sub>	108.8	108.8	0.0
L <sub>50</sub>	92.9	92.8	0.1
L <sub>90</sub>	76.9	76.8	0.1
L <sub>95</sub>	75.0	74.9	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

**Environment conditions:**

Air temperature: 20 °C

Relative humidity: 50 %

Static pressure: 101.8 kPa

**Reference equipment used in the calibration:**

Description:	Model	Serial No.	Expiry Date	Traceable To
Microphone	B&K 4191	2929405	2024-12-15	NML
Multi function sound calibrator	B&K 4226	2288444	2024-10-15	CIGISMEC
Signal generator	DS 360	33873	2024-10-15	CEPREI

**Test specifications:**

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of  $\pm 20\%$ .
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

**References:**

IEC 61672-3 Sound Level Meters Part 3: Periodic tests

## CERTIFICATE OF CALIBRATION

NO. 20241212036

Name of Product:	Sound Level Meter
Model:	ST-11D
Serial Number:	820385
Specification:	Class 1
Conclusion:	Pass
Date of calibration:	2024-12-13
Due Date:	2025-12-12

Calibra

- I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
- II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type &amp; serial No. of Microphone: AWA14425-54573

3. Adjustments to indicated sound levels:

Type of Calibrator B&K 4231 SoundPressure Level 94.0 dB4. Measuring up limit: 140 dBA

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
10	-71.1	-14.6	0.2	1000	0.0	0.0	-0.1
20	-50.4	-6.4	-0.4	2000	0.1	0.0	0.0
31.5	-39.4	-2.2	0.1	4000	1.3	-0.1	0.0
63	-26.2	-0.8	-0.1	8000	1.2	-0.8	0.0
125	-16.3	-0.1	-0.2	12500	-5.7	-7.2	0.1
250	-8.5	0.2	0.0	16000	-11.7	-13.4	0.2
500	-3.2	0.1	0.0	20000	-23.9	-25.8	-0.3

**6. Self-generated noise**

Microphone replaced by electrical input signal device

7.3 dB(A)	11.2 dB(C)	13.3 dB(Z)
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**7. F&S Weighting**

Rate of the F weighting decrease ( dB/s )	35.1
Rate of the S weighting decrease ( dB/s )	4.3
Deviation of F&S	-0.1

**8. Level Linearity (A-weighting at frequency 1 kHz)**Reference sound level 90.0 dBMax error at 10dB steps upper reference sound level 0.1 dBMax error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dBMax error at 10dB steps below reference sound level 0.1 dBMax error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB**9. Tone burst response ( A Weighting ) :**

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.1	-26.9	-26.9	-7.0
0.25	-27.2	/	-36.0	-7.0

**10. Peak C sound level ( 500Hz ) :**

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.4	2.4	2.3	2.4

**11. Overload indication:** Pass**12. Statistical analysis function**Sweep signal maximum indicated sound level: 112.8 dBSweep amplitude: 40 dBScan cycle time: 60 S; Measurement period: 180 S.



Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
L <sub>Aeq,T</sub>	103.2	103.2	0.0
L <sub>5</sub>	110.8	110.8	0.0
L <sub>10</sub>	108.8	108.8	0.0
L <sub>50</sub>	92.9	92.8	0.1
L <sub>90</sub>	76.9	76.8	0.1
L <sub>95</sub>	75.0	74.9	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

**Environment conditions:**

Air temperature: 20 °C

Relative humidity: 50 %

Static pressure: 101.8 kPa

**Reference equipment used in the calibration:**

Description:	Model	Serial No.	Expiry Date	Traceable To
Microphone	B&K 4191	2929405	2024-12-15	NML
Multi function sound calibrator	B&K 4226	2288444	2024-10-15	CIGISMEC
Signal generator	DS 360	33873	2024-10-15	CEPREI

**Test specifications:**

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of  $\pm 20\%$ .
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

**References:**

IEC 61672-3 Sound Level Meters Part 3: Periodic tests



www.accl-calibration.com  
www.accl-cal.com  
www.ณัฐพิทักษ์วิศวกรรม.com

## ADVANTAGE CENTER CO., LTD.

59/494 M.6, Frakham Road, T.Kukhot, Lumlookkar, Pathumthani 12130 Thailand.

Tel. (66-2) 9873248-50 Fax: (66-2) 9873252 E-mail: info.accl2662@gmail.com

pornsak2008@yahoo.co.th



# CALIBRATION LABORATORY

Certificate No. RS-2502017-21

## Certificate of Calibration

Job No. RS-2502017

### FOR

Equipment Name : Sound Level Meter

Manufacturer : SCARLET TECH

Model : ST-11

Serial Number : 820628

Customer Code : N/A

Location of Calibration : In Lab

Customer Name : Smile Laboratory Co., Ltd.

563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

Calibration Procedure : CPE-04-01

Received Date : Feb 1, 2025

Calibration Date : Feb 11, 2025

Recommended Due Date : N/A

CONDITION AS RECEIVED : Normal

#### Environmental Conditions

Ambient Temperature :  $(25 \pm 2) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 15) \% \text{RH}$

Result : No Adjustment (See data attached in page 3 to the end of certificate)

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, Advantage Center Co., Ltd.

Calibrated by : B. Pradit

Appr

Date of Issue : Feb 25, 2025

Laboratory Management

Page 1 of 3



www.accl-calibration.com  
www.accl-cal.com  
www.นอูฟฟอูนสอ๑๑๓.com

# ADVANTAGE CENTER CO., LTD.

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Tel. (66-2) 9873248-50 Fax: (66-2) 9873252 E-mail: info.accl2662@gmail.com  
pornsak2008@yahoo.co.th

Certificate No.: RS-2502017-21

## Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	170603302	EEL.BP. 32/1167	Nov 14, 2025	TISTR

## Traceability

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

- TISTR : Thailand Institute of Scientific and Technological Research





Certificate No. : RS-2502017-21

## Result of Calibration

Calibration Range : 94 dB, 114 dB

Function : Mesurement @ 1 kHz

Select A Fast response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.5	-0.08	0.88
114.32 dB	114.5	-0.18	0.88

Select A Slow response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.5	-0.08	0.88
114.32 dB	114.5	-0.18	0.88

Select C Fast response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.5	-0.08	0.88
114.32 dB	114.5	-0.18	0.88

Select C Slow response

STD Setting	UUC Reading (dB)	Correction (dB)	Uncertainty of Measurement ( ± dB)
94.42 dB	94.5	-0.08	0.88
114.32 dB	114.5	-0.18	0.88

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



# CERTIFICATE OF CALIBRATION

NO. 20250130115

Name of Product:	Sound Level Meter
Model:	ST-11D
Serial Number:	820890
Specification:	Class 1
Conclusion:	Pass
Date of calibration:	2025-01-30
Due Date:	2026-01-29



- I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
- II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

 2. Type & serial No. of Microphone: AWA14425-57144

3. Adjustments to indicated sound levels:

 Type of Calibrator B&K 4231 Sound

 Pressure Level 94.0 dB

 4. Measuring up limit: 140 dBA

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

 Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
10	-71.1	-14.2	-0.4	1000	0.0	0.0	-0.1
20	-50.1	-6.3	-0.1	2000	1.3	-0.1	-0.1
31.5	-39.1	-2.6	-0.1	4000	1.1	-0.9	-0.1
63	-26.1	-0.4	-0.1	8000	-1.0	-3.1	0.0
125	-16.2	-0.1	0.1	12500	-11.5	-13.5	0.1
250	-8.7	0.1	-0.1	16000	-11.5	-13.4	0.1
500	-3.1	0.1	-0.2	20000	-23.8	-25.8	-0.1

## 6. Self-generated noise

Microphone replaced by electrical input signal device

7.5 dB(A)	10.9 dB(C)	10.9 dB(Z)
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## 7. F&S Weighting

Rate of the F weighting decrease (dB/s)	35.1
Rate of the S weighting decrease (dB/s)	4.4
Deviation of F&S	-0.1

## 8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level 0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

## 9. Tone burst response (A Weighting) :

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.1	-26.9	-26.9	-7.0
0.25	-27.2	/	-36.0	-7.0

## 10. Peak C sound level (500Hz) :

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.4	2.4	2.3	2.4

## 11. Overload indication: Pass

## 12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.



Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
LAeq,T	103.2	103.2	0.0
L5	110.8	110.8	0.0
L10	108.8	108.8	0.0
L50	92.9	92.8	0.1
L90	76.9	76.8	0.1
L95	75.0	74.9	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C

Relative humidity: 50 %

Static pressure: 101.8 kPa

Reference equipment used in the calibration:

Description:	Model	Serial No.	Expiry Date	Traceable To
Microphone	B&K 4191	2929405	2024-12-15	NML
Multi function sound calibrator	B&K 4226	2288444	2024-10-15	CIGISMEC
Signal generator	DS 360	33873	2024-10-15	CEPREI

Test specifications:

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of  $\pm 20\%$ .
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests



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บริษัท สไมล์ แล็บอราทอรี จำกัด

Smile Laboratory Co., Ltd.

563/1 ถนนเอกชัย แขวงบางกอบัว เขตภาษีเจริญ กรุงเทพฯ 10160 โทรศัพท์ 02-227-0265 โทรสาร 02-454-0317

563/1 Thoei Thal Rd., Bangwa, Phasicharoen, Bangkok 10160 Tel: 02-227-0265 Fax: 02-454-0317

## TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลล็อปเมนต์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	พื้นที่โครงการ	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

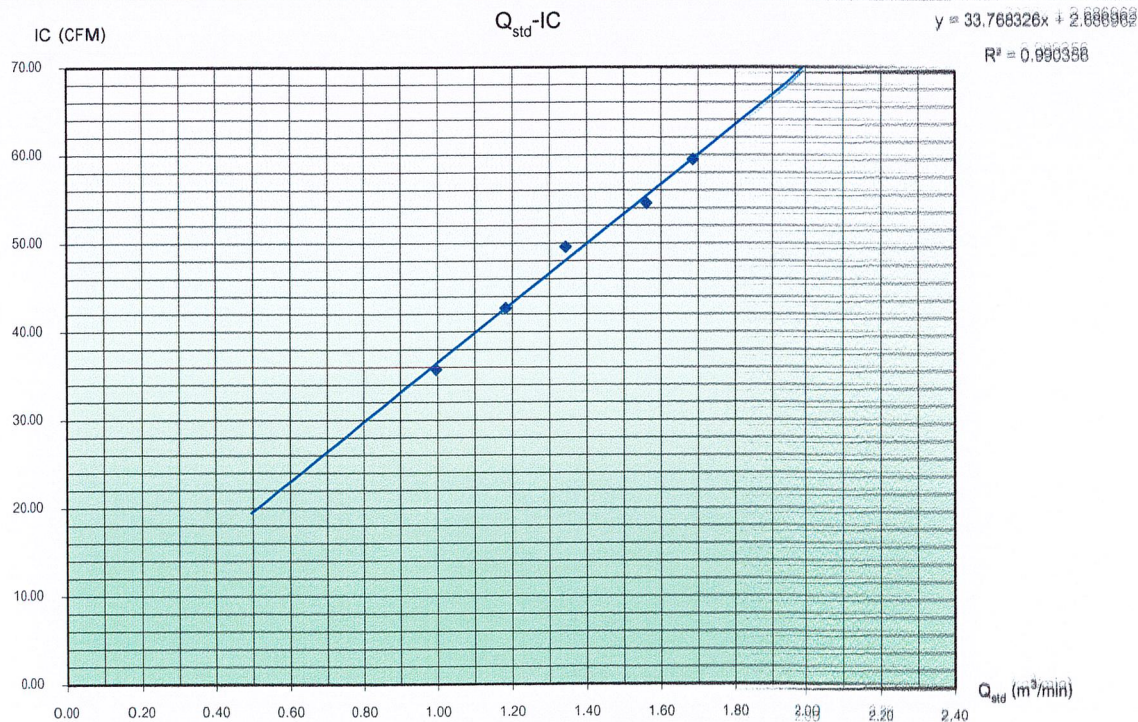
Sampler Number	TSP No.01	Motor Serial Number	1203-415	Recorder Serial Number	596
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Test No.	Pressure Drop Across Orifice (H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Ψ)	Temperature	Barometric Pressure
	Positive	Negative	ΔH <sub>2</sub> O	$[H_2O(P_s/P_{std})(T_{std}/T_s)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$ (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	$IC = [(P_s/P_{std})(T_{std}/T_s)]^{1/2}$ (ft <sup>3</sup> /min)	(°K = °C+273)	(mmHg)
1	2.2	2.1	4.30	2.05646	0.99603	36.0	35.70	303.0	760.0
2	3.2	2.9	6.10	2.44936	1.18279	43.0	42.64	303.0	760.0
3	4.1	3.8	7.90	2.78741	1.34348	50.0	49.59	303.0	760.0
4	5.4	5.3	10.70	3.24398	1.56051	55.0	54.54	303.0	760.0
5	6.3	6.2	12.50	3.50624	1.68518	60.0	59.50	303.0	760.0
Average								303.0	760.0

Linear Regression : y = mX + b

Slope (m)	33.768326
Intercept (b)	2.686962
R-Square (R <sup>2</sup> )	0.990356
Correlation Coefficient (r)	0.995166

Andersen Instruments, Inc.



Calibr





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Smile Laboratory Co., Ltd.

563/1 ถนนเอกชัย แขวงบางกอกใหญ่ เขตภาษีเจริญ กรุงเทพฯ 10160 โทรศัพท์ 02-227-0265 โทรสาร 02-454-0317

563/1 Thoei Thal Rd., Bangwa, Phasicharoen, Bangkok 10160 Tel. 02-227-0265 Fax. 02-454-0317

## PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลอปเม้นท์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	พื้นที่โครงการ	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	$Q_{std}$ Slope (m)	2.10372
Calibrator Model	TE-5025A	$Q_{std}$ Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

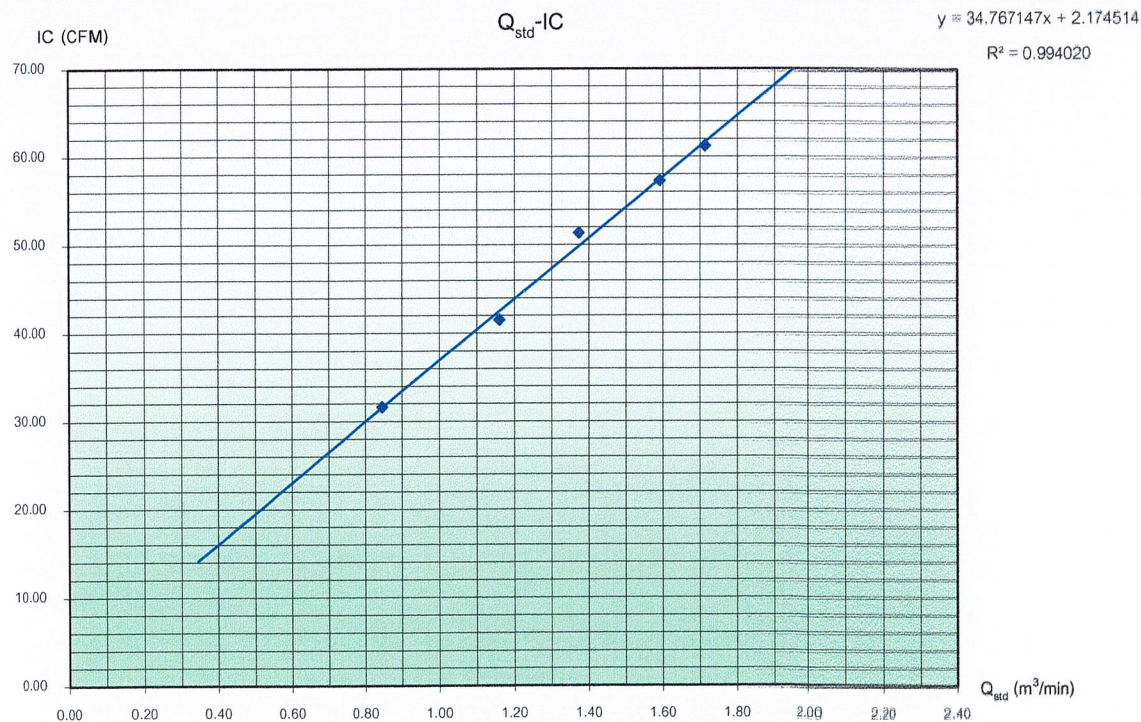
Sampler Number	PM10 No.01	Motor Serial Number	1203-440	Recorder Serial Number	604
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Test No.	Pressure Drop Across Orifice (H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	$\Delta H_2O$	$[H_2O(P_a/P_{std})(T_{std}/T_a)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$ (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	$IC = [(P_a/P_{std})(T_{std}/T_a)]^{1/2}$ (ft <sup>3</sup> /min)		
1	1.6	1.5	3.10	1.74036	0.84577	32.0	31.83	305.0	760.0
2	3.0	2.9	5.90	2.40096	1.15978	42.0	41.52	305.0	760.0
3	4.2	4.1	8.30	2.84772	1.37215	52.0	51.40	305.0	760.0
4	5.7	5.5	11.20	3.30801	1.59095	58.0	57.33	305.0	760.0
5	6.6	6.4	13.00	3.56394	1.71260	62.0	61.28	305.0	760.0
Average								305.0	760.0

Linear Regression :  $y = mX + b$

Slope (m)	34.767147
Intercept (b)	2.174514
R-Square ( $R^2$ )	0.994020
Correlation Coefficient (r)	0.997006

Andersen Instruments, Inc.







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บริษัท สไมล์ แล็บอราทอรี จำกัด

Smile Laboratory Co., Ltd.

563/1 ถนนเอกชัย แขวงบางกุ่ม เขตภาษีเจริญ กรุงเทพฯ 10160 โทรศัพท์ 02-227-0265 โทรสาร 02-454-0317

563/1 Thoei Thai Rd., Bangwa, Phasicharoen, Bangkok 10160 Tel. 02-227-0265 Fax. 02-454-0317

## TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลล็อปเมนต์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	สุสานไทยสมบุรณ์ (ชุมชนบ้านมาบใหญ่)	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

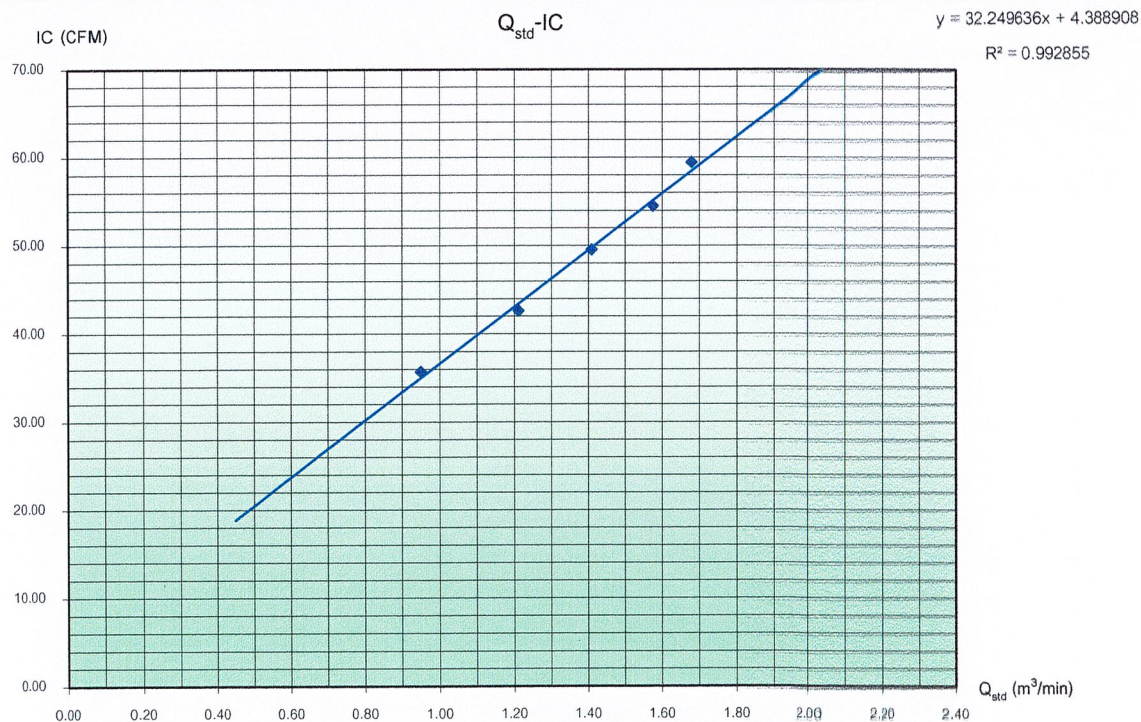
Sampler Number	TSP No.03	Motor Serial Number	1203-426	Recorder Serial Number	600
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Test No.	Pressure Drop Across Orifice (H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	ΔH <sub>2</sub> O	[H <sub>2</sub> O(P <sub>s</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>s</sub> )] <sup>1/2</sup>	Q <sub>std</sub> = (1/m)[(A-b)] (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	IC = [(P <sub>s</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>s</sub> )] <sup>1/2</sup> (ft <sup>3</sup> /min)		
1	2.0	1.9	3.90	1.95848	0.94945	36.0	35.70	303.0	760.0
2	3.3	3.1	6.40	2.50886	1.21107	43.0	42.64	303.0	760.0
3	4.4	4.3	8.70	2.92514	1.40895	50.0	49.59	303.0	760.0
4	5.5	5.4	10.90	3.27416	1.57486	55.0	54.54	303.0	760.0
5	6.3	6.1	12.40	3.49219	1.67850	60.0	59.50	303.0	760.0
Average								303.0	760.0

Linear Regression : y = mX + b

Slope (m)	32.249636
Intercept (b)	4.388908
R-Square (R <sup>2</sup> )	0.992855
Correlation Coefficient (r)	0.996421

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## PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลล็อปเมนต์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	สุสานไทยสมบุรณ์ (ชุมชนบ้านนาบใหญ่)	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

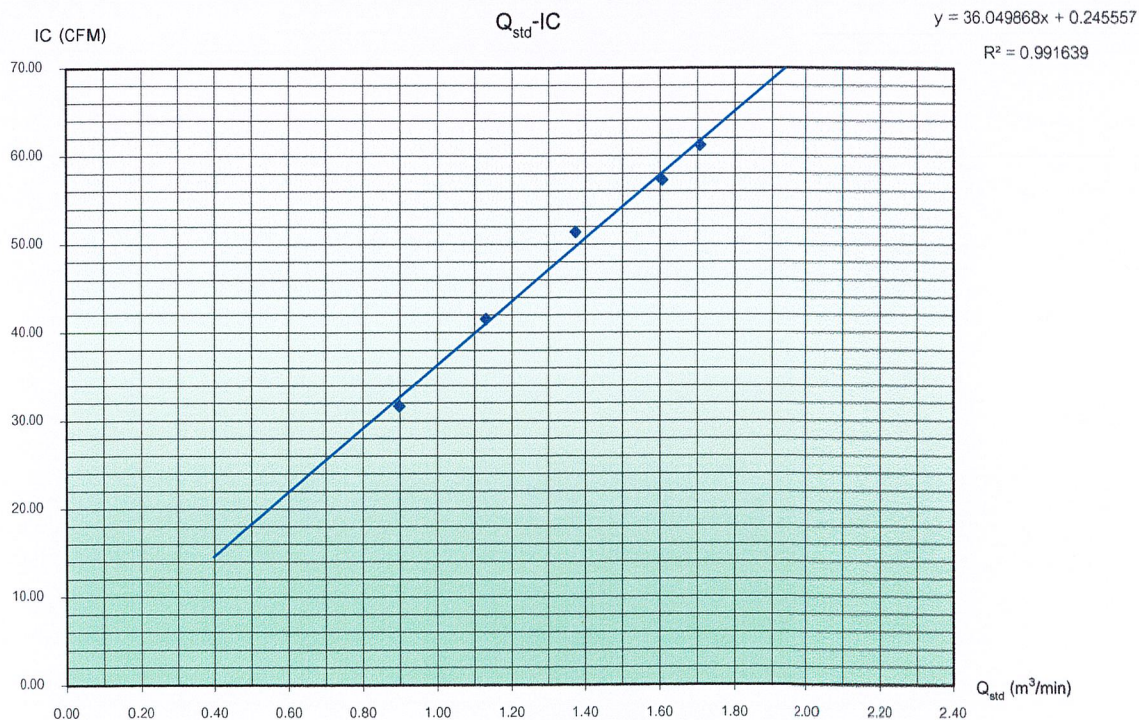
Sampler Number	PM10 No.03	Motor Serial Number	1203-449	Recorder Serial Number	608
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Test No.	Pressure Drop Across Orifice ( H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	ΔH <sub>2</sub> O	[ H <sub>2</sub> O(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ]	Q <sub>std</sub> = (1/m)[(A-b)] (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	IC = I[(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ] (ft <sup>3</sup> /min)		
1	1.8	1.7	3.50	1.84924	0.89752	32.0	31.63	305.0	760.0
2	2.9	2.7	5.60	2.33912	1.13039	42.0	41.52	305.0	760.0
3	4.2	4.1	8.30	2.84772	1.37215	52.0	51.40	305.0	760.0
4	5.8	5.6	11.40	3.33742	1.60493	58.0	57.33	305.0	760.0
5	6.5	6.4	12.90	3.55020	1.70607	62.0	61.28	305.0	760.0
Average								305.0	760.0

Linear Regression : y= mX + b

Slope (m)	36.049868
Intercept (b)	0.245557
R-Square (R <sup>2</sup> )	0.991639
Correlation Coefficient (r)	0.995811

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## TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลอปเม้นท์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	ศาลเจ้าซาโทจิ	Person	Mr. Natthaphong Panpradap

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	0.0397050
Calibrator Serial Number	3092		

### Calibration Information

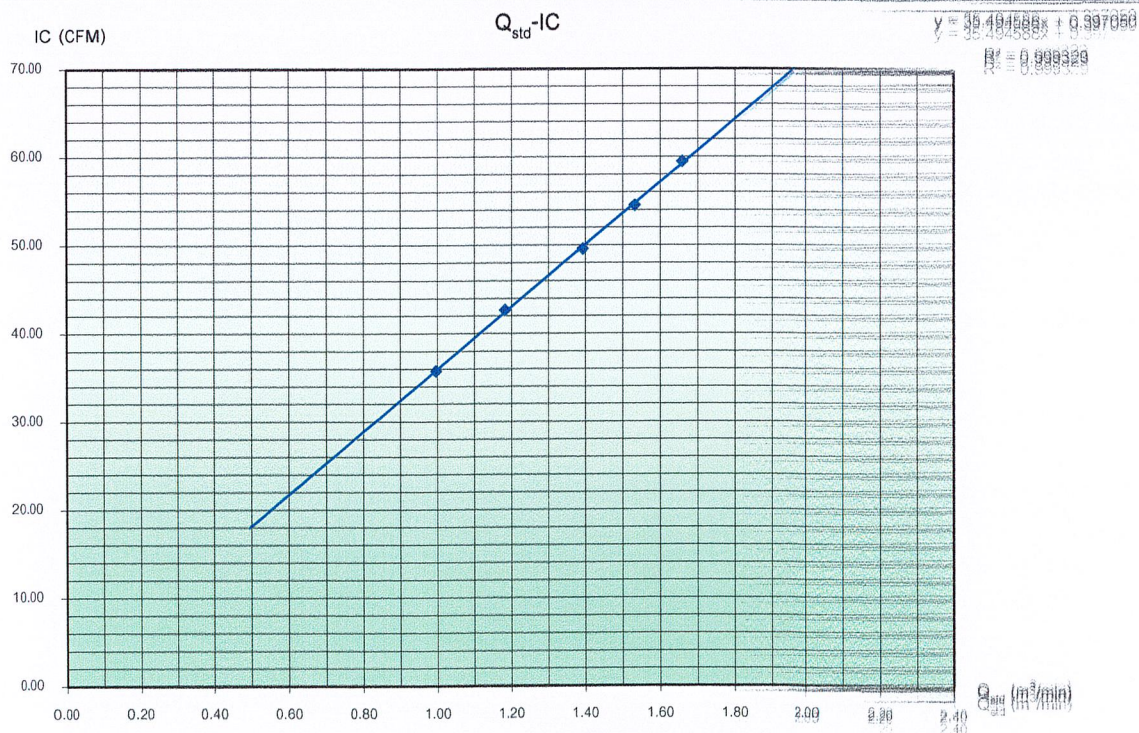
Sampler Number	TSP No.02	Motor Serial Number	1203-421	Recorder Serial Number	698
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Test No.	Pressure Drop Across Orifice (H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature	Baremetric Pressure
	Positive	Negative	ΔH <sub>2</sub> O	[H <sub>2</sub> O(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ]	Q <sub>std</sub> = (1/m)[(A-b)] (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	IC = [(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ] (ft <sup>3</sup> /min)	(°K = °C + 273)	(mmHg)
1	2.2	2.1	4.30	2.05646	0.99603	36.0	35.70	303.0	760.0
2	3.1	3.0	6.10	2.44936	1.18279	43.0	42.64	303.0	760.0
3	4.3	4.2	8.50	2.89132	1.39288	50.0	49.59	303.0	760.0
4	5.2	5.1	10.30	3.18277	1.53142	55.0	54.54	303.0	760.0
5	6.1	6.0	12.10	3.44969	1.65829	60.0	59.50	303.0	760.0
Average								303.0	760.0

Linear Regression : y = mX + b

Slope (m)	35.494588
Intercept (b)	0.397050
R-Square (R <sup>2</sup> )	0.999329
Correlation Coefficient (r)	0.999664

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## PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลอปเม้นท์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	ศาลเจ้าซาโทจิ	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

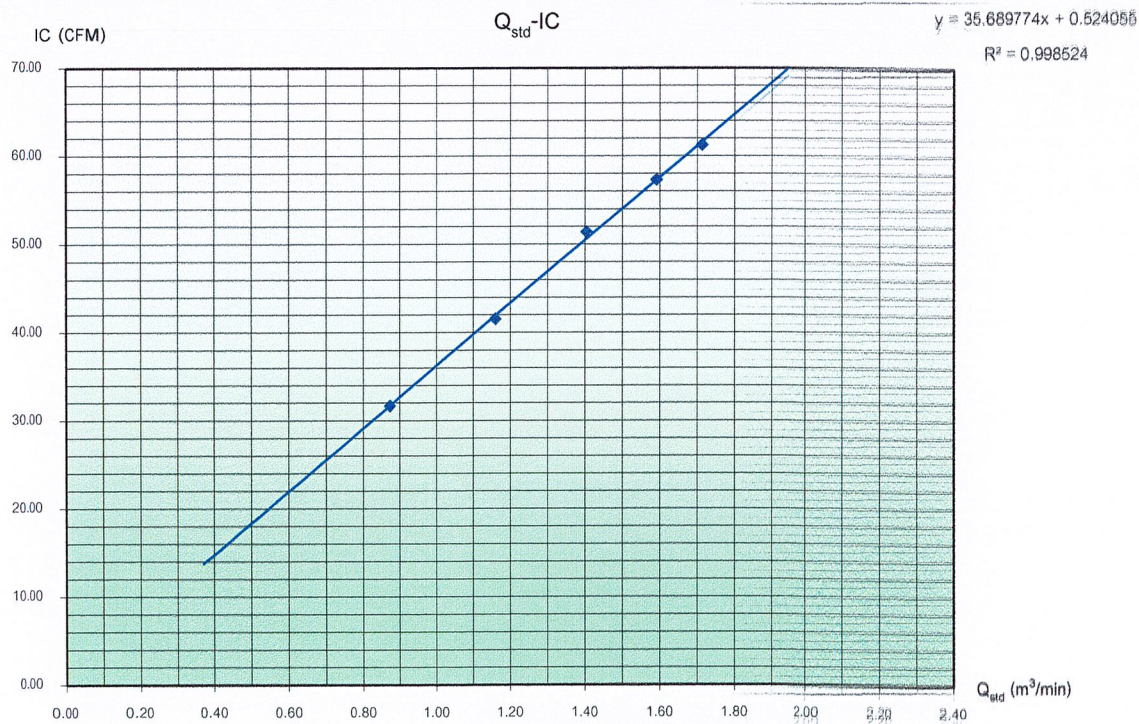
Sampler Number	PM10 No.02	Motor Serial Number	1203-444	Recorder Serial Number	606
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Test No.	Pressure Drop Across Orifice ( H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	ΔH <sub>2</sub> O	[ H <sub>2</sub> O(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ]	Q <sub>std</sub> = (1/m)[(A-b)] (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	IC = [((P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> )) <sup>1/2</sup> ] (ft <sup>3</sup> /min)		
1	1.7	1.6	3.30	1.79562	0.87204	32.0	31.83	305.0	760.0
2	3.0	2.9	5.90	2.40096	1.15978	42.0	41.52	305.0	760.0
3	4.4	4.3	8.70	2.91553	1.40438	52.0	51.40	305.0	760.0
4	5.7	5.5	11.20	3.30801	1.59095	58.0	57.33	305.0	760.0
5	6.6	6.4	13.00	3.56394	1.71260	62.0	61.25	305.0	760.0
Average								305.0	760.0

Linear Regression : y= mX + b

Slope (m)	35.689774
Intercept (b)	0.524055
R-Square (R <sup>2</sup> )	0.998524
Correlation Coefficient (r)	0.999262

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## TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลอปเม้นท์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	สุสานสุขาสันต์สุขาวดี	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

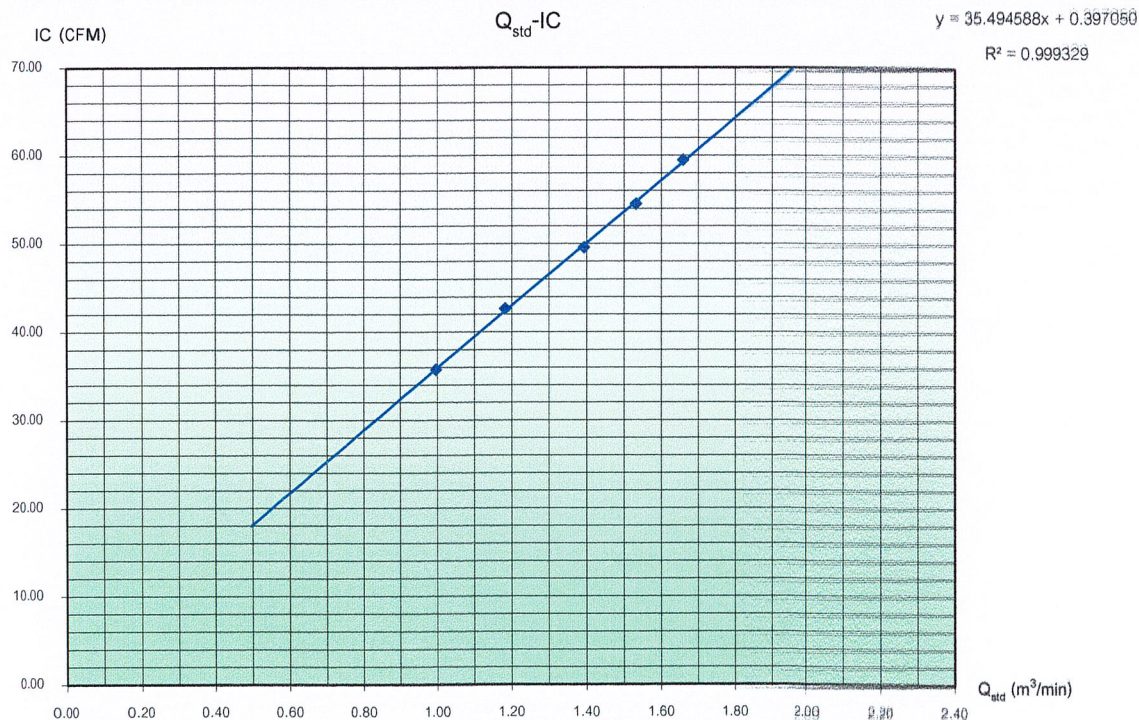
Sampler Number	TSP No.05	Motor Serial Number	1203-422	Recorder Serial Number	599
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Test No.	Pressure Drop Across Orifice (H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	ΔH <sub>2</sub> O	[H <sub>2</sub> O(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ]	Q <sub>std</sub> = (1/m)[(A-b)] (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	IC = [(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ] (ft <sup>3</sup> /min)		
1	2.2	2.1	4.30	2.05646	0.99603	36.0	36.70	303.0	760.0
2	3.1	3.0	6.10	2.44936	1.18279	43.0	42.64	303.0	760.0
3	4.3	4.2	8.50	2.89132	1.39288	50.0	49.59	303.0	760.0
4	5.2	5.1	10.30	3.18277	1.53142	55.0	54.54	303.0	760.0
5	6.1	6.0	12.10	3.44969	1.65829	60.0	59.50	303.0	760.0
Average								303.0	760.0

Linear Regression : y = mX + b

Slope (m)	35.494588
Intercept (b)	0.397050
R-Square (R <sup>2</sup> )	0.999329
Correlation Coefficient (r)	0.999664

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## PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลล็อปเมนต์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	สุสานสุขสันต์สุขาวดี	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

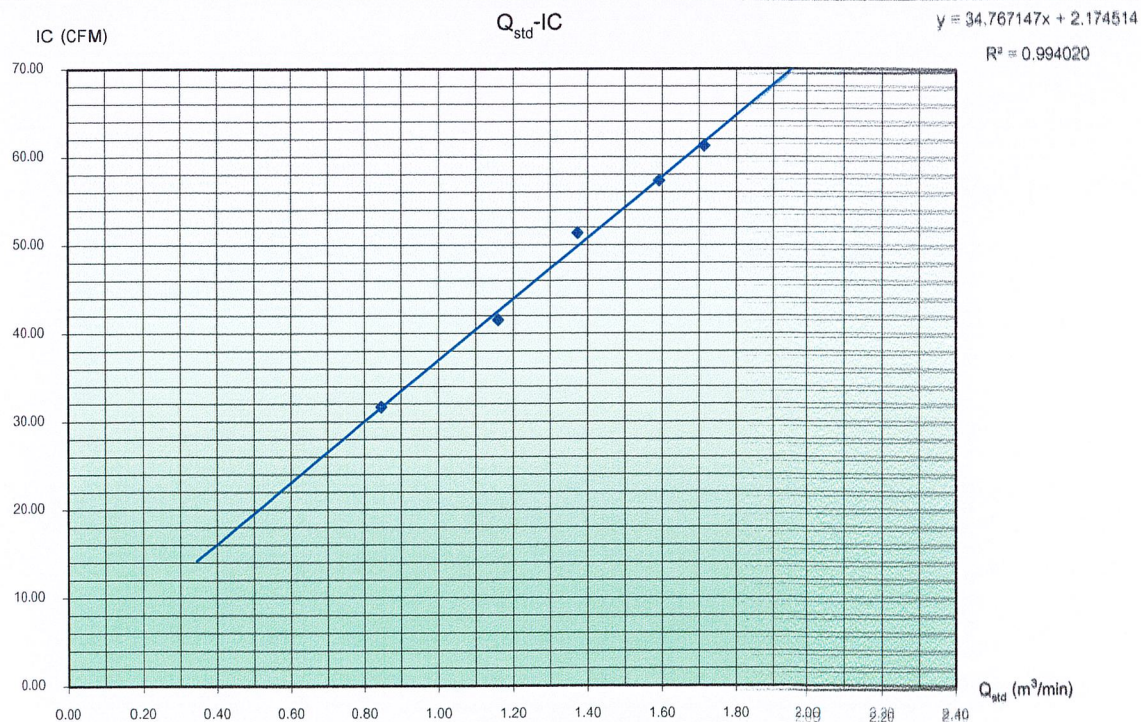
Sampler Number	PM10 No.05	Motor Serial Number	1203-447	Recorder Serial Number	605
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Test No.	Pressure Drop Across Orifice (H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	ΔH <sub>2</sub> O	$[H_2O(P_a/P_{std})(T_{std}/T_a)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$ (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	$IC = [(P_a/P_{std})(T_{std}/T_a)]^{1/2}$ (ft <sup>3</sup> /min)		
1	1.6	1.5	3.10	1.74036	0.84577	32.0	31.63	305.0	760.0
2	3.0	2.9	5.90	2.40096	1.15978	42.0	41.52	305.0	760.0
3	4.2	4.1	8.30	2.84772	1.37215	52.0	51.40	305.0	760.0
4	5.7	5.5	11.20	3.30801	1.59095	58.0	57.33	305.0	760.0
5	6.6	6.4	13.00	3.56394	1.71260	62.0	61.28	305.0	760.0
Average								305.0	760.0

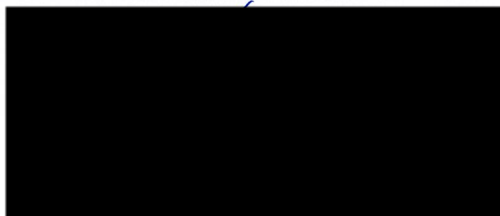
Linear Regression : y = mX + b

Slope (m)	34.767147
Intercept (b)	2.174514
R-Square (R <sup>2</sup> )	0.994020
Correlation Coefficient (r)	0.997006

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## TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลอปเม้นท์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	บ้านราษฎร์โกศลเคียง พื้นที่ทิศตะวันตก	Person	Mr. Natthaphong Panpradab

### Calibration Office

Transfer Standard Type	Orifice	Q <sub>std</sub> Slope (m)	2.10372
Calibrator Model	TE-5025A	Q <sub>std</sub> Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

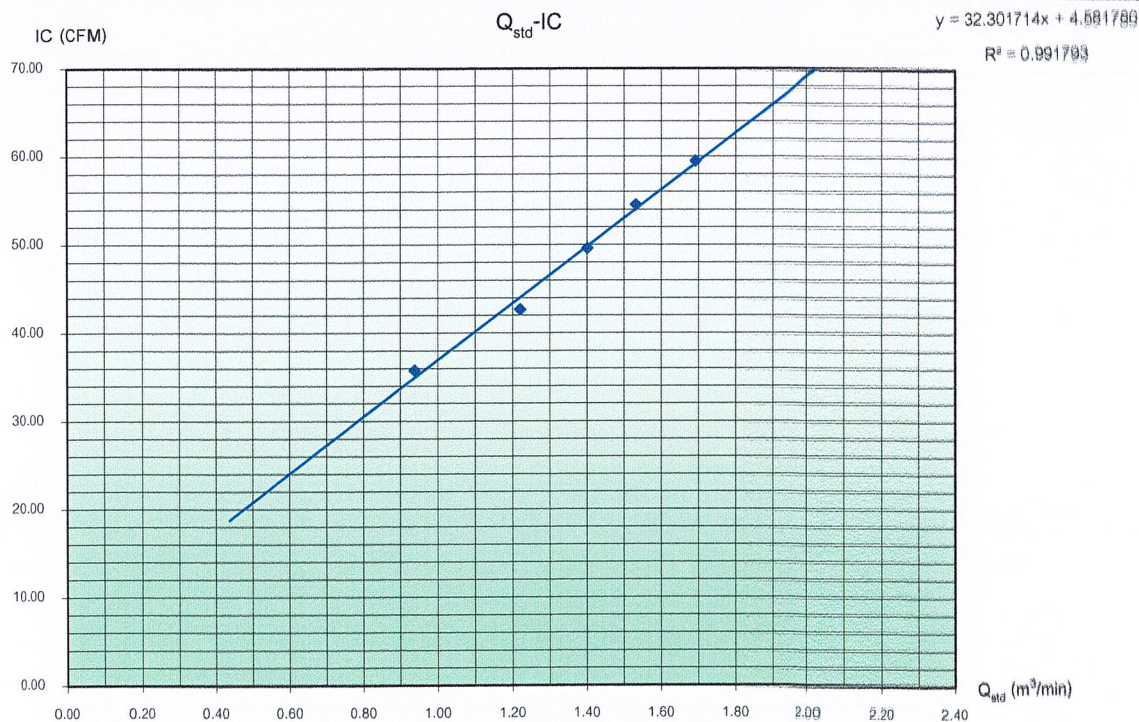
Sampler Number	TSP No.04	Motor Serial Number	1203-432	Recorder Serial Number	002
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Test No.	Pressure Drop Across Orifice ( H <sub>2</sub> O) (inH <sub>2</sub> O)			(A)	(X)	(I)	(Y)	Temperature (°K = °C+273)	Barometric Pressure (mmHg)
	Positive	Negative	ΔH <sub>2</sub> O	[ H <sub>2</sub> O(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ]	Q <sub>std</sub> = (1/m)[(A-b)] (m <sup>3</sup> /min)	Sample Flow Rate Indication (ft <sup>3</sup> /min)	IC = [(P <sub>a</sub> /P <sub>std</sub> )(T <sub>std</sub> /T <sub>a</sub> ) <sup>1/2</sup> ] (ft <sup>3</sup> /min)		
1	1.9	1.9	3.80	1.93321	0.93744	36.0	35.70	303.0	760.0
2	3.3	3.2	6.50	2.52839	1.22036	43.0	42.64	303.0	760.0
3	4.4	4.2	8.60	2.90828	1.40094	50.0	49.59	303.0	760.0
4	5.2	5.1	10.30	3.18277	1.53142	55.0	54.54	303.0	760.0
5	6.4	6.2	12.60	3.52024	1.69183	60.0	59.50	303.0	760.0
Average								303.0	760.0

Linear Regression : y = mX + b

Slope (m)	32.301714
Intercept (b)	4.581780
R-Square (R <sup>2</sup> )	0.991793
Correlation Coefficient (r)	0.995888

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## PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

### Site Information

Sampler Location	บริษัท อิตาเลียนไทย ดีเวลล็อปเมนต์ จำกัด (มหาชน)	Date	18 February 2025
Project Site	บ้านราษฎรที่ใกล้เคียง พื้นที่ทิศตะวันตก	Person	Mr. Natthaphong Panpradab

### Calibration Orifice

Transfer Standard Type	Orifice	$Q_{std}$ Slope (m)	2.10372
Calibrator Model	TE-5025A	$Q_{std}$ Intercept (b)	-0.03890
Calibrator Serial Number	3092		

### Calibration Information

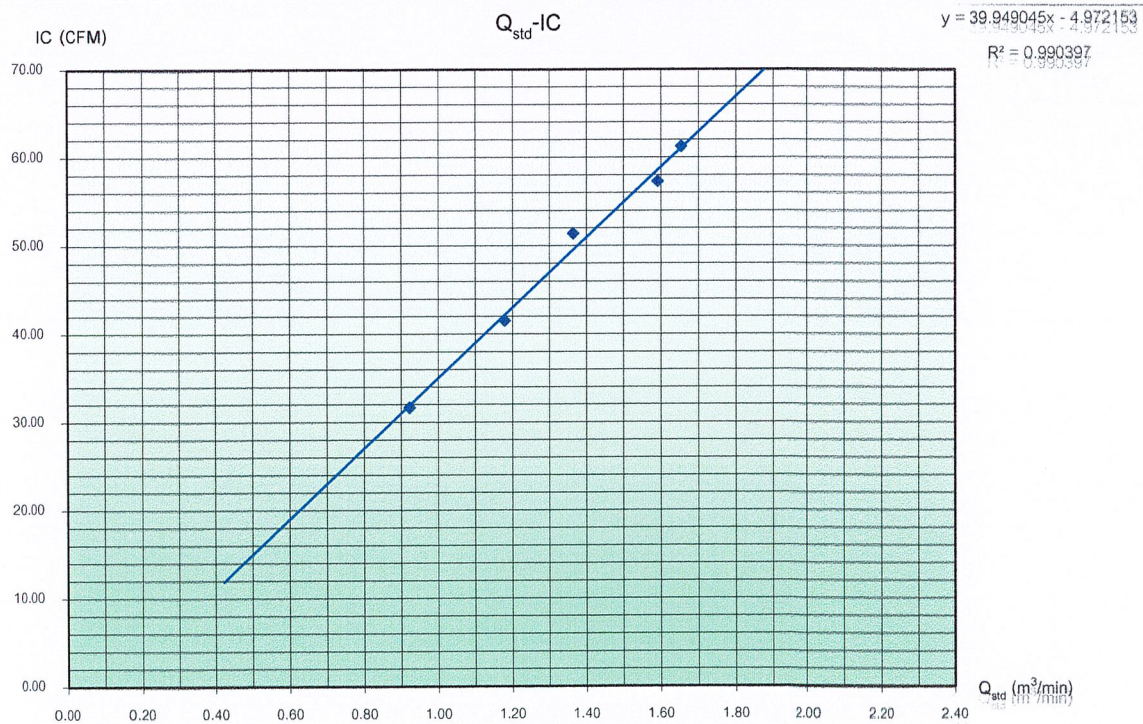
Sampler Number	PM10 No.04	Motor Serial Number	1203-453	Recorder Serial Number	619
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Test No.	Pressure Drop Across Orifice ( $H_2O$ ) (in $H_2O$ )			(A)	(X)	(I)	(Y)	Temperature ( $^{\circ}K = ^{\circ}C + 273$ )	Barometric Pressure (mmHg)
	Positive	Negative	$\Delta H_2O$	$[H_2O(P_a/P_{std})(T_{std}/T_a)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$ ( $m^3/min$ )	Sample Flow Rate Indication ( $ft^3/min$ )	$IC = I[(P_a/P_{std})(T_{std}/T_a)]^{1/2}$ ( $ft^3/min$ )		
1	1.9	1.8	3.70	1.90134	0.92229	32.0	31.63	305.0	760.0
2	3.1	3.0	6.10	2.44131	1.17896	42.0	41.52	305.0	760.0
3	4.2	4.0	8.20	2.83051	1.36397	52.0	51.40	305.0	760.0
4	5.7	5.5	11.20	3.30801	1.59095	58.0	57.33	305.0	760.0
5	6.1	6.0	12.10	3.43836	1.65291	62.0	61.28	305.0	760.0
Average								305.0	760.0

Linear Regression :  $y = mX + b$

Slope (m)	39.949045
Intercept (b)	4.972153
R-Square ( $R^2$ )	0.990397
Correlation Coefficient (r)	0.995187

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Calibrated



## Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 18 February 2025

Certificate No. 123/21

Page : 1 of 2

Manufacture Yong Instruments

Type four blade helicoid propeller

Model No. 05103

Mfg Code Logger 30908233

Transmitter -

Customer ENVIR SERVICE CO., LTD.

42 Raminthra 14 yeak 9, Tha Raeng,

Bangkhen, Bangkok 10230

Calibration Condition : Temperature

25.2 °C

Barometric Pressure

1012.8 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425

: Wind Aloft Plotting Board

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

: Ultrasonic Anemometer Model DA-650-3TV

(sensor TR-90AH)

Serial Number 110730029

(sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

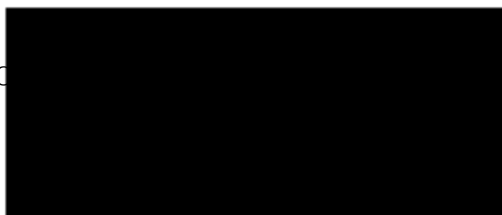
STANDARD THERMOMETER

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

: Thermoschneider No. 918802

STANDARD BAROMETER

: Digital Barometer Vaisala Type RTB220 No. V1220015



## The Result of Calibration

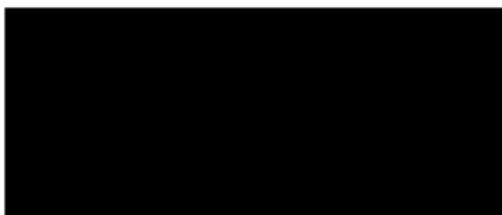
Date of Issue 18 February 2025

Certificate No. 123/21

Page : 2 of 2

Standard  Ultrasonic Anemometer m/sec	HOOK GAGE NO 1425			TESTED ANEMOMETER			
	Pressure inches	Vacuum inches	Pressure hPa	Pressure hPa	Correction hPa	Velocity m/sec	Correction m/sec
1.00	-	-	-	-	-	0.7	0.30
3.02	-	-	-	-	-	2.7	0.32
5.04	-	-	-	-	-	4.7	0.34
7.03	-	-	-	-	-	6.7	0.33
9.01	-	-	-	-	-	8.5	0.51
11.03	-	-	-	-	-	10.7	0.33
13.01	-	-	-	-	-	12.4	0.61
15.03	-	-	-	-	-	14.1	0.93
17.05	-	-	-	-	-	16.4	0.65
20.02	-	-	-	-	-	19.1	0.92

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



## Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 18 February 2025

Certificate No. 124/21

Page : 1 of 2

Manufacture Yong Instruments

Type four blade helicoid propeller

Model No. 05103

Mfg Code Logger 30908695

Transmitter -

Customer ENVIR SERVICE CO., LTD.

42 Raminthra 14 yeak 9, Tha Raeng,

Bangkhen, Bangkok 10230

Calibration Condition : Temperature 25.2 °C

Barometric Pressure 1012.8 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

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

: Thermoschneider No. 918802

STANDARD BAROMETER : Digital Barometer Vaisala Type RTB220 No. V1220015

## The Result of Calibration

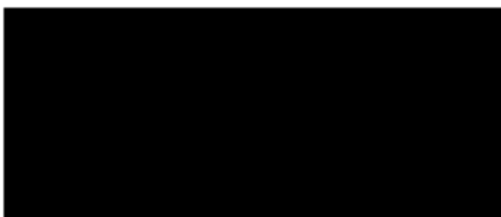
Date of Issue 18 February 2025

Certificate No. 124/21

Page : 2 of 2

Standard  Ultrasonic Anemometer m/sec	HOOK GAGE NO 1425			TESTED ANEMOMETER			
	Pressure inches	Vacuum inches	Pressure hPa	Pressure hPa	Correction hPa	Velocity m/sec	Correction m/sec
1.00	-	-	-	-	-	0.7	0.30
3.02	-	-	-	-	-	2.7	0.32
5.04	-	-	-	-	-	4.7	0.34
7.03	-	-	-	-	-	6.7	0.33
9.01	-	-	-	-	-	8.5	0.51
11.03	-	-	-	-	-	10.7	0.33
13.01	-	-	-	-	-	12.4	0.61
15.03	-	-	-	-	-	14.1	0.93
17.05	-	-	-	-	-	16.4	0.65
20.02	-	-	-	-	-	19.1	0.92

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





## Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

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Manufacture Yong Instruments

Type four blade helicoid propeller

Model No. 05103

Mfg Code Logger 30908794

Transmitter -

Customer ENVIR SERVICE CO., LTD.

42 Raminthra 14 yeak 9, Tha Raeng,

Bangkhen, Bangkok 10230

Calibration Condition : Temperature 25.2 °C

Barometric Pressure 1012.8 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

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

: Thermoschneider No. 918802

STANDARD BAROMETER : Digital Barometer Vaisala Type RTB220 No. V1220015

## The Result of Calibration

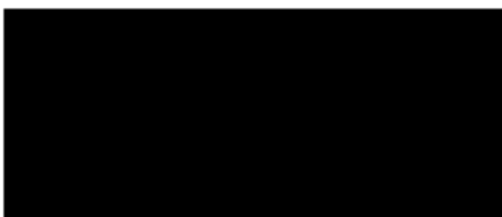
Date of Issue 18 February 2025

Certificate No. 122/21

Page : 2 of 2

Standard  Ultrasonic Anemometer m/sec	HOOK GAGE NO 1425			TESTED ANEMOMETER			
	Pressure inches	Vacuum inches	Pressure hPa	Pressure hPa	Correction hPa	Velocity m/sec	Correction m/sec
1.00	-	-	-	-	-	0.7	0.30
3.02	-	-	-	-	-	2.7	0.32
5.04	-	-	-	-	-	4.5	0.54
7.03	-	-	-	-	-	6.7	0.33
9.01	-	-	-	-	-	8.5	0.51
11.03	-	-	-	-	-	10.7	0.33
13.01	-	-	-	-	-	12.4	0.61
15.03	-	-	-	-	-	14.1	0.93
17.05	-	-	-	-	-	16.4	0.65
20.02	-	-	-	-	-	19.1	0.92

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



## Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 18 February 2025

Certificate No. 114/21

Page : 1 of 2

Manufacture Yong Instruments

Type four blade helicoid propeller

Model No. 05103

Mfg Code Logger 309020206

Transmitter -

Customer ENVIR SERVICE CO., LTD.

42 Raminthra 14 yeak 9, Tha Raeng,

Bangkhen, Bangkok 10230

Calibration Condition : Temperature 25.2 °C

Barometric Pressure 1012.8 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

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

: Thermoschneider No. 918802

STANDARD BAROMETER : Digital Barometer Vaisaia Type RTB220 No. V1220015



## The Result of Calibration

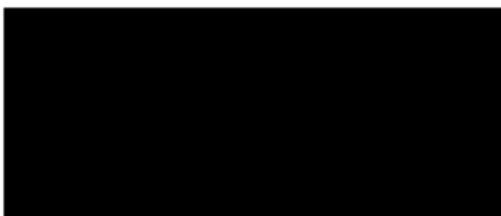
Date of Issue 18 February 2025

Certificate No. 114/21

Page : 2 of 2

Standard	HOOK GAGE NO 1425			TESTED ANEMOMETER			
	Pressure	Vacuum	Pressure	Pressure	Correction	Velocity	Correction
Ultrasonic Anemometer m/sec	inches	inches	hPa	hPa	hPa	m/sec	m/sec
1.00	-	-	-	-	-	0.7	0.30
3.02	-	-	-	-	-	2.7	0.32
5.04	-	-	-	-	-	4.8	0.24
7.03	-	-	-	-	-	6.7	0.33
9.01	-	-	-	-	-	8.7	0.31
11.03	-	-	-	-	-	10.7	0.33
13.01	-	-	-	-	-	12.4	0.61
15.03	-	-	-	-	-	14.1	0.93
17.05	-	-	-	-	-	16.4	0.65
20.02	-	-	-	-	-	19.1	0.92

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



## Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 18 February 2025

Certificate No. 241/21

Page : 1 of 2

Manufacture NRG Instruments

Type 3 Cup Anemometer

Model No. 40C

Mfg Code Logger 309012581

Transmitter -

Customer ENVIR SERVICE CO., LTD.

42 Raminthra 14 yeak 9, Tha Raeng,

Bangkhen, Bangkok 10230

Calibration Condition : Temperature 25.2 °C Barometric Pressure 1012.8 hPa

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 : Wind Aloft Plotting Board

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

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

: Thermoschneider No. 918802

STANDARD BAROMETER : Digital Barometer Vaisaia Type RTB220 No. V1220015

## The Result of Calibration

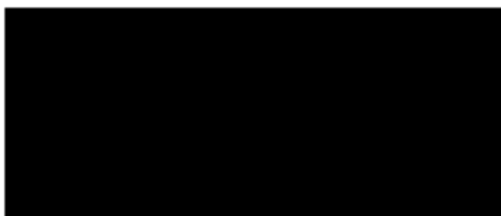
Date of Issue 18 February 2025

Certificate No. 241/21

Page : 2 of 2

Standard	HOOK GAGE NO 1425			TESTED ANEMOMETER			
	Pressure	Vacuum	Pressure	Pressure	Correction	Velocity	Correction
Ultrasonic Anemometer m/sec	inches	inches	hPa	hPa	hPa	m/sec	m/sec
1.00	-	-	-	-	-	0.9	0.10
3.02	-	-	-	-	-	2.9	0.12
5.04	-	-	-	-	-	4.8	0.24
7.03	-	-	-	-	-	6.9	0.13
9.01	-	-	-	-	-	8.7	0.31
11.03	-	-	-	-	-	10.7	0.33
13.01	-	-	-	-	-	12.5	0.51
15.03	-	-	-	-	-	14.1	0.93
17.05	-	-	-	-	-	16.4	0.65
20.02	-	-	-	-	-	19.1	0.92

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



# Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM20453

Calibration Date: April 21, 2024

Calibration Reference Equipment: SRV-AFR 714J7401

*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.*

Calibra

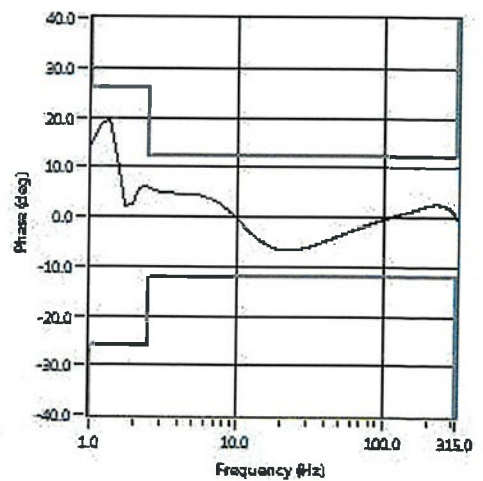
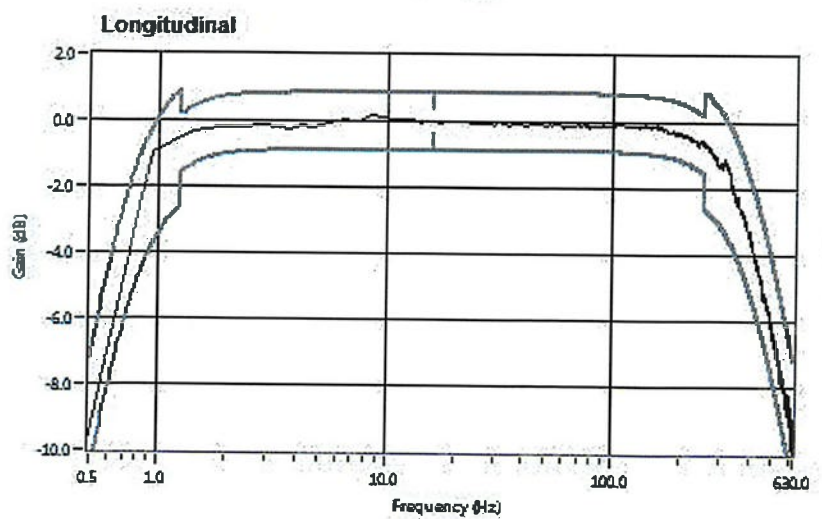
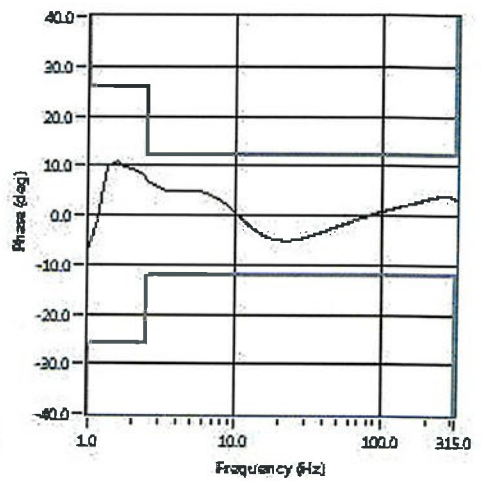
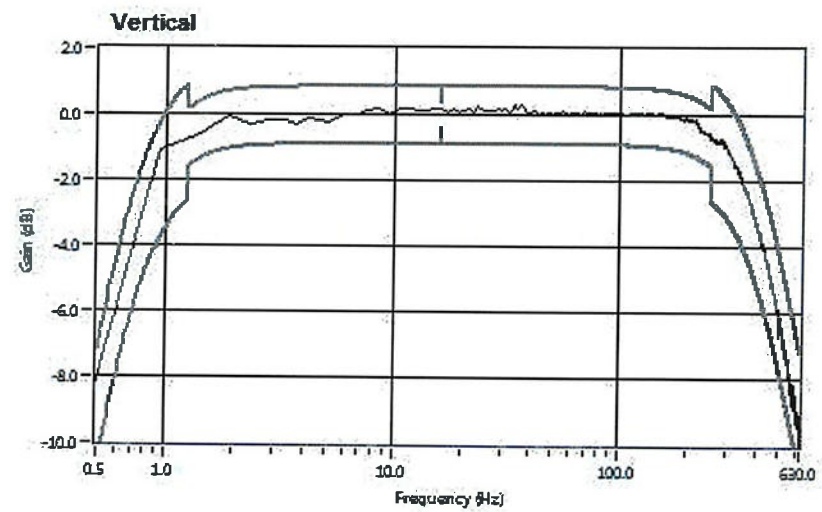
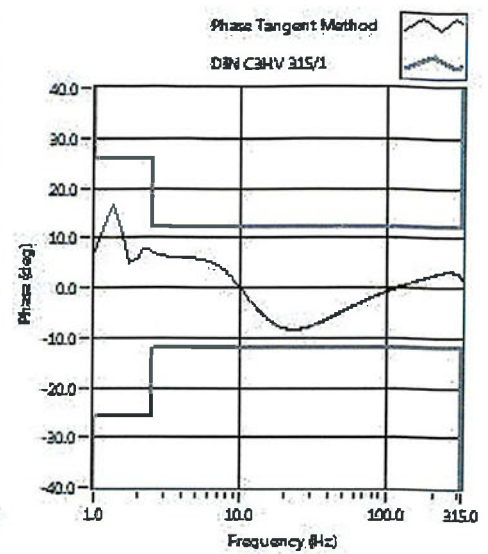
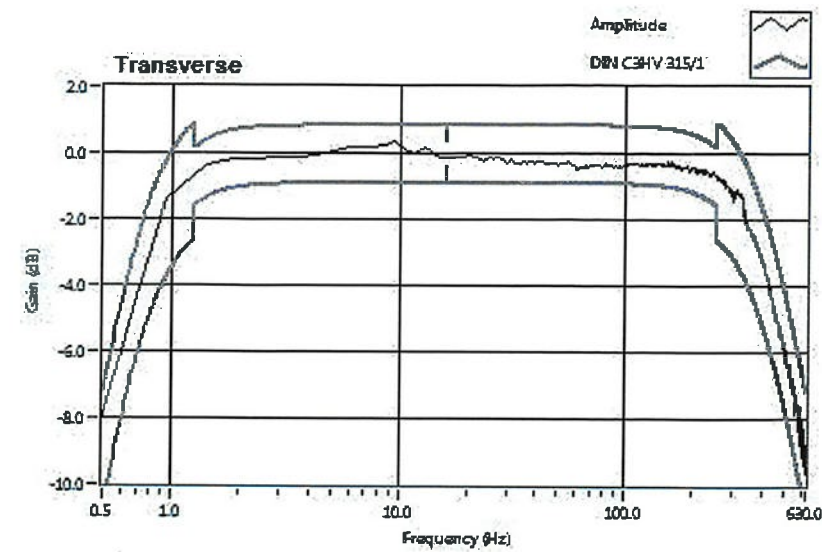


**Instantel®**

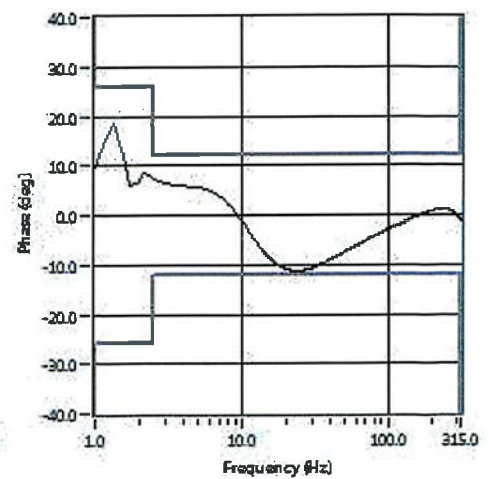
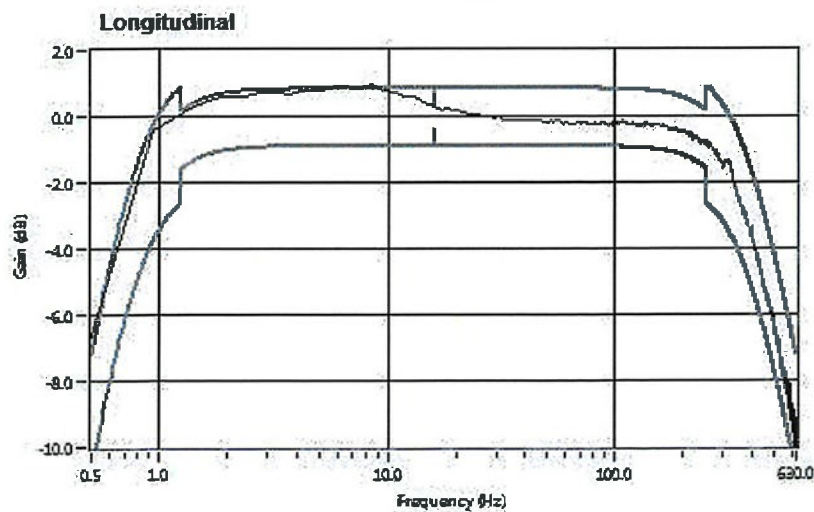
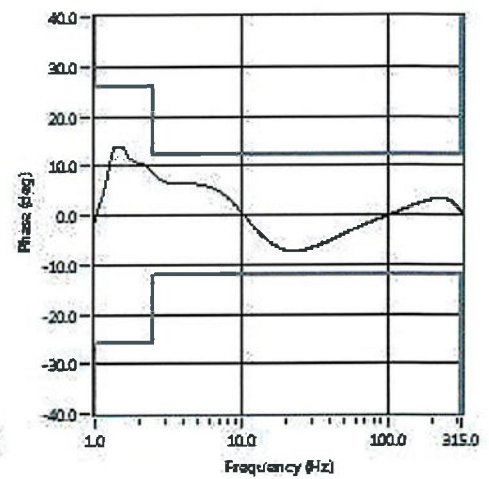
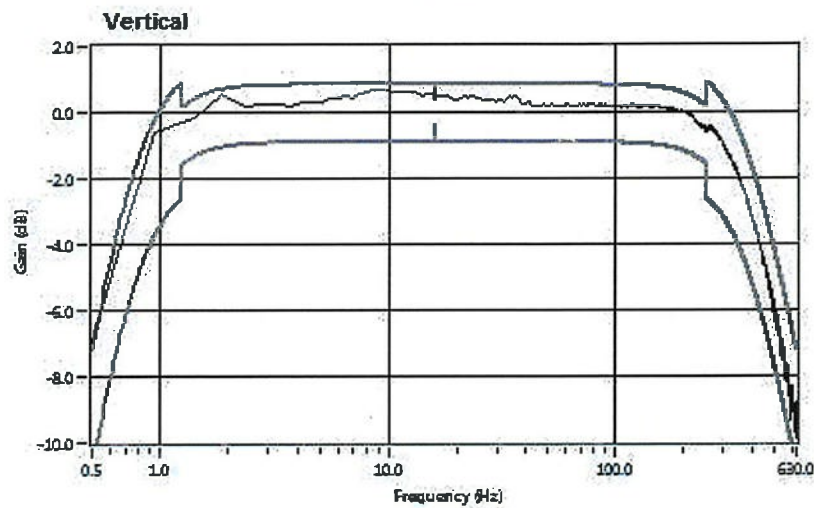
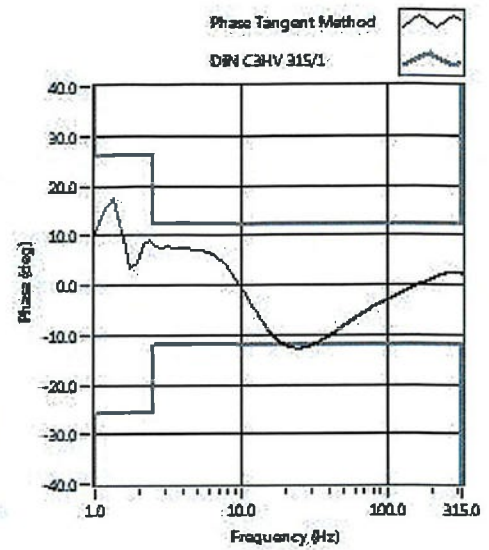
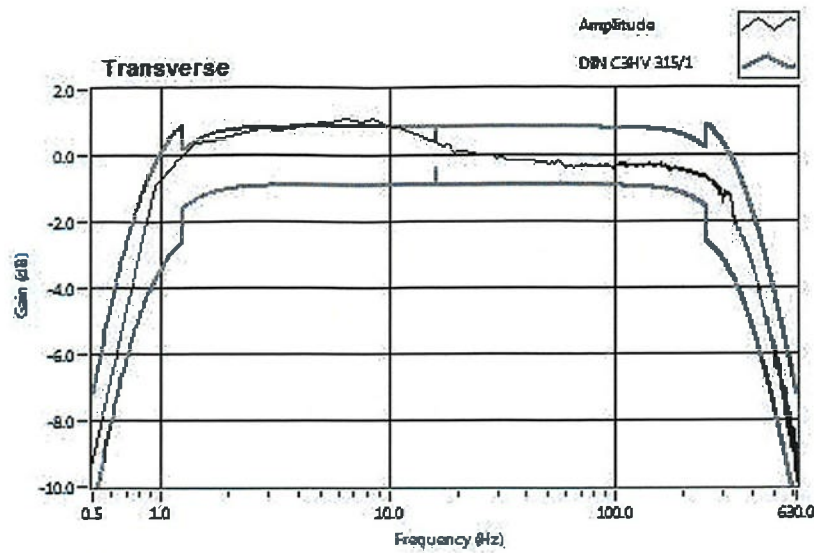
309 Legget Drive, Ottawa, Ontario, K2K 3A3, (613) 592-4642



## Frequency Response of UM20453



# Frequency Response of UM20453 (As Found)





# Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM20454

Calibration Date: April 21, 2024

Calibration Reference Equipment: SRV-AFR 714J7401

*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.*

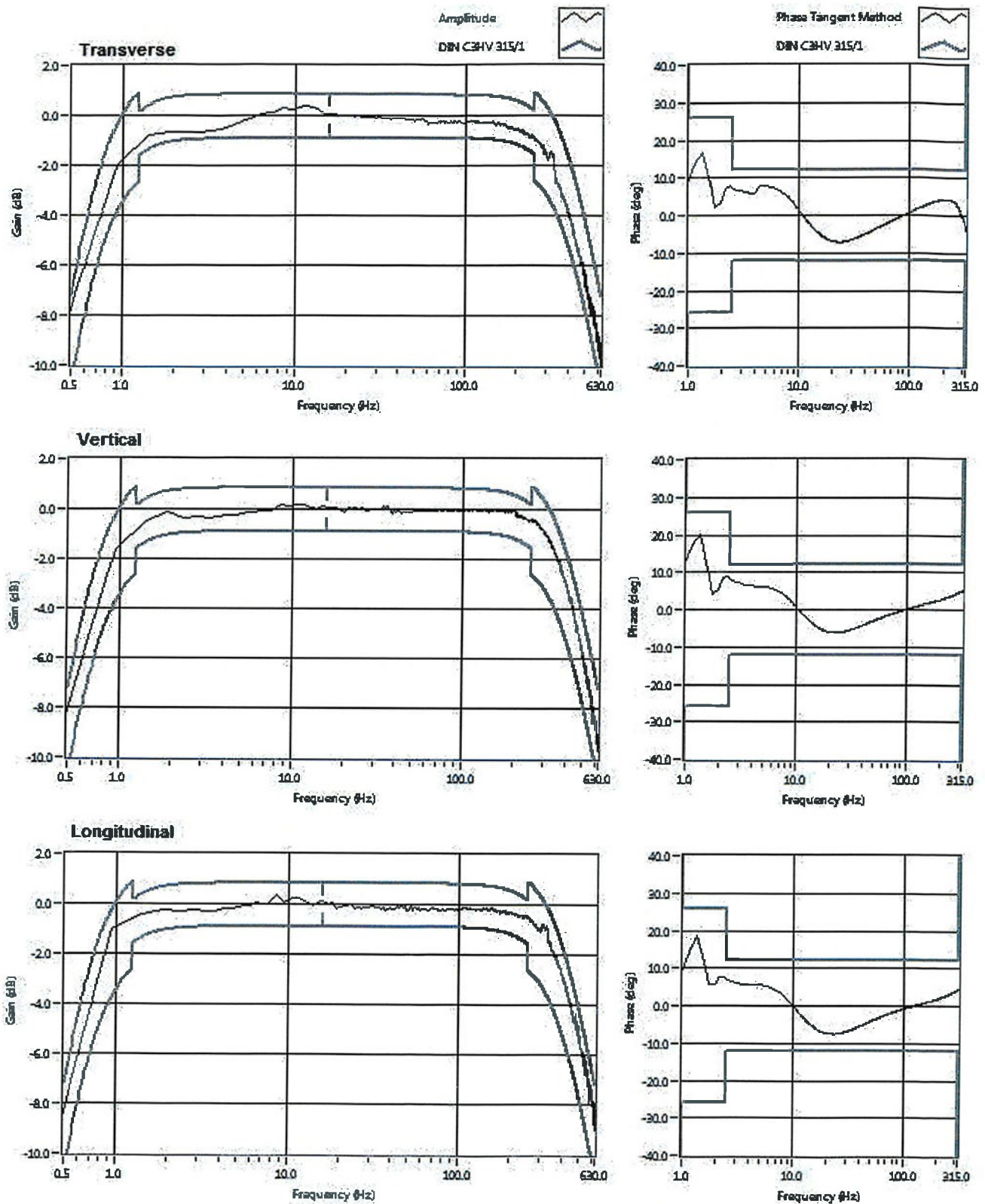
Calibration



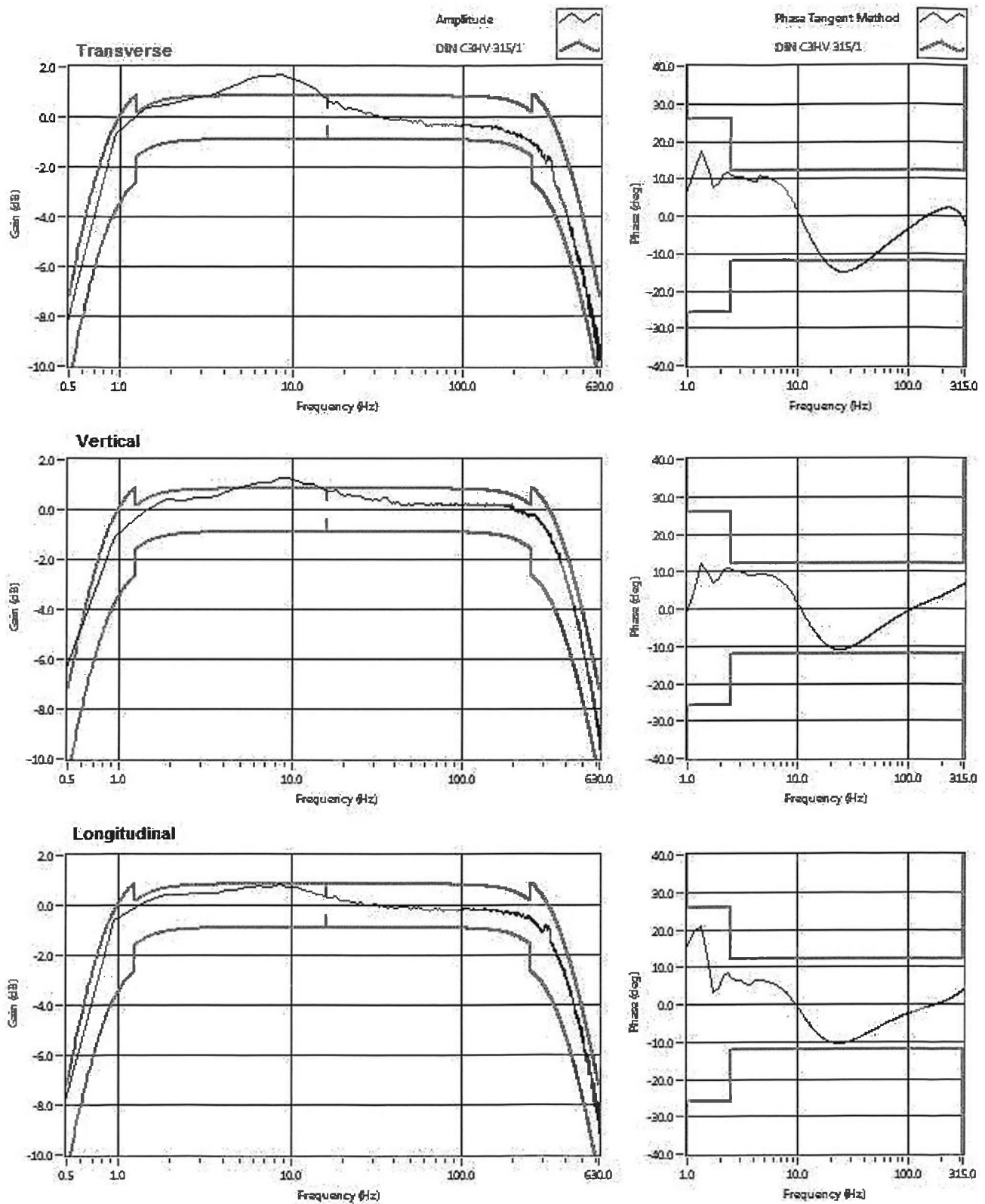
309 Legget Drive, Ottawa, Ontario, K2K 3A3, (613) 592-4642



## Frequency Response of UM20454



## Frequency Response of UM20454 (As Found)





# Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM21456

Calibration Date: April 21, 2024

Calibration Reference Equipment: SRV-AFR 714J7401

*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.*

Calibrated By

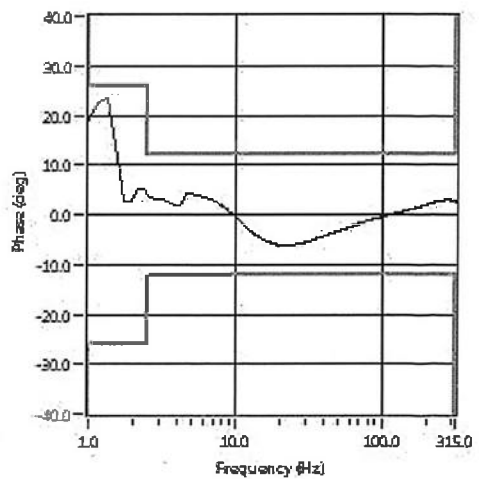
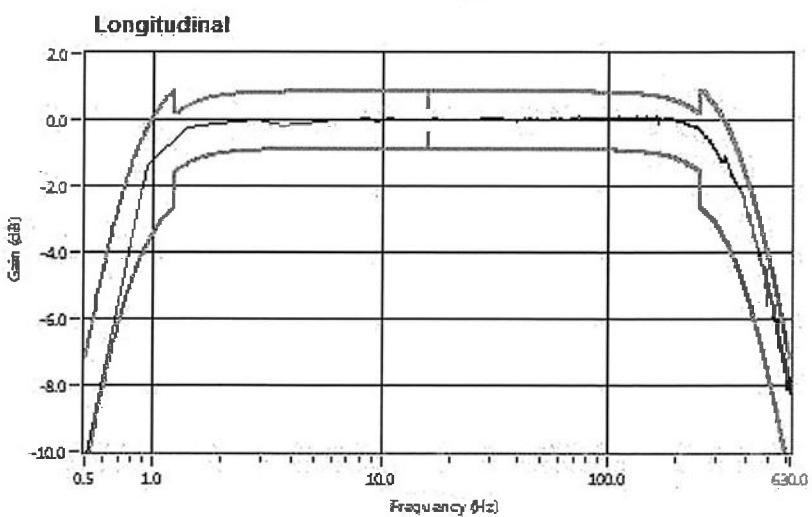
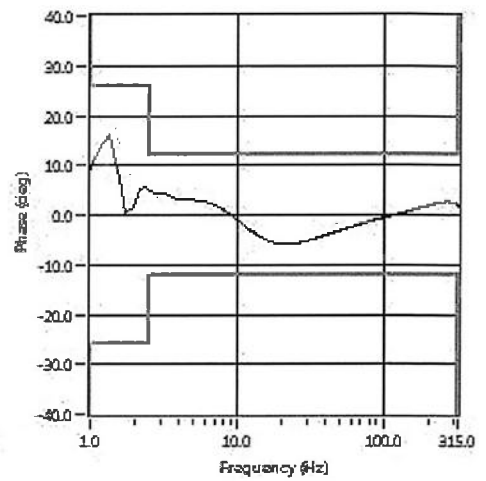
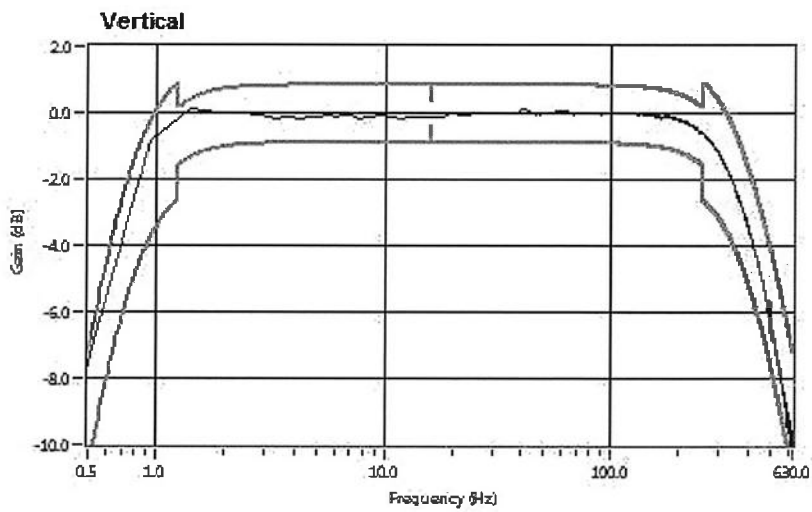
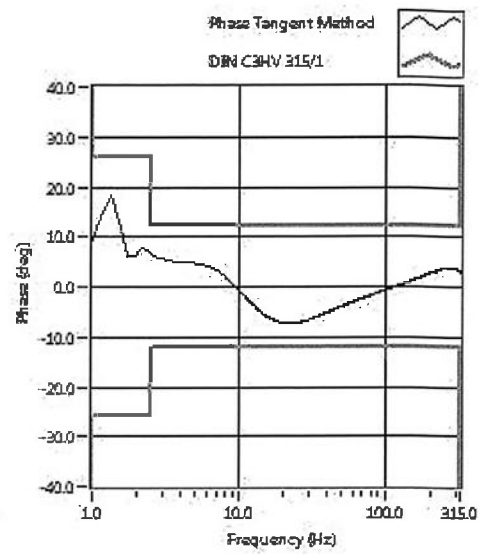
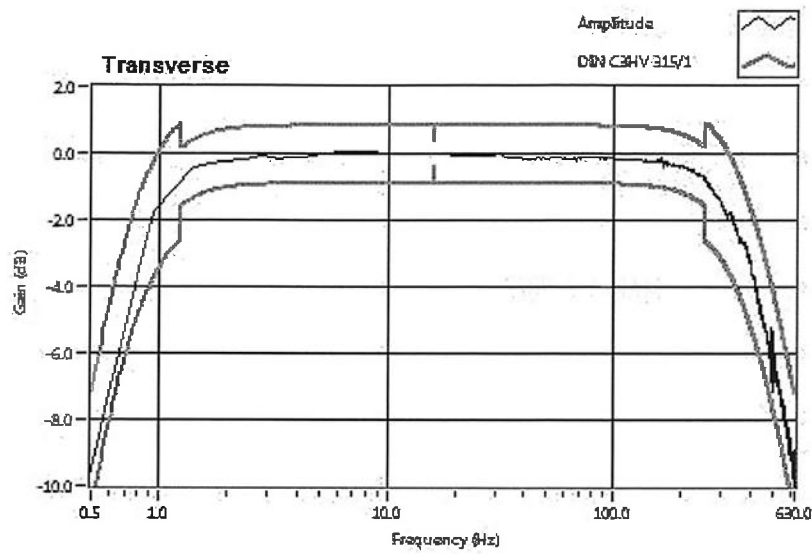


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## Frequency Response of UM21456



# Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM22200

Calibration Date: April 21, 2024

Calibration Reference Equipment: SRV-AFR 714J7401

*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.*

Calibr

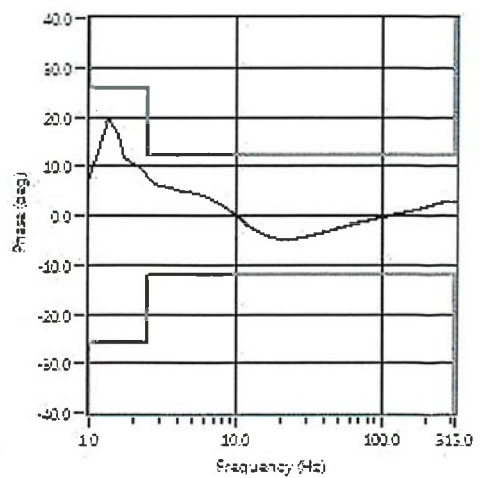
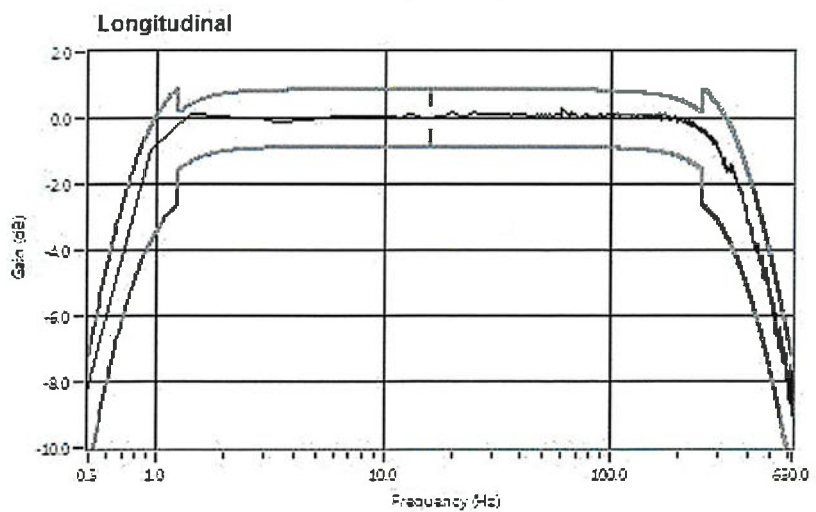
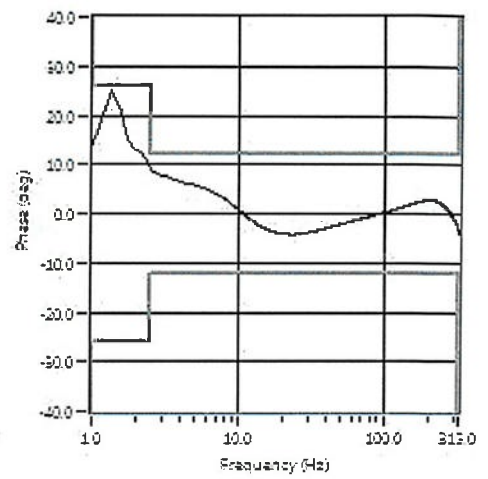
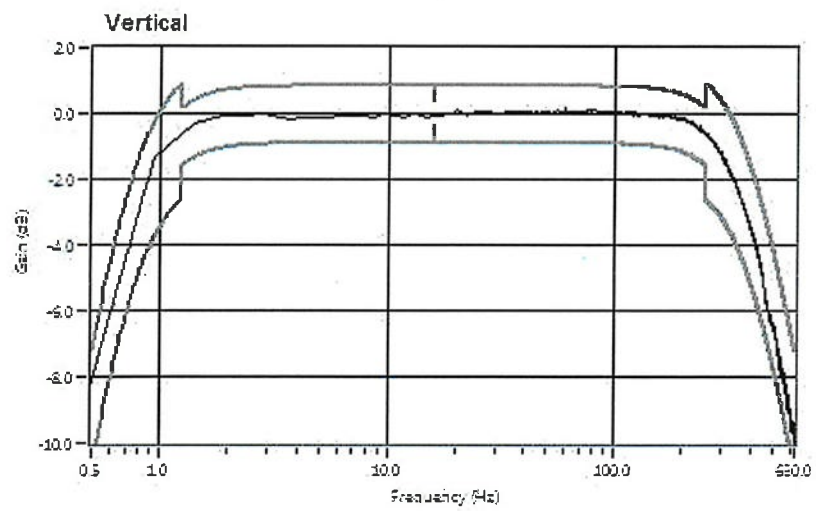
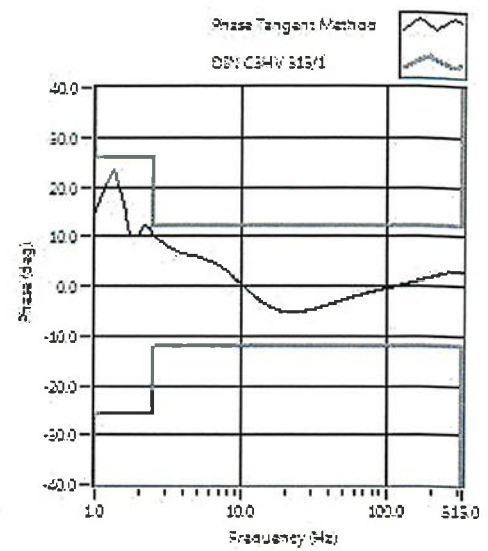
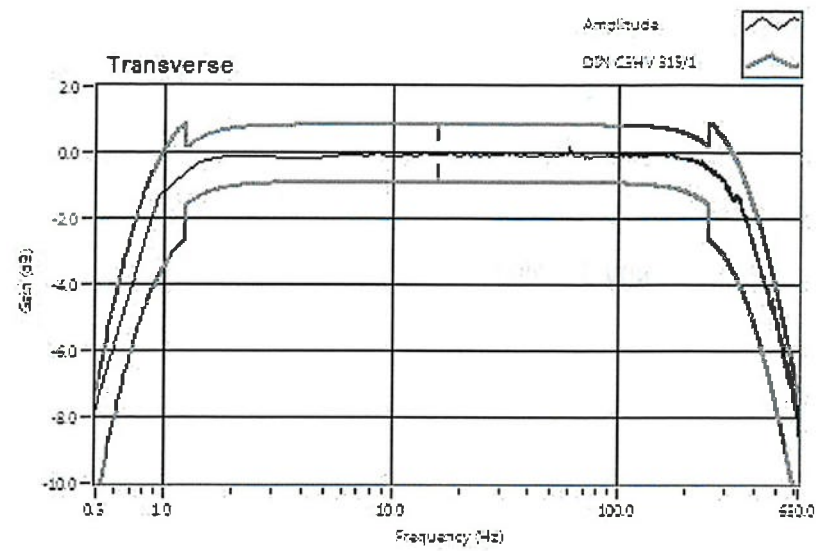


**Instantel®**

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



# Frequency Response of UM22200





# Calibration Certificate

Part Number: 721A2601

Description: Micromate with DIN Geophone

Serial Number: UM23376

Calibration Date: April 21, 2024

Calibration Reference Equipment: SRV-AFR 714J7401

*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.*

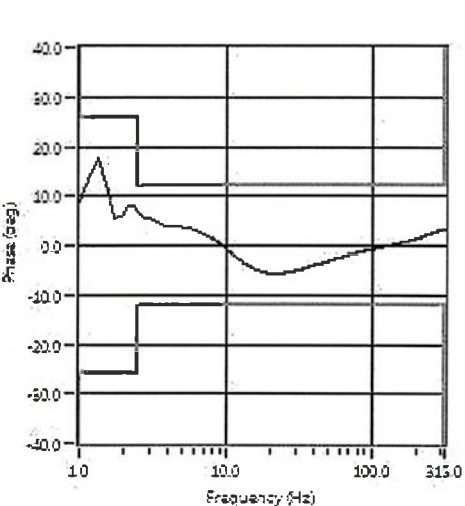
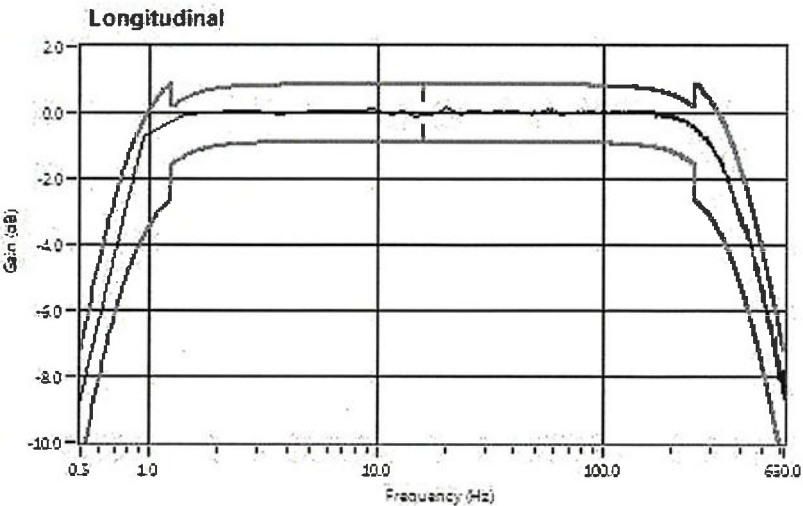
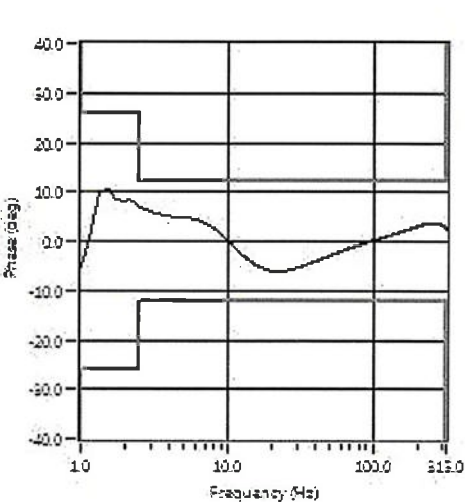
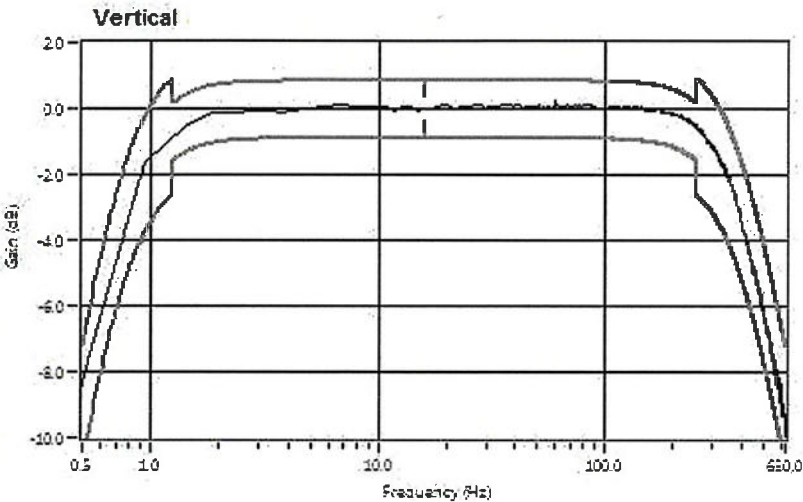
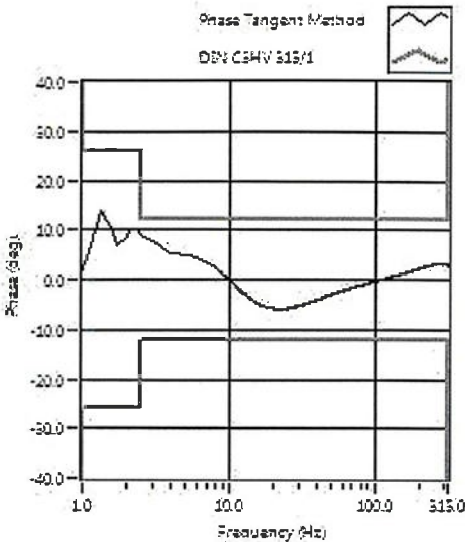
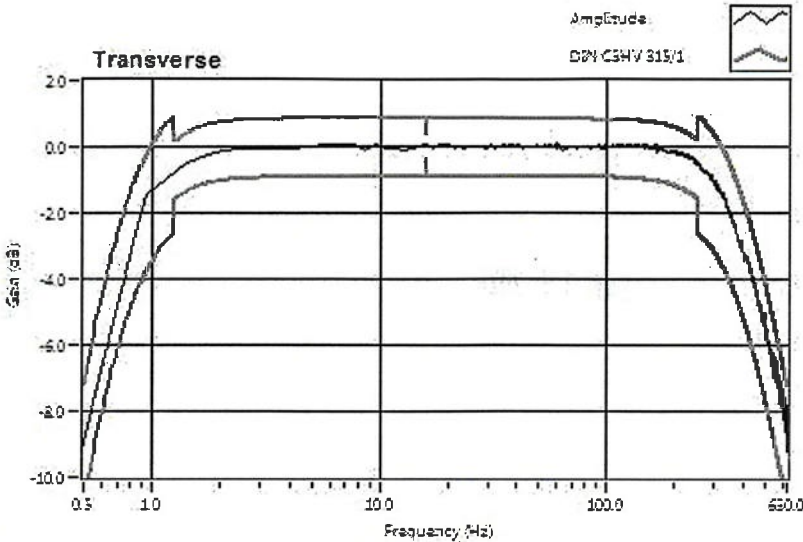
Calibrated



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Frequency Response of UM22376







# Certificate of Calibration

**Certificate No.** : MC24-2306

**Page** : 1 of 2

**Customer** : Smile Laboratory Co., Ltd.  
**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Description** : pH Meter  
**Manufacturer** : Mettler Toledo  
**Model** : Seven Direct SD20  
**Serial No.** : C238817351  
**Identification No.** : SML.PH001/61  
**Calibration Place** : Laboratory Room

**Order No.** : 3350/24  
**Received date** : Sep 27, 2024  
**Calibration date** : Sep 27, 2024  
**Environment Condition :**  
**Temperature** : ( 25+/-10 ) °C  
**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MC-001* According to direct with Standard Thermometer and Standard Buffer Solution at 25 °C. The calibration methods based on ISO 10523 Water quality - Determination of pH, NIST : 1994.  
Calibration were conducted using In-house calibration procedure *CP-MT-001* According to comparison with Standard Digital Thermometer with 2 PRT.  
The calibration methods based on ITS-90.

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Digital Thermometer	EFT-4	EFT42020033	MT24-4034	May 03, 2025
Standard Digital Thermometer	UM RTD	2002Z Z38 0073A	MT23-7158	Nov 20, 2024
<u>Instrument</u>	<u>Model</u>	<u>Lot No.</u>	<u>Expired Date.</u>	
Standard Buffer Solution ( 4 pH )	TRM-S-2027	150823	Feb 28, 2025	
Standard Buffer Solution ( 7 pH )	TRM-S-2034	180723	Feb 28, 2025	
Standard Buffer Solution ( 10 pH )	TRM-S-2031	160823	Feb 28, 2025	

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through  
National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%

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**Certificate No.** : MC24-2306

**Page** : 2 of 2

**Function** : pH measurement (Electrode)  
**Calibration point** : 4, 7, 10 pH  
**Probe S/N** : B514800084

**Result** : Before adjustment

**Resolution** : 0.01 pH

Standard Buffer ( pH )	UUC* reading ( pH )	UUC* correction ( pH )	Uncertainty of measurement ( +/- pH )
4.01	4.09	-0.08	0.02
7.01	7.07	-0.06	0.02
10.01	10.08	-0.07	0.02

**Function** : pH measurement (Electrode)  
**Calibration point** : 4, 7, 10 pH  
**Probe S/N** : B514800084

**Result** : After adjustment

**Resolution** : 0.01 pH

Standard Buffer ( pH )	UUC* reading ( pH )	UUC* correction ( pH )	Uncertainty of measurement ( +/- pH )
4.01	4.01	0.00	0.02
7.01	7.00	0.01	0.02
10.01	9.98	0.03	0.02

**Result** : Without Adjustment  
**Function** : Temperature measurement  
**Calibration point** : 23, 25, 27 °C

**Resolution** : 0.1 °C

Calibration point ( °C )	Standard reading ( °C )	UUC* reading ( °C )	UUC* correction ( °C )	Uncertainty of measurement ( +/- °C )
23	23.05	23.1	-0.05	0.20
25	25.06	25.1	-0.04	0.20
27	27.06	27.3	-0.24	0.20
23	23.05	23.1	-0.05	0.20

UUC\* = Unit under calibration



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Calibration Cert. # 3884.01  
ISO/IEC 17025

# Certificate of Calibration

**Certificate No.** : MC24-2307

**Page** : 1 of 3

**Customer** : Smile Laboratory Co., Ltd.

**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Description** : Spectrophotometer

**Manufacturer** : Hach

**Model** : DR6000

**Serial No.** : 1735844

**Identification No.** : SML.UV001/61

**Calibration Place** : Laboratory Room

**Order No.** : 3350/24

**Received date** : Sep 27, 2024

**Calibration date** : Sep 27, 2024

**Environment Condition :**

**Temperature** : ( 25+/-10 ) °C

**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MC-008*. According to direct measurement with wavelength standard filter and absorbance standard filter.

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Neutral Density Filter	RM-1N2N3N	18944	CI-0137-23	Apr 25, 2025
Holmium Filter	RM-HG	19136	CI-0138-23	Apr 24, 2025
Didymium Glass Filter	RM-DG	19137	CI-0140-23	Apr 25, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



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Certificate No. : MC24-2307

Page : 2 of 3

Result : Without adjustment

Function : Photometric accuracy

Wavelength setting ( nm )	Standard value ( Abs )	UUC* reading ( Abs )	UUC* correction ( Abs )	Uncertainty of measurement ( +/- Abs )
440	0.0000	0.000	0.0000	0.004
	0.5537	0.556	-0.0023	0.004
	0.7450	0.747	-0.0020	0.004
	0.9898	0.991	-0.0012	0.004
465	0.0000	0.000	0.0000	0.004
	0.5142	0.516	-0.0018	0.004
	0.6873	0.688	-0.0007	0.004
	0.9400	0.940	0.0000	0.004
546.1	0.0000	0.000	0.0000	0.004
	0.5104	0.511	-0.0006	0.004
	0.6953	0.695	0.0003	0.004
	0.9831	0.982	0.0011	0.004
590	0.0000	0.000	0.0000	0.004
	0.5439	0.543	0.0009	0.004
	0.7230	0.722	0.0010	0.004
	1.0785	1.076	0.0025	0.004
635	0.0000	0.000	0.0000	0.004
	0.5511	0.550	0.0011	0.004
	0.6900	0.689	0.0010	0.004
	1.0715	1.069	0.0025	0.004

UUC\* = Unit under calibration



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Certificate No. : MC24-2307

Page : 3 of 3

**Result** : Without adjustment  
**Function** : Wavelength accuracy

Spectral Band Width : 1 nm

Scan Speed : -

Standard value ( nm )	UUC* reading ( nm )	UUC* correction ( nm )	Uncertainty of measurement ( +/- nm )
279.22	279.0	0.22	0.60
287.93	288.0	-0.07	0.60
360.90	361.0	-0.1	0.60
445.85	446.0	-0.15	0.60
459.83	460.0	-0.17	0.60
528.74	529.0	-0.26	0.62
573.16	574.0	-0.84	0.62
585.09	585.0	0.09	0.62
740.76	740.0	0.76	0.62
807.27	807.0	0.27	0.62

UUC\* = Unit under calibration



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Calibration Cert. # 3884.01  
ISO/IEC 17025

# Certificate of Calibration

**Certificate No.** : MM24-3151

**Page** : 1 of 3

**Customer** : Smile Laboratory Co.,Ltd.

**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Description** : Electronic Balance

**Manufacturer** : Mettler Toledo

**Model** : MS205DU

**Serial No.** : 850938841

**Identification No.** : SML.AB002/61

**Calibration Place** : Balance Room

**Order No.** : 3350/24

**Received date** : Sep 27, 2024

**Calibration date** : Sep 27, 2024

**Environment Condition :**

**Temperature** : (25+/-10) °C

**Humidity** : (50+/-30) %RH

**Atm. Pressure** : (1010+/-10) hPa

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MM-001*  
According to comparison with Standard Weight Set.  
The calibration methods based on UKAS - LAB 14 : 2022

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Weight Set	NC-001-0.2K-E1-ASS	0022	NC-527	Oct 17, 2024

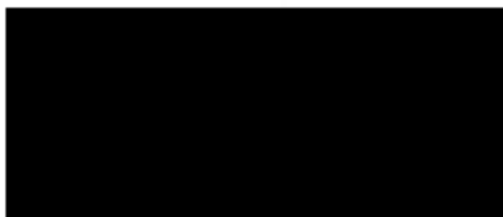
The effect that the result relate only of the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through  
National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



**Calibrated by**



**Approved by**



**Issue date** : Oct 03, 2024

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Certificate No. : MM24-3151

Page : 2 of 3

Calibration Result : Without Adjustment

Function : Repeatability

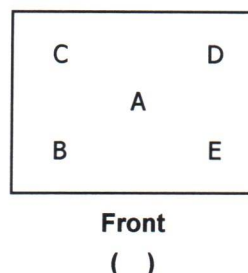
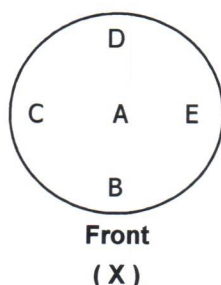
Maximum Capacity : 220 g

Resolution : 0.0001 g

Nominal Weight Value	Instrument Deviation of Reading
( g )	( g )
200	0.0000

Calibration Result : Without Adjustment

Function : Effect of Off Center Loading



A Mass of 100 Was Placed to various Position on the pan.

The Weight Machine Reading Obtained is Given in The Tabel

Load	Measuring Positions					Maximum Different	
	A	B	C	D	E		
	( g )	( g )	( g )	( g )	( g )		
100	100.0000	99.9998	99.9999	100.0000	99.9999	100.0000	0.0002

Calibration Result : Without Adjustment

Function : Effect of Tare

Nominal Tare Weight	Standard Weight		UUC* Reading	UUC* Deviation
( g )	( g )		( g )	( g )
100	Tare		0.0000	0.0000
	At 20 %	20	20.0000	0.0000
	At 40 %	40	40.0000	0.0000
	At 60 %	60	60.0000	0.0000
	At 80 %	80	80.0000	0.0000
	At 100 %	100	100.0000	0.0000

UUC\* = Unit Under Calibration



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Certificate No. : MM24-3151

Page : 3 of 3

Calibration Result : Before Adjustment

Function : Departure of indication from nominal value

Standard Weight Value ( g )	UUC* Reading ( g )	UUC* Correction ( g )	Uncertainty of Measurement ( +/- g )
0.00000	0.0000	0.00000	0.000058
20.00001	20.0000	0.00001	0.000070
40.00002	40.0000	0.00002	0.000090
60.00002	60.0000	0.00002	0.00014
80.00003	80.0001	-0.00007	0.00014
100.00000	100.0004	-0.00040	0.00014
120.00001	120.0004	-0.00039	0.00027
140.00002	140.0004	-0.00038	0.00027
160.00002	160.0003	-0.00028	0.00027
180.00003	180.0002	-0.00017	0.00027
200.00000	200.0001	-0.00010	0.00027

UUC\* = Unit Under Calibration

Calibration Result : After Adjustment

Standard Weight Value ( g )	UUC* Reading ( g )	UUC* Correction ( g )	Uncertainty of Measurement ( +/- g )
0.00000	0.0000	0.00000	0.000058
20.00001	20.0000	0.00001	0.000070
40.00002	40.0000	0.00002	0.000090
60.00002	60.0000	0.00002	0.00014
80.00003	80.0000	0.00003	0.00014
100.00000	100.0000	0.00000	0.00014
120.00001	120.0000	0.00001	0.00027
140.00002	140.0000	0.00002	0.00027
160.00002	160.0000	0.00002	0.00027
180.00003	180.0000	0.00003	0.00027
200.00000	200.0000	0.00000	0.00027

UUC\* = Unit Under Calibration



# Certificate of Calibration

**Certificate No.** : MP24-6122  
**Page** : 1 of 2

**Customer** : Smile Laboratory Co.,Ltd.  
**Address** : 563/1 Thoet Thai Rd.,Bangwa,Phasicharoen,Bangkok 10160

**Description** : Digital Vacuum Gauge  
**Manufacturer** : Dwyer  
**Model** : DPGA-00  
**Serial No.** : A12BI0158  
**Identification No.** : N/A  
**Calibration Place** : Mechanical Laboratory ( IMC )

**Order No.** : 3350/24  
**Received date** : Sep 27, 2024  
**Calibration date** : Oct 02, 2024  
**Environment Condition :**  
**Temperature** : ( 23+/-3 ) °C  
**Humidity** : ( 50+/-15 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MP-001*.  
According to comparison with Primary Pressure Indicator.  
The calibration methods based on DKD-R6-1/03:2014

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Primary Pressure Calibrator	PACE 1000	4318561	MP-0086-24	Mar 27, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only

**Traceability** : This measurement are traceable to the International System of Unit (SI), through  
National Institute of Metrology Thailand ( NIMT )

The reported expadded uncertainty of measurement was base on standard uncertainty multiplied by coverage factor  $k = 2$ ,  
providing a level of confidence of not less than 95%



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Calibration Cert. # 3884.01

ISO/IEC 17025

**Certificate No. : MP24-6122****Page : 2 of 2****Function : Vacuum Measurement****Reference Level : Vertical****Range : 0 to -760 mmHg****Calibration Result : Without Adjustment****Pressure Medium : Air****Resolution : 1 mmHg**

	<b>UUC* Value ( mmHg )</b>	<b>Standard Reading ( mmHg )</b>	<b>UUC* Error ( mmHg )</b>	<b>Uncertainty of Measurement ( +/- mmHg )</b>
<b>Increasing :</b>				
	0	0.00	0.00	0.61
	-76	-76.40	0.40	0.61
	-152	-152.81	0.81	0.61
	-228	-228.21	0.21	0.61
	-304	-303.40	-0.60	0.61
	-380	-379.09	-0.91	0.61
	-456	-454.57	-1.43	0.61
	-532	-530.39	-1.61	0.61
	-608	-606.11	-1.89	0.61
	-684	-682.10	-1.90	0.61
	-710	-705.33	-4.67	
<b>Decreasing :</b>				
	-710	-706.53	-3.47	0.61
	-684	-683.12	-0.88	0.61
	-608	-606.52	-1.48	0.61
	-532	-531.25	-0.75	0.61
	-456	-455.72	-0.28	0.61
	-380	-379.81	-0.19	0.61
	-304	-304.31	0.31	0.61
	-228	-228.59	0.59	0.61
	-152	-152.95	0.95	0.61
	-76	-77.51	1.51	0.61
	0	0.00	0.00	0.61

UUC\* = Unit Under Calibration





# Certificate of Calibration

**Certificate No.** : MT24-8016

**Page** : 1 of 2

**Customer** : Smile Laboratory Co.,Ltd.  
**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok, 10160

**Description** : Hot Air Oven  
**Manufacturer** : Bio Base  
**Model** : BOV-V30F  
**Serial No.** : 1705226  
**Identification No.** : SML.OV001/61  
**Calibration Place** : Laboratory Room

**Order No.** : 3350/24  
**Received date** : Sep 27, 2024  
**Calibration date** : Sep 27, 2024  
**Environment Condition :**  
**Temperature** : ( 25+/-10 ) °C  
**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

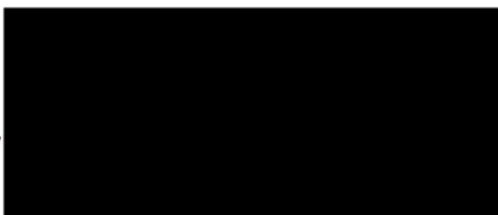
The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k=2$ , providing a level of confidence of not less than 95%



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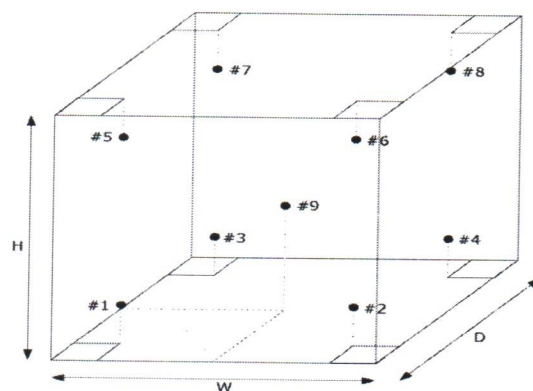
**Issue date :** Oct 01, 2024

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**Certificate No. : MT24-8016**
**Page : 2 of 2**
**Function : Temperature measurement**
**Result : Without adjustment**
**Calibration point : 104, 150, 180 °C**
**Resolution : 0.1 °C**

Calibration point ( °C )	Temperature of UUC* at each position ( °C )									Uncertainty of measurement ( +/- °C )
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
104	103.547	104.000	103.524	104.321	104.266	104.315	104.318	104.642	104.119	0.44
150	150.509	149.679	150.527	150.812	150.560	149.604	150.303	150.470	150.698	0.73
180	180.546	179.900	179.973	180.730	180.877	179.934	179.858	180.029	179.912	0.81

Setting temperature ( °C )	Indicating Temperature ( °C )	Measured stability ( +/- °C )	Measured uniformity ( °C )	Overall variation ( °C )
104.0	104.0	0.16	0.70	1.3
150.0	150.0	0.55	1.4	1.9
180.0	180.0	0.64	1.3	2.2



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

**Front view**
**UUC\*** = Unit under calibration

**Uniformity** = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

**Overall Variation** = Difference of temperature value between the maximum and minimum any time.

**Stability** = One half of the maximum difference of measured temperatures at any one probe.





# Certificate of Calibration

**Certificate No.** : MT24-8017

**Page** : 1 of 2

**Customer** : Smile Laboratory Co.,Ltd.  
**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok, 10160

**Description** : Refrigerator  
**Manufacturer** : Accuplus  
**Model** : SMART I250  
**Serial No.** : 2059-1117-0035  
**Identification No.** : SML.IN002/61  
**Calibration Place** : Laboratory Room

**Order No.** : 3350/24  
**Received date** : Sep 27, 2024  
**Calibration date** : Sep 27, 2024  
**Environment Condition :**  
**Temperature** : ( 25+/-10 ) °C  
**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



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**Certificate No.** : MT24-8017

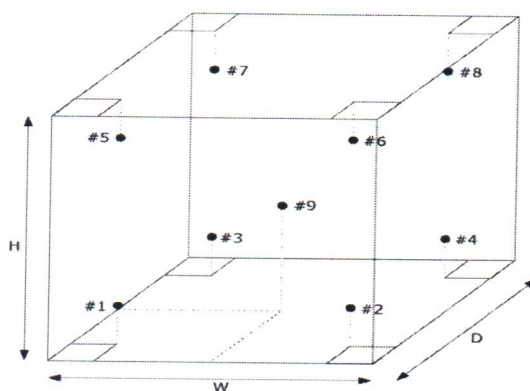
**Page** : 2 of 2

**Function** : Temperature measurement  
**Calibration point** : 4 °C

**Result** : Without adjustment  
**Resolution** : 0.1 °C

Calibration point ( °C )	Temperature of UUC* at each position ( °C )									Uncertainty of measurement ( +/- °C )
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
4	4.360	4.514	4.572	4.408	4.488	4.557	4.334	4.652	4.380	0.31

Setting temperature ( °C )	Indicating Temperature ( °C )	Measured stability ( +/- °C )	Measured uniformity ( °C )	Overall variation ( °C )
4.0	4.0	0.10	0.32	0.46



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

**Front view**

**UUC\*** = Unit under calibration

**Uniformity** = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

**Overall Variation** = Difference of temperature value between the maximum and minimum any time.

**Stability** = One half of the maximum difference of measured temperatures at any one probe.



# Certificate of Calibration

**Certificate No.** : MT24-8102

**Page** : 1 of 2

**Customer** : Smile Laboratory Co.,Ltd.

**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok, 10160

**Description** : Liquid in glass Thermometer

**Manufacturer** : Lab Medic

**Model** : -10 to 110 °C

**Serial No.** : 332750

**Identification No.** : N/A

**Calibration Place** : Temperature Laboratory ( IMC )

**Order No.** : 3350/24

**Received date** : Sep 27, 2024

**Calibration date** : Oct 02, 2024

**Environment Condition :**

**Temperature** : ( 23+/-3 ) °C

**Humidity** : ( 50+/-15 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MT-001* According to comparison with Standard Digital Thermometer with 2 PRT.  
The calibration methods based on ITS-90.

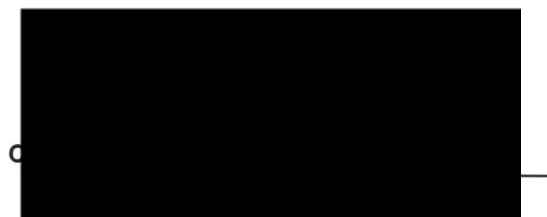
## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Digital Thermometer with 2 PRT	1586A/5609/5609	41130006/00543/03713	TE24-0006	Jan 14, 2025

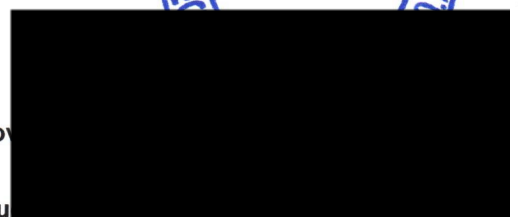
The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k=2$ , providing a level of confidence of not less than 95%



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**Inctech Metrological Center Co.Ltd.**

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) [www.imcinstrument.com](http://www.imcinstrument.com)

Calibration Cert. # 3884.01

ISO/IEC 17025

**Certificate No. : MT24-8102****Page : 2 of 2**

**Result** : Without Adjustment  
**Function** : Temperature measurement  
**Resolution** : 0.5 °C  
**Type** : Partial immersion  
**Calibration point** : 0, 50, 100 °C

Immersion depth ( mm )	Calibration point ( °C )	Standard reading ( °C )	UUC* reading ( °C )	UUC* correction ( °C )	Uncertainty of measurement ( +/- °C )
76	0	0.024	0.5	-0.476	0.29
76	50	50.021	50.5	-0.479	0.29
76	100	99.992	100.5	-0.508	0.30
76	0	0.019	0.5	-0.481	0.29

UUC\* = Unit under calibration





# Certificate of Calibration

Certificate No. : MT24-7376

Page : 1 of 2

**Customer** : Smile Laboratory Co.,Ltd.

**Address** : 563/1 Thoet Thai Rd., Bangwa, Phasicharoen, Bangkok 10160

**Description** : Incubator

**Manufacturer** : Accuplus

**Model** : i250

**Serial No.** : 0408-0315-0026

**Identification No.** : N/A

**Calibration Place** : Laboratory Room

**Order No.** : 2825/24

**Received date** : Aug 21, 2024

**Calibration date** : Aug 21, 2024

**Environment Condition :**

**Temperature** : ( 25+/-10 ) °C

**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY49020096	MT23-7163	Nov 30, 2024

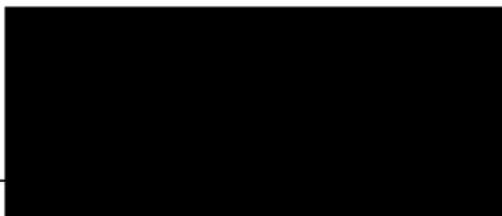
The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



Calibrated by :



Appr

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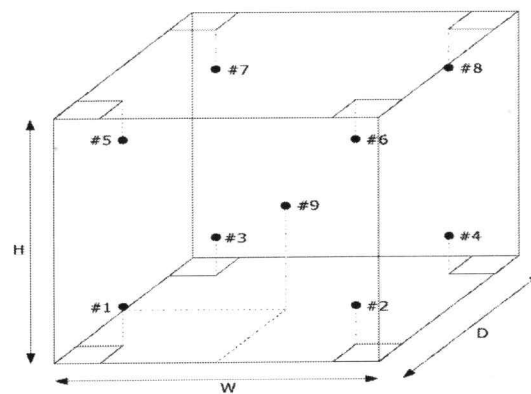


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Saimai, Bangkok 10220, ThailandTel. (662) 909-8820 (Auto 10 lines) [www.imcinstrument.com](http://www.imcinstrument.com)Calibration Cert. # 3884.01  
ISO/IEC 17025**Certificate No.** : MT24-7376**Page** : 2 of 2**Function** : Temperature measurement**Result** : Without adjustment**Calibration point** : 20 °C**Resolution** : 0.1 °C

Calibration point ( °C )	Temperature of UUC* at each position ( °C )									Uncertainty of measurement ( +/- °C )
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	20.104	19.801	20.227	20.089	20.636	20.412	20.580	20.234	19.986	0.70

Setting temperature ( °C )	Indicating Temperature ( °C )	Measured stability ( +/- °C )	Measured uniformity ( °C )	Overall variation ( °C )
20.0	20.0	0.57	0.77	1.7



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

**Front view****UUC\*** = Unit under calibration**Uniformity** = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.**Overall Variation** = Difference of temperature value between the maximum and minimum any time.**Stability** = One half of the maximum difference of measured temperatures at any one probe.