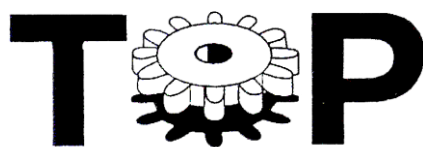


ภาคผนวกที่ 4

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สรุปเอกสารสอบเทียบอุปกรณ์เครื่องมือ

เอกสารการสอบเทียบเครื่องมือตรวจวัดคุณภาพอากาศในบรรยากาศ



Trade & Engineering

**TSP High Volume Sampler  
TE-5000 TSP Sampler Verification  
Site Information**

<b>Location:</b> -	<b>Site ID:</b> -	<b>Date:</b> 13 Oct 23
<b>Sampler:</b> TE-5000 TSP	<b>Serial No:</b> 3278	<b>Tech:</b> Tong.P

**Site Conditions**

<b>Barometric Pressure (in Hg):</b> 28.00	<b>Corrected Pressure (mm Hg):</b> 711.2
<b>Temperature (deg F):</b> 75.8	<b>Temperature (deg K):</b> 297.5
<b>Average Press. (in Hg):</b> 26.00	<b>Corrected Average (mm Hg):</b> 660.4
<b>Average Temp (Deg F):</b> 76.3	<b>Average Temp: (Deg K):</b> 297.8

**Calibration Orifice**

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 1.58304
<b>Model:</b> TE-5028A	<b>Qstd Intercept:</b> -0.01520
<b>Serial#:</b> 1179	<b>Calibration Due Date</b> 12 December 2023

**Calibration Information**

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	7.00	1.628	60.5	58.58	<b>Slope:</b> 48.3100
2	6.20	1.532	56.4	54.61	<b>Intercept:</b> -20.5901
3	5.70	1.470	50.7	49.09	<b>Corr. Coeff:</b> 0.9844
4	4.80	1.350	44.3	42.89	
5	3.80	1.202	40.1	38.82	
					<b># of Observations:</b> 5

**Calculations**

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

b = sampler intercept

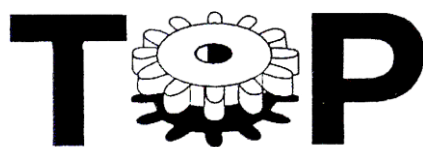
I = chart response

Tav = daily average temperature

Pav = daily average pressure

<b>Enter Average I (chart):</b>	50.4
<b>Average Flow Calculation m3/min</b>	1.399099132
<b>Average Flow Calculation in cfm</b>	49.40321728
<b>Sample Time (Hrs):</b>	24.0
<b>Total flow in 24 hours m3/min</b>	2014.70275
<b>Total flow in 24 hours cfm</b>	71140.63288

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



Trade & Engineering

**TSP High Volume Sampler  
TE-5000 TSP Sampler Verification  
Site Information**

<b>Location:</b> -	<b>Site ID:</b> -	<b>Date:</b> 18 Oct 23
<b>Sampler:</b> TE-5000 TSP	<b>Serial No:</b> 3281	<b>Tech:</b> Tong.P

**Site Conditions**

<b>Barometric Pressure (in Hg):</b> 28.10	<b>Corrected Pressure (mm Hg):</b> 713.7
<b>Temperature (deg F):</b> 76.9	<b>Temperature (deg K):</b> 298.1
<b>Average Press. (in Hg):</b> 27.10	<b>Corrected Average (mm Hg):</b> 688.3
<b>Average Temp (Deg F):</b> 75.5	<b>Average Temp: (Deg K):</b> 297.3

**Calibration Orifice**

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 1.58304
<b>Model:</b> TE-5028A	<b>Qstd Intercept:</b> -0.01520
<b>Serial#:</b> 1179	<b>Calibration Due Date</b> 12 December 2023

**Calibration Information**

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	7.40	1.675	60.5	58.62	<b>Slope:</b> 36.1315
2	5.90	1.496	56.7	54.94	<b>Intercept:</b> -0.2465
3	4.80	1.351	52.2	50.58	<b>Corr. Coeff:</b> 0.9689
4	4.00	1.234	46.7	45.25	
5	3.50	1.155	40.3	39.05	
					<b># of Observations:</b> 5

**Calculations**

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

<b>Enter Average I (chart):</b>	51.3
<b>Average Flow Calculation m3/min</b>	1.359064623
<b>Average Flow Calculation in cfm</b>	47.98956941
<b>Sample Time (Hrs):</b>	24.0
<b>Total flow in 24 hours m3/min</b>	1957.053058
<b>Total flow in 24 hours cfm</b>	69104.97995

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

## Certificate of Analyzer Performance Testing

Calibrated Date : 30-Sep-23

Certificate No. : 0923-006

Page : 1/1

### Analyzer Instruments

Analyzer Type : SO2 Analyzer

Manufacturer : Thermo Environmental

Model : 43C

Serial No. : CTL63588-340

### Environmental

Temperature : 26.7 °C

Humidity : 44.0 %RH

### Calibration System

#### Calibrator Units

Gas Calibration : Thermo Environmental

Zero Air Generator : API

Model : 146C

Model : 701

Serial No. : 514811458

Serial No. : 179

### Standard Gas

NO Conc. : 2 ppm

Cylinder No. : CC750227

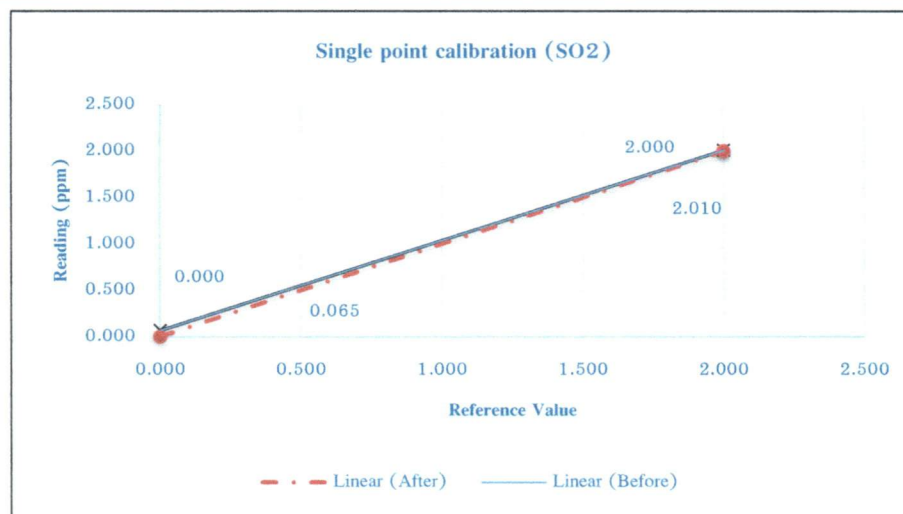
SO2 Conc. : 2 ppm

Expire Date : 21-Nov-23

CO Conc. : 50 ppm

### Calibration Check

Gas	Zero			Span		
	Reading Value (ppm)	Expected Value (ppm)	Drift (%)	Reading Value (ppm)	Expected Value (ppm)	Drift (%)
Before						
SO2	0.065	0.000	0.07	2.01	2.000	0.50
After						
SO2	0.000	0.000	0.00	2.00	2.000	0.00



Calibrated by :

  
 (Mr. Tong Piima)

## Certificate of Analyzer Performance Testing

Calibrated Date : 26-Aug-23

Certificate No. : 0823-003

Page : 1/1

### Analyzer Instruments

Analyzer Type : SO2 Analyzer

Manufacturer : Thermo Environmental

Model : 43C

Serial No. : 43C-70852-367

### Environmental

Temperature : 24.9 °C

Humidity : 46.9 %RH

### Calibration System

#### Calibrator Units

Gas Calibration : Thermo Environmental

Zero Air Generator : API

Model : 146C

Model : 701

Serial No. : 514811458

Serial No. : 179

### Standard Gas

NO Conc. : 2 ppm

Cylinder No. : CC750227

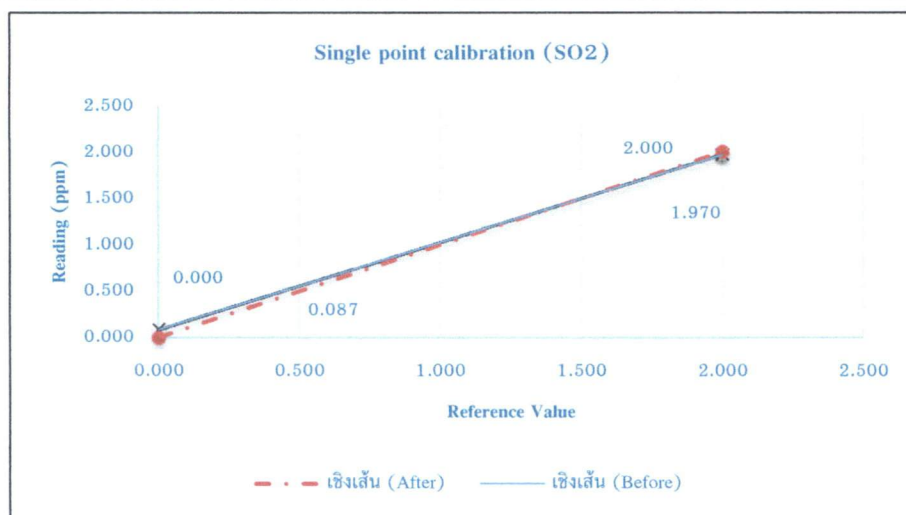
SO2 Conc. : 2 ppm

Expire Date : 21-Nov-23


CO Conc. : 50 ppm

### Calibration Check

Gas	Zero			Span		
	Reading Value (ppm)	Expected Value (ppm)	Drift (%)	Reading Value (ppm)	Expected Value (ppm)	Drift (%)
Before						
SO2	0.087	0.000	0.09	1.97	2.000	-1.50
After						
SO2	0.000	0.000	0.00	2.00	2.000	0.00



Calibrated by :

  
 (Mr. Tong Piima)

เอกสารการสอบเทียบเครื่องมือตรวจวัดระดับเสียงในบรรยากาศ

Certificate No.: CP20240126EA

Operation No.: CP2024030095

## Certificate of Calibration

**Equipment:** Sound Level Meter

**Manufacturer:** ACO

**Model/Type:** 6236 (Meter), 7052NR (Microphone), - (Preamplifier)

**Serial No.:** 222186 (Meter), 84150 (Microphone), - (Preamplifier)

**ID No.:** NS-03-016

**Customer:** C.E.M. Technology (Thailand) Co.,Ltd.

**Address:** 31/8 Moo 13 T.Rai Khung, A.Sam Phran,  
Nakorn Phatom 73210

**Received Date:** 7 March 2024

**Calibrated Date:** 13 - 18 March 2024

**Issued Date:** 19 March 2024

**Calibrated by:** Ms. Juntaporn Kunhakom

Approved by: \_\_\_\_\_



( Mr. Sittichai Swaksuriyawong )  
Group Manager

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The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor ( $k$ ) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



Certificate No.: CP20240126EA

## Calibration Report

Equipment: Sound Level Meter  
 Manufacturer: ACO  
 Model/Type: 6236 (Meter), 7052NR (Microphone), - (Preamplifier)  
 Serial No.: 222186 (Meter), 84150 (Microphone), - (Preamplifier)  
 ID No.: NS-03-016  
 Ambient Temperature: ( 23 ± 2 ) °C  
 Relative Humidity: ( 50 ± 15 ) %  
 Pressure: (101.3 ± 1.5) kPa  
 Method of Calibration :-  
 IEC61672-3:2013.

### Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2787490	AA-1012-23	12 November 2024
2) Arbitrary Function Generator	AFG2021	C010063	CK20230040EA	26 June 2024
3) Programmable Attenuator	PA5	2755	EF-0040-23	1 October 2024
4) 6.5 Digit precision multimeter	8846A	9609027	CB20230108EB	8 June 2024
5) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P230024 CD20230196EA	20 March 2024 23 July 2024
6) Pressure humidity and Temperature Transmitter	PTU301	F0640003	CL1-P230032 CD20230197EA	4 April 2024 23 July 2024
7) Performance Audio Analyzer	U8903B	MY56510003	CB20240035EA CK20230072EA	13 February 2025 13 September 2024

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

3. This certification is traceable to the international system of unit maintained at :-

Reference standards instrument for Acoustic function

- National Institute of Metrology (Thailand)

Reference standards instrument for Electrical function

- National Institute of Metrology (Thailand)

- Electrical and Electronics Institute; NSC Accredited Calibration No.0119

### Result of Calibration:-

Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
-	-	-	-

Certificate No.: CP20240126EA

## Calibration Report

Function : 2. Self-generated Noise

### 2.1 Microphone Installed

Measured value (dB)
21.9

### 2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	18.6
C-weighting	41.7
Z-weighting	43.2

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)

Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.3	-0.6	0.2	±1.5
1000	0.3	0.3	0.3	±1.0
8000	-0.2	0.4	0.5	±5.0

Function : 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	0.1	-0.3	0.0	±2.0
125	0.2	-0.2	0.1	±1.5
250	0.2	-0.1	0.1	±1.5
500	0.2	0.0	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.1	-0.1	0.0	±2.0
4000	-0.1	-0.3	0.0	±3.0
8000	-0.4	-0.4	-0.2	±5.0

Certificate No.: CP20240126EA

### Calibration Report

Function : 5. Frequency and time weighting at 1 kHz

#### 5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2

#### 5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability

Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.3

Function : 7. Level Linearity on the reference level range

#### 7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.0	0.0	±1.1
120.0	120.0	0.0	±1.1
121.0	121.0	0.0	±1.1

Certificate No.: CP20240126EA

## Calibration Report

### 7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.5	0.5	±1.1
33.0	33.7	0.7	±1.1
32.0	32.9	0.9	±1.1
31.0	32.1	1.1	±1.1
30.0	31.1	1.1	±1.1

Function : 8. Level Linearity including level range control

### 8.1. Level Linearity Including the Level Range (Reference Signal)

Range	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
20-100	94.0	94.0	0.0	±1.1
20-110	94.0	94.0	0.0	±1.1
30-120	94.0	94.0	0.0	±1.1
40-130	94.0	94.0	0.0	±1.1

### 8.2. Level Linearity Including the Level range (5dB Above Under-range)

Range	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
20-80	25.0	25.5	0.5	±1.1
20-90	25.0	25.7	0.7	±1.1
20-100	25.0	25.8	0.8	±1.1
20-110	25.0	26.0	1.0	±1.1
30-120	35.0	35.0	0.0	±1.1
40-130	45.0	44.9	-0.1	±1.1

Certificate No.: CP20240126EA

### Calibration Report

Function : 9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	116.0	0.0	±1.0
	2	98.9	-0.1	+1.0 ; -2.5
	0.25	89.8	-0.2	+1.5 ; -5.0
Slow	200	109.4	-0.2	±1.0
	2	89.8	-0.2	+1.0 ; -5.0
LAE	200	109.9	-0.1	±1.0
	2	90.0	0.0	+1.0 ; -2.5
	0.25	80.9	-0.1	+1.5 ; -5.0

Function : 10. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	125.4	125.3	-0.1	±3.0
Positive half cycle	124.4	124.2	-0.2	±2.0
Negative half cycle	124.4	124.2	-0.2	±2.0

Function : 11. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
-	-	-	-

Function : 12. High-Level Stability

High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	129.0	129.0	0.0	±0.3

Certificate No.: CP20240126EA

## Calibration Report

### Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Level Linearity including level range control	0.30	0.30
9) Tone burst response	0.20	0.30
10) Peak C sound level	0.20	0.35
11) Overload indication	0.20	0.25
12) High-Level Stability	0.10	0.10

- Remarks:
1. Indication at the calibration check frequency can not measured because customer does not provide a sound calibrator.
  2. Overload indication can not measured because sound level meter can not set to Reference value of the standard calibration.
  3. The acceptance limit is for the deviated value.
  4. Acceptance limits was IEC61672-3:2013 Class 2.
  5. The coverage factor  $k = 2.00$

- - End of Report - -

Certificate No.: CP20240127EA

Operation No.: CP2024030096

## Certificate of Calibration

**Equipment:** Sound Level Meter

**Manufacturer:** ACO

**Model/Type:** 6236 (Meter), 7052NR (Microphone), - (Preamplifier)

**Serial No.:** 222187 (Meter), 84151 (Microphone), - (Preamplifier)

**ID No.:** NS-03-017

**Customer:** C.E.M. Technology (Thailand) Co.,Ltd.

**Address:** 31/8 Moo 13 T.Rai Khung, A.Sam Phran,  
Nakorn Phatom 73210

**Received Date:** 7 March 2024

**Calibrated Date:** 13 - 18 March 2024

**Issued Date:** 19 March 2024

**Calibrated by:** Ms. Juntaporn Kunhakom

Approved by:



( Mr. Sittichai Swaksuriyawong )  
Group Manager

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The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor ( $k$ ) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.

Certificate No.: CP20240127EA

## Calibration Report

Equipment: Sound Level Meter  
 Manufacturer: ACO  
 Model/Type: 6236 (Meter), 7052NR (Microphone), - (Preamplifier)  
 Serial No.: 222187 (Meter), 84151 (Microphone), - (Preamplifier)  
 ID No.: NS-03-017  
 Ambient Temperature: ( 23 ± 2 ) °C  
 Relative Humidity: ( 50 ± 15 ) %  
 Pressure: (101.3 ± 1.5) kPa  
 Method of Calibration :-  
 IEC61672-3:2013.

### Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2787490	AA-1012-23	12 November 2024
2) Arbitrary Function Generator	AFG2021	C010063	CK20230040EA	26 June 2024
3) Programmable Attenuator	PA5	2755	EF-0040-23	1 October 2024
4) 6.5 Digit precision multimeter	8846A	9609027	CB20230108EB	8 June 2024
5) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P230024 CD20230196EA	20 March 2024 23 July 2024
6) Pressure humidity and Temperature Transmitter	PTU301	F0640003	CL1-P230032 CD20230197EA	4 April 2024 23 July 2024
7) Performance Audio Analyzer	U8903B	MY56510003	CB20240035EA CK20230072EA	13 February 2025 13 September 2024

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

3. This certification is traceable to the international system of unit maintained at :-

Reference standards instrument for Acoustic function

- National Institute of Metrology (Thailand)

Reference standards instrument for Electrical function

- National Institute of Metrology (Thailand)

- Electrical and Electronics Institute; NSC Accredited Calibration No.0119

### Result of Calibration:-

Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
-	-	-	-



Certificate No.: CP20240127EA

## Calibration Report

Function : 2. Self-generated Noise

### 2.1 Microphone Installed

Measured value (dB)
21.6

### 2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	17.0
C-weighting	24.7
Z-weighting	31.7

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)

Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.1	-0.2	0.0	±1.5
1000	-0.2	-0.2	-0.2	±1.0
8000	-0.2	-0.1	0.1	±5.0

Function : 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	-0.1	-0.2	0.0	±2.0
125	0.1	-0.2	0.0	±1.5
250	0.0	-0.1	0.0	±1.5
500	0.1	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	-0.1	0.0	0.0	±2.0
4000	-0.4	-0.3	-0.1	±3.0
8000	-0.5	-0.4	-0.1	±5.0

Certificate No.: CP20240127EA

### Calibration Report

Function : 5. Frequency and time weighting at 1 kHz

#### 5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2

#### 5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability

Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.3

Function : 7. Level Linearity on the reference level range

#### 7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.0	0.0	±1.1
120.0	120.0	0.0	±1.1
121.0	121.0	0.0	±1.1

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### 7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	68.9	-0.1	±1.1
64.0	63.8	-0.2	±1.1
59.0	58.8	-0.2	±1.1
54.0	53.8	-0.2	±1.1
49.0	48.8	-0.2	±1.1
44.0	43.8	-0.2	±1.1
39.0	38.8	-0.2	±1.1
34.0	33.9	-0.1	±1.1
33.0	33.0	0.0	±1.1
32.0	32.0	0.0	±1.1
31.0	31.1	0.1	±1.1
30.0	30.2	0.2	±1.1

Function : 8. Level Linearity including level range control

### 8.1. Level Linearity Including the Level Range (Reference Signal)

Range	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
20-100	94.0	94.0	0.0	±1.1
20-110	94.0	94.0	0.0	±1.1
30-120	94.0	94.0	0.0	±1.1
40-130	94.0	94.0	0.0	±1.1

### 8.2. Level Linearity Including the Level range (5dB Above Under-range)

Range	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
20-80	25.0	25.4	0.4	±1.1
20-90	25.0	25.4	0.4	±1.1
20-100	25.0	25.5	0.5	±1.1
20-110	25.0	25.3	0.3	±1.1
30-120	35.0	35.0	0.0	±1.1
40-130	45.0	45.0	0.0	±1.1

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Function : 9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	116.0	0.0	±1.0
	2	98.9	-0.1	+1.0 ; -2.5
	0.25	89.8	-0.2	+1.5 ; -5.0
Slow	200	109.4	-0.2	±1.0
	2	89.8	-0.2	+1.0 ; -5.0
LAE	200	109.9	-0.1	±1.0
	2	90.0	0.0	+1.0 ; -2.5
	0.25	80.8	-0.2	+1.5 ; -5.0

Function : 10. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	125.4	125.3	-0.1	±3.0
Positive half cycle	124.4	124.2	-0.2	±2.0
Negative half cycle	124.4	124.2	-0.2	±2.0

Function : 11. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
-	-	-	-

Function : 12. High-Level Stability

High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	129.0	129.0	0.0	±0.3

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#### Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Level Linearity including level range control	0.30	0.30
9) Tone burst response	0.20	0.30
10) Peak C sound level	0.20	0.35
11) Overload indication	0.20	0.25
12) High-Level Stability	0.10	0.10

- Remarks:
1. Indication at the calibration check frequency can not measured because customer does not provide a sound calibrator.
  2. Overload indication can not measured because sound level meter can not set to Reference value of the standard calibration.
  3. The acceptance limit is for the deviated value.
  4. Acceptance limits was IEC61672-3:2013 Class 2.
  5. The coverage factor  $k = 2.00$

- - End of Report - -