ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือฯ

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

ANAB ANSI National Accreditation Board ACCREDITED CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2402038-3
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Light Meter
Manufacturer	:	Extech
Model	:	407026
Serial Number	:	A.055562
Control Number	:	LH-02-008
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPP-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : M. Teaw

Approved by :
(Mr. Chanat Mongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-3

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Standard Light Meter	210801715	5523631030457536	Nov 1, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-3

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

Appearance and Function of Use Inspection : GOOD

Luminance Accuracy Test

Unit : Lux

Range	STD. Value	UUC. Reading	Correction	(±) Uncertainty
2000	25.10	25	0.10	2.3
	200.2	197	3.2	11
	1004	990	14	44
	1801	1786	15	79
20000	2009	1910	99	88
	3008	2870	138	132
	5000	4800	200	220

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC
TH

FORTH CALIBRATION & SERVICE CO., LTD.
305/47 Soi Ramintra 123, Ramintra Rd., Minburi, Minburi, Bangkok 10510
Tel. 0-2948-6668, 0-2517-6650-1 Fax. 0-2517-6674
E-mail: forthcalibration@gmail.com
www.forthcal.com

ilac-MRA ANAB ACCREDITED CALIBRATION LABORATORY AC-3041

CERTIFICATE OF CALIBRATION

Certificate No. : 66S1031-25 Job No. : 66S1031 Page : 1 of 2

Customer	: C.E.M. Technology (Thailand) Co.,Ltd.		
Address	: 31/8 Moo 13, Raikhing, Samphran, Nakhornpathom 73210		
Location	: Laboratory		
Equipment	: Sound Level Meter	Ambient temperature	: (20 ± 2) °C
Manufacturer	: ACO	Relative humidity	: (50 ± 15) %
Model	: 6236	Atmospheric pressure	: -
Serial No.	: 222128	Date of received	: 26-Oct-2023
Identity No.	: NS-03-013	Date of calibration	: 30-Oct-2023
Range	: See to Data	Date of issued	: 01-Nov-2023

Calibration Method : This instrument was calibrated by comparison measurement with sound level calibrator, according to in house calibration method.

Reference Standard Instruments :

Equipment	Model	Serial No.	Certification No.	Due Date
Sound Level Calibrator	8930B	2000210	EEL.BP.40/0666	21-Jun-2025

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

Calibrated By : *Mr. Boonyarit Auejirakarn*

Approved By :
[ ] Ms. Bhacharin Phanangkaew (MD)
[ ] Mr. Boonyarit Auejirakarn

Reviewed By : [ ] Mr. Sompong Srisert
[ ] Ms. Natthaprakarn Thammaphan

The reported expanded uncertainty is based uncertainty multipied by a coverage factor k = 2, providing a level of confidence appoximately 95%
This result relates only to the item calibrated. The certificate shall not be reproduced except in full, without the written approval of the calibration director.

Result of Calibration : Without Adjustment

Function : Sound Level Measurement

Calibration Range : @ 1 kHz

Resolution : 0.1 dB / 1 dB

Response	Standard Setting (dB)	UUC Reading (dB)	Error Value (dB)	Uncertainty (+/-dB)
A	94	94.0	0.0	0.20
	104	104.0	0.0	0.20
	114	114.0	0.0	0.20
C	94	94.0	0.0	0.20
	104	104.0	0.0	0.20
	114	114.0	0.0	0.20
Z	94	93.9	-0.1	0.20
	104	103.9	-0.1	0.20
	114	113.9	-0.1	0.20

UUC = Unit Under Calibration*

- The End -

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www.forthcal.com

ilac-MRA ANAB ACCREDITED CALIBRATION LABORATORY AC-3041

CERTIFICATE OF CALIBRATION

Certificate No. : 66S1031-24 Job No. : 66S1031 Page : 1 of 2

Customer	: C.E.M. Technology (Thailand) Co.,Ltd.		
Address	: 31/8 Moo 13, Raikhing, Samphran, Nakhornpathom 73210		
Location	: Laboratory		
Equipment	: Sound Level Meter	Ambient temperature	: (20 ± 2) °C
Manufacturer	: ACO	Relative humidity	: (50 ± 15) %
Model	: 6236	Atmospheric pressure	: -
Serial No.	: 222129	Date of received	: 26-Oct-2023
Identity No.	: NS-03-014	Date of calibration	: 30-Oct-2023
Range	: See to Data	Date of issued	: 01-Nov-2023

Calibration Method : This instrument was calibrated by comparison measurement with sound level calibrator, according to in house calibration method.

Reference Standard Instruments :

Equipment	Model	Serial No.	Certification No.	Due Date
Sound Level Calibrator	8930B	2000210	EEL.BP.40/0666	21-Jun-2025

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

Calibrated By : *Mr. Boonyarit Auejirakarn*

Approved By :
[ ] Ms. Bhacharin Phanangkaew (MD)
[✓] Mr. Boonyarit Auejirakarn

Reviewed By : [ ] Mr. Sompong Srisert
[✓] Ms. Natthaprakarn Thammaphan

The reported expanded uncertainty is based uncertainty multipied by a coverage factor k = 2, providing a level of confidence appoximately 95%
This result relates only to the item calibrated. The certificate shall not be reproduced except in full, without the written approval of the calibration director.

Result of Calibration : Without Adjustment

Function : Sound Level Measurement

Calibration Range : @ 1 kHz

Resolution : 0.1 dB / 1 dB

Response	Standard Setting (dB)	UUC Reading (dB)	Error Value (dB)	Uncertainty (+/-dB)
A	94	94.1	0.1	0.20
	104	104.2	0.2	0.20
	114	114.2	0.2	0.20
C	94	94.1	0.1	0.20
	104	104.1	0.1	0.20
	114	114.1	0.1	0.20
Z	94	94.1	0.1	0.20
	104	104.1	0.1	0.20
	114	114.1	0.1	0.20

UUC = Unit Under Calibration*

- The End -

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ANAB ACCREDITED CALIBRATION LABORATORY AC-3041

CERTIFICATE OF CALIBRATION

Certificate No. : 66S1229-11 Job No. : 66S1229 Page : 1 of 2

Customer	: C.E.M. Technology (Thailand) Co.,Ltd.		
Address	: 31/8 Moo 13, Raikhing, Samphran, Nakhornpathom 73210		
Location	: Laboratory		
Equipment	: Sound Level Meter	Ambient temperature	: (20 ± 2) °C
Manufacturer	: ACO	Relative humidity	: (50 ± 15) %
Model	: 6236	Atmospheric pressure	: -
Serial No.	: 222185	Date of received	: 12-Dec-2023
Identity No.	: NS-03-015	Date of calibration	: 15-Dec-2023
Range	: See to Data	Date of issued	: 18-Dec-2023

Calibration Method : This instrument was calibrated by comparison measurement with sound level calibrator, according to in house calibration method.

Reference Standard Instruments :

Equipment	Model	Serial No.	Certification No.	Due Date
Sound Level Calibrator	8930B	2000210	EEL.BP.40/0666	21-Jun-2025

Traceability : This certification is traceable to the International System of Unit maintained at : -

- National Institute of Metrology Thailand, (NIMT).

Calibrated By : *Mr. Boonyarit Auejirakarn*

Approved By :

[ ] Ms. Bhacharin Phanangkaew (MD)

[ ] Mr. Boonyarit Auejirakarn

Reviewed By : [ ] Mr. Sompong Srisert

[ ] Ms. Natthaprakarn Thammaphan

The reported expanded uncertainty is based uncertainty multipied by a coverage factor k = 2, providing a level of confidence appoximately 95%

This result relates only to the item calibrated. The certificate shall not be reproduced except in full, without the written approval of the calibration director.

Result of Calibration : Without Adjustment

Function : Sound Level Measurement

Calibration Range : @ 1 kHz

Resolution : 0.1 dB / 1 dB

Response	Standard Setting (dB)	UUC Reading (dB)	Error Value (dB)	Uncertainty (+/-dB)
A	94	94.5	0.5	0.20
	104	104.5	0.5	0.20
	114	114.5	0.5	0.20
C	94	94.5	0.5	0.20
	104	104.4	0.4	0.20
	114	114.4	0.4	0.20
Z	94	94.5	0.5	0.20
	104	104.4	0.4	0.20
	114	114.4	0.4	0.20

UUC = Unit Under Calibration*

- The End -

ELECTRICAL AND ELECTRONICS INSTITUTE
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Tel: +66 2709 4860 Fax: +66 2324 0917

NSC-TISI-TIS 17025
CALIBRATION 0119

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

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

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

ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

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

สถาบันไฟฟ้าและอิเล็กทรอนิกส์
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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 - -

สถาบันไฟฟ้าและอิเล็กทรอนิกส์
ELECTRICAL AND ELECTRONICS INSTITUTE

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ilac-MRA

NSC-TISI-TIS 17025
CALIBRATION 0119

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

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

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

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FOUNDATION FOR INDUSTRIAL DEVELOPMENT

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

Certificate No.: CP20240127EA

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	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

ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20240127EA

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	80.8	-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

Certificate No.: CP20240127EA

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 - -

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NSC-TISI-TIS 17025
CALIBRATION 0119

Certificate No.: CP20240128EA
Operation No.: CP2024030097

Certificate of Calibration

Equipment:	Sound Level Meter
Manufacturer:	ACO
Model/Type:	6236 (Meter), 7052NR (Microphone), - (Preamplifier)
Serial No.:	222189 (Meter), 84153 (Microphone), - (Preamplifier)
ID No.:	NS-03-019
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:	18 - 19 March 2024
Issued Date:	21 March 2024
Calibrated by:	Ms. Juntaporn Kunhakom

Approved by: _____
(Mr. Sittichai Swaksuriyawong)
Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

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.: CP20240128EA

Calibration Report

Equipment:	Sound Level Meter
Manufacturer:	ACO
Model/Type:	6236 (Meter), 7052NR (Microphone), - (Preamplifier)
Serial No.:	222189 (Meter), 84153 (Microphone), - (Preamplifier)
ID No.:	NS-03-019
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.: CP20240128EA

Calibration Report

Function : 2. Self-generated Noise

2.1 Microphone Installed

Measured value (dB)
20.7

2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	17.2
C-weighting	24.8
Z-weighting	32.1

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	0.2	0.1	0.1	±1.5
1000	-0.2	-0.2	-0.2	±1.0
8000	-0.5	-0.4	-0.3	±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	0.0	-0.2	0.1	±1.5
250	0.0	0.0	0.0	±1.5
500	0.1	0.0	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	-0.1	0.0	0.0	±2.0
4000	-0.3	-0.3	0.0	±3.0
8000	-0.5	-0.4	-0.2	±5.0

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Certificate No.: CP20240128EA

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.: CP20240128EA

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	43.9	-0.1	±1.1
39.0	38.9	-0.1	±1.1
34.0	34.0	0.0	±1.1
33.0	33.1	0.1	±1.1
32.0	32.2	0.2	±1.1
31.0	31.3	0.3	±1.1
30.0	30.4	0.4	±1.1
29.0	29.5	0.5	±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	25.3	0.3	±1.1
20-90	25.0	25.3	0.3	±1.1
20-100	25.0	25.2	0.2	±1.1
20-110	25.0	25.5	0.5	±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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Certificate No.: CP20240128EA

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	89.9	-0.1	+1.5 ; -5.0
Slow	200	109.5	-0.1	±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	125.4	0.0	±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	Acceptance limits
Positive one-half cycle	Negative one-half cycle	(dB)	(dB)
-	-	-	-

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.: CP20240128EA

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 - -

SMART TECH CALIBRATION & SERVICES CO., LTD.
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THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

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ANAB
ANSI National Accreditation Board
ACCREDITED
CALIBRATION LABORATORY
AC-3093

Certificate of Calibration

Certificate No. STCR-2403049-14
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340890
Control Number	:	NS-09-001
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024 **Approved by :**
Calibrated by : M. Sakchai

(Mr.Chavit Mongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-14

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-14

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	74.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	94.6 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	74.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	94.4 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC
TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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ACCREDITED
CALIBRATION LABORATORY
AC-3093

Certificate of Calibration

Certificate No. STCR-2403049-15
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340891
Control Number	:	NS-09-002
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024

Calibrated by : M. Sakchai

Approved by :

(Mr. Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-15

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-15

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	90.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	110.6 dB	114.1 dB	-0.03 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	90.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	110.5 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2403049-16
Work Order No. STCR-2403049
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340892
Control Number	:	NS-09-003
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024 **Approved by :**

Calibrated by : M. Sakchai

(Mr. Chaiyut Wongpleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-16 Page 2 of 3

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-16

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	95.1 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	115.0 dB	114.0 dB	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	95.0 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.0 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2403049-17
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340894
Control Number	:	NS-09-005
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024 **Approved by :**

Calibrated by : M. Sakchai

(Mr.Chaiya Wongleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-17

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-17

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	89.9 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	110.0 dB	114.0 dB	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	90.0 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	110.0 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2403049-18
Work Order No. STCR-2403049
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340895
Control Number	:	NS-09-006
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024 **Approved by :**

Calibrated by : M. Sakchai

(Mr. Thanin Wongleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-18

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-18

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	66.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	86.3 dB	114.0 dB	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	66.5 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	86.3 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2403049-19
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340896
Control Number	:	NS-09-007
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024

Calibrated by : M. Sakchai

Approved by :

(Mr. Chayut Mongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-19

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-19

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	98.2 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	117.5 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	98.1 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	117.6 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2403049-20
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Scarlet Tech
Model	:	ST-25D
Serial Number	:	10340897
Control Number	:	NS-09-008
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of issue : Mar 20, 2024 **Approved by :**
Calibrated by : M. Sakchai
(Mr. [illegible] Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-20

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-20

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	92.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.6 dB	114.0 dB	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
Auto	94.09 dB	92.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.0 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-10
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	170200093
Control Number	:	NS-06-002
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : S. Sompoch

Approved by :
(Mr. [illegible] Kleeang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-10

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-10

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.0 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	111.4 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	92.0 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	111.5 dB	114.1 dB	-0.03 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	91.5 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	111.4 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	91.5 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	111.4 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2310045-7
Work Order No. STCR-2310045

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	170400006
Control Number	:	NS-06-004
Received Date	:	Oct 18, 2023
Calibration Date	:	Oct 24, 2023
Recommended Due Date	:	Oct 24, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

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Date of Issue : Oct 25, 2023
Calibrated by : S. Sompoch

Approved by :

(Ms.Orayat Wongsang)
Laboratory Manager

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2310045-7

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	551220085447862	Nov 2, 2023	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Bord.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2310045-7

UUC Range : (30 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	93.9 dB	-	0.17 dB	0.40 dB
	114.05 dB	113.8 dB	-	0.25 dB	0.40 dB
SLOW	94.07 dB	94.1 dB	-	-0.03 dB	0.40 dB
	114.05 dB	113.8 dB	-	0.25 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	93.8 dB	-	0.27 dB	0.40 dB
	114.05 dB	113.8 dB	-	0.25 dB	0.40 dB
SLOW	94.07 dB	93.8 dB	-	0.27 dB	0.40 dB
	114.05 dB	113.8 dB	-	0.25 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2311033-3
Work Order No. STCR-2311033
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	Tenmars
Model	:	ST-130
Serial Number	:	220100166
Control Number	:	NS-06-005
Received Date	:	Nov 15, 2023
Calibration Date	:	Nov 16, 2023
Recommended Due Date	:	Nov 16, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
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Date of Issue : Nov 17, 2023
Calibrated by : A. Somchai

Approved by :

(M.C. Sayut Wongleang)
Laboratory Manager

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2311033-3

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Bord.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2311033-3

UUC Range : (70 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.9 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.9 dB	113.8 dB	0.27 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.0 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.0 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2310045-8
Work Order No. STCR-2310045

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100167
Control Number	:	NS-06-006
Received Date	:	Oct 18, 2023
Calibration Date	:	Oct 24, 2023
Recommended Due Date	:	Oct 24, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
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Date of Issue : Oct 25, 2023
Calibrated by : S. Sompoch

Approved by :
(Mr.Chayut Wongkeang)
Laboratory Manager

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2310045-8

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	551220085447862	Nov 2, 2023	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2310045-8

UUC Range : (30 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	94.5 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	114.3 dB	114.0 dB	0.05 dB	0.40 dB
SLOW	94.07 dB	94.5 dB	94.1 dB	-0.03 dB	0.40 dB
	114.05 dB	114.5 dB	114.0 dB	0.05 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	94.3 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	114.1 dB	114.1 dB	-0.05 dB	0.40 dB
SLOW	94.07 dB	94.3 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	114.1 dB	114.1 dB	-0.05 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2310045-9
Work Order No. STCR-2310045

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100168
Control Number	:	NS-06-007
Received Date	:	Oct 18, 2023
Calibration Date	:	Oct 24, 2023
Recommended Due Date	:	Oct 24, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
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Date of Issue : Oct 25, 2023
Calibrated by : S. Sompoch

Approved by :
(Mr.Chavin Wongleang)
Laboratory Manager

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2310045-9

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	551220085447862	Nov 2, 2023	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2310045-9

UUC Range : (30 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	91.5 dB	94.1 dB	-0.03 dB	0.40 dB
	114.05 dB	111.3 dB	114.0 dB	0.05 dB	0.40 dB
SLOW	94.07 dB	91.6 dB	94.1 dB	-0.03 dB	0.40 dB
	114.05 dB	111.5 dB	114.0 dB	0.05 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	91.4 dB	94.2 dB	-0.13 dB	0.40 dB
	114.05 dB	111.2 dB	114.1 dB	-0.05 dB	0.40 dB
SLOW	94.07 dB	91.4 dB	94.2 dB	-0.13 dB	0.40 dB
	114.05 dB	111.2 dB	114.1 dB	-0.05 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

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Certificate of Calibration

Certificate No. STCR-2402038-5
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100180
Control Number	:	NS-06-012
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
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Date of Issue : Feb 22, 2024
Calibrated by : S. Sompoch

Approved by :
(Mr. Thanachai Mueangleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-5

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-5

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.2 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	95.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.2 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.5 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.3 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	95.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.3 dB	113.9 dB	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-6
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100189
Control Number	:	NS-06-013
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024 **Approved by :**
Calibrated by : S. Sompoch ([illegible] Wongleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-6

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-6

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.1 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	94.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.1 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.2 dB	114.0 dB	0.07 dB	0.40 dB
SLOW	94.09 dB	94.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.2 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-7
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100197
Control Number	:	NS-06-014
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : S. Sompoch

Approved by :
(Mr. [illegible] Wongleang)
Laboratory Manager

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Calibration Report
Smart Tech Calibration & Services Co., Ltd.

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-7

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	90.2 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	110.9 dB	114.0 dB	0.07 dB	0.40 dB
SLOW	94.09 dB	90.2 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	110.9 dB	114.0 dB	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	90.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	110.3 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	90.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	110.3 dB	113.9 dB	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-8
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100018
Control Number	:	NS-06-015
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : S. Sompoch

Approved by :
([illegible] Meeleang)
Laboratory Manager

@smarttecbcal

Calibration Report
Smart Tech Calibration & Services Co., Ltd.

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-8

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.1 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	95.2 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.1 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.5 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	95.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.3 dB	113.9 dB	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-9
Work Order No. STCR-2402038
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100017
Control Number	:	NS-06-016
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024 **Approved by :**
Calibrated by : S. Sompoch

(Mingleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-9

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

This calibration is traceable to the International System of Unit via :
- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-9

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.5 dB	114.0 dB	0.07 dB	0.40 dB
SLOW	94.09 dB	95.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.5 dB	114.0 dB	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.5 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	95.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	115.6 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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ANAB ANSI National Accreditation Board ACCREDITED CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2403049-8
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Ratkhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100035
Control Number	:	NS-06-024
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024
Calibrated by : M. Sakchai

Approved by :
(Mr.Chanin Wattleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-8

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-8

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.5 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.3 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	92.5 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.3 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.9 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.4 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	92.9 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.4 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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SMART TECH CALIBRATION & SERVICES CO., LTD.
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Certificate of Calibration

Certificate No. STCR-2403049-9
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100036
Control Number	:	NS-06-025
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
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5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024
Calibrated by : M. Sakchai

Approved by :
([illegible] Wongleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-9

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-9

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	90.8 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	111.1 dB	114.2 dB	-0.13 dB	0.40 dB
SLOW	94.09 dB	90.8 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	111.2 dB	114.2 dB	-0.13 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	91.0 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	111.1 dB	114.0 dB	0.07 dB	0.40 dB
SLOW	94.09 dB	91.0 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	111.1 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2403049-10
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Noise Dose Meter
Manufacturer	:	SOUNDTEK
Model	:	ST-130
Serial Number	:	220100037
Control Number	:	NS-06-026
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01

Environmental Conditions

Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024 **Approved by :**
Calibrated by : M. Sakchai
(Sakchai Wongleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-10

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-10

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.7 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.6 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	93.8 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.6 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	95.5 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	115.5 dB	114.0 dB	0.07 dB	0.40 dB
SLOW	94.09 dB	95.5 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	115.5 dB	114.0 dB	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



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ANAB ACCREDITED CALIBRATION LABORATORY AC-3083

Certificate of Calibration

Certificate No. STCR-2402038-16
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	Jantytech
Model	:	JT2011-E2
Serial Number	:	352221402
Control Number	:	HT-03-017
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : A. Somchai

Approved by : (Mr. Chai Mee Leang) Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-16

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-16

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.016	15.0	0.016	0.16
25.020	25.0	0.020	0.16
40.011	40.0	0.011	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.019	15.1	-0.081	0.16
25.015	25.1	-0.085	0.16
40.017	40.0	0.017	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.018	15.2	-0.182	0.16
25.016	25.1	-0.084	0.16
40.012	40.1	-0.088	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



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Certificate of Calibration

Certificate No. STCR-2402038-15
Work Order No. STCR-2402038
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	Jantytech
Model	:	JT2011-E2
Serial Number	:	352221403
Control Number	:	HT-03-018
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : A. Somchai

Approved by :

CALIBRATION STC
(...) Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-15

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-15

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.014	15.1	-0.086	0.16
25.011	25.1	-0.089	0.16
40.013	40.1	-0.087	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.019	15.1	-0.081	0.16
25.010	25.1	-0.090	0.16
40.012	40.0	0.012	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.016	15.1	-0.084	0.16
25.013	25.1	-0.087	0.16
40.015	40.0	0.015	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-17
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	Jantytech
Model	:	JT2011-E2
Serial Number	:	352221404
Control Number	:	HT-03-019
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : A. Somchai

Approved by :
(Mr. [illegible] Thongsang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-17

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

This calibration is traceable to the International System of Unit via :
- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-17

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.010	15.1	-0.090	0.16
25.015	25.1	-0.085	0.16
40.013	40.0	0.013	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.015	15.0	0.015	0.16
25.011	25.1	-0.089	0.16
40.010	40.1	-0.090	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.014	15.2	-0.186	0.16
25.016	25.1	-0.084	0.16
40.013	40.1	-0.087	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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Certificate of Calibration

Certificate No. STCR-2402038-13
Work Order No. STCR-2402038

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	Jantytech
Model	:	JT2011-E2
Serial Number	:	352221405
Control Number	:	HT-03-020
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11

Environmental Conditions

Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : A. Somchai

Approved by :
([illegible])
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-13

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-13

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.020	14.9	0.120	0.16
25.016	25.0	0.016	0.16
40.011	40.0	0.011	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.017	14.9	0.117	0.16
25.011	25.0	0.011	0.16
40.013	40.1	-0.087	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.016	15.0	0.016	0.16
25.015	25.1	-0.085	0.16
40.013	40.1	-0.087	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

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AC-3093

Certificate of Calibration

Certificate No. STCR-2402038-18
Work Order No. STCR-2402038
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	Jantytech
Model	:	JT2011-E2
Serial Number	:	352221406
Control Number	:	HT-03-021
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : A. Somchai

Approved by :
([illegible])
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-18

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-18

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.010	14.9	0.110	0.16
25.015	24.9	0.115	0.16
40.013	39.9	0.113	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.015	14.9	0.115	0.16
25.011	25.0	0.011	0.16
40.010	39.9	0.110	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.014	15.0	0.014	0.16
25.016	25.0	0.016	0.16
40.013	39.9	0.113	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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THANYABURI, PATHUM THANI 12110, THAILAND
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ANAB ACCREDITED CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2403049-21
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	JANTYTECH
Model	:	JT2011-E2
Serial Number	:	352221407
Control Number	:	HT-03-022
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024
Calibrated by : A. Somchai

Approved by : (Mr. Wat Wanbloang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-21

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-21

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.009	15.0	0.009	0.16
25.012	24.9	0.112	0.16
40.008	39.9	0.108	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.009	15.0	0.009	0.16
25.009	24.9	0.109	0.16
40.012	39.9	0.112	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.013	15.1	-0.087	0.16
25.011	25.1	-0.089	0.16
40.014	40.0	0.014	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

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Certificate of Calibration

Certificate No. STCR-2403049-22
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	JANTYTECH
Model	:	JT2011-E2
Serial Number	:	352221408
Control Number	:	HT-03-023
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024 **Approved by :**
Calibrated by : A. Somchai
(Mr. [illegible] Thongsang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-22

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-22

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.014	15.0	0.014	0.16
25.020	24.9	0.120	0.16
40.018	39.9	0.118	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.012	15.0	0.012	0.16
25.015	25.0	0.015	0.16
40.015	39.9	0.115	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.019	15.0	0.019	0.16
25.020	25.1	-0.080	0.16
40.016	40.1	-0.084	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

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AC-3093

Certificate of Calibration

Certificate No. STCR-2403049-23
Work Order No. STCR-2403049
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	JANTYTECH
Model	:	JT2011-E2
Serial Number	:	352221409
Control Number	:	HT-03-024
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
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5. This results of this report only to the items calibrated.

Date of Issue : Mar 21, 2024
Calibrated by : A. Somchai

Approved by :
(Mr. Thanyaluk Tongleang)
Laboratory Manager

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-23

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

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

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-23

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.012	15.0	0.012	0.16
25.022	25.0	0.022	0.16
40.013	40.0	0.013	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.014	15.0	0.014	0.16
25.016	25.0	0.016	0.16
40.012	39.9	0.112	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.015	15.0	0.015	0.16
25.022	25.0	0.022	0.16
40.011	40.1	-0.089	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

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Certificate of Calibration

Certificate No. STCR-2403049-24
Work Order No. STCR-2403049

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Ratkhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	JANTYTECH
Model	:	JT2011-E2
Serial Number	:	352221410
Control Number	:	HT-03-025
Received Date	:	Mar 18, 2024
Calibration Date	:	Mar 19, 2024
Recommended Due Date	:	Mar 19, 2025
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 20, 2024
Calibrated by : A. Somchai

Approved by :
(Mr. Chaiya Mueangkleang)
Laboratory Manager

@smartechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-24

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Reference Thermometer Readout	250220030008	TMU2301636	Sep 11, 2024	ANAB : AC-2658
Secondary Reference PRT	04794	TMU2301636	Sep 10, 2024	ANAB : AC-2658
Temperature and Humidity Standard	LA-00002148	5523631030503907	Nov 20, 2024	ANAB : AC-1969

Traceability

This calibration is traceable to the International System of Unit via :
- ANAB : The ANSI National Accreditation Board.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2403049-24

Results of Calibration

1. Temperature measurement (Wet-bulb temperature) Range : 0 to 85 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.015	14.9	0.115	0.16
25.020	24.9	0.120	0.16
40.015	40.0	0.015	0.16

2. Temperature measurement (Dry-bulb temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.013	15.0	0.013	0.16
25.017	24.9	0.117	0.16
40.014	39.9	0.114	0.16

3. Temperature measurement (Black globe temperature) Range : 0 to 120 °C

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
15.013	15.1	-0.087	0.16
25.016	25.1	-0.084	0.16
40.015	40.0	0.015	0.16

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Soi 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-67/0020

MTC.No.23-67/0020-01

Number of page(s) 2

CALIBRATION CERTIFICATE

Nomenclature : **DRYCAL**

Manufacturer : BIOS International Corporation, USA.

Serial No.: 108158

Model : DCL-ML

Scale range : 50 ml/min to 2 l/min

Subdivision : (0.0001, 0.001, 0.01) l/min

Submitted by : **C.E.M.TECHNOLOGY (THAILAND) CO.,LTD.**

31/8 Moo 13 , Raikhing, Samphran,

Nakhornpathom 73210, Thailand.

Received date : 6 October 2023 **Condition of measured item :** Normal

Calibration date : 1 November 2023

Standard :

Standard	Certificate No.	Date due	Traceability
RTD Thermometer	PSL-T 643/65	1-Jun-24	TISTR
Molbox/PressureTransducer/UpStream	MP-0076-23	2-Apr-25	NIMT
Primary Flow Calibrator S/N 117982	MW-0034-23	11-Jun-25	NIMT
Primary Flow Calibrator S/N 119521	MW-0033-23	6-Jun-25	NIMT

Calibrated by : Terasak Panna

(Mr.Terasak Panna)

Approved by :

(Ms.Kirana Luanghirun)

Director

Mechanical Engineering Standards Laboratory

Ref. 20132661006039860O1

Issued Date 7 November 2023

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.

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Fax. (66) 0 2323 9165
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Office
196 Phahonyothin Road, Chatuchak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

TISTR
NSC-TISI-TIS 17025
CALIBRATION 0060

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Soi 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Calibration point : (0.05, 0.1, 0.2, 1, 2) l/min

Ambient condition : Temperature (23 ± 3) ℃ , Relative humidity (55 ± 15) %

Atmospheric pressure (1010±13) hPa

Calibration method : The flowmeter (UUC) was calibrated by comparison method with standard flowmeter according to CP-370.01.

The reported value is the value that converted to value at reference condition within pressure and temperature of the actual gas entering the UUC

Measurement data :

UUC Value (l/min)	Standard Value (l/min)	Temperature (℃)	Pressure (hPa)	Deviation (%)	Uncertainty (%)
0.0509	0.048870	24.850	1008.36	+4.16	1.00
0.1027	0.10016	24.851	1008.31	+2.54	1.00
0.2094	0.20688	24.730	1006.58	+1.20	1.00
1.009	1.0012	24.679	1006.77	+0.78	0.86
2.035	2.0198	24.542	1006.93	+0.73	0.86

The reported expanded uncertainties are based on standard uncertainties multiplied by a coverage factor *k*=2, which provides a level of confidence of approximately 95%.

The end of calibration certificate.

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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Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

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

S K SALES AND SERVICE CO.,LTD.
194/56, 194/57 Thakham Rd. Samae Dam
Bang Khun Thian Bangkok 10150
Tel. : 02-417-2144 Fax : 02-417-2155

ISC-TISI-TIS 17025 CALIBRATION 0261

Certificate of Calibration

Reference No.	:	C01580/2401-065	Certificate No.	: S2401-3006
Customer	:	C.E.M. TECHNOLOGY (THAILAND) CO.,LTD		Page 1 of 2
	:	31/8 Moo 13 Raikhing, Samphran,		
	:	Nakhorn Pathom 73210		
Equipment	:	Electronic Balance		
Manufacturer	:	OHAUS		
Model	:	SPX 1202		
Serial No.	:	C325357974		
ID No.	:	-		
Received Date	:	19 January 2024		
Calibrated Date	:	19 January 2024		
Issued Date	:	25 January 2024		

Environment	Minimum Value	Maximum Value
Ambient Temperature (°C)	30.0	30.9
Relative Humidity (% RH)	54	56
Atmospheric Pressure (mbar)	1011	1011

Place of Calibration : Warehouse

Calibrated by : Mr. Sarayut Lapkietsakul

Calibration Method

In-house method : SK-WI-08 base on UKAS Lab 14 Edition 6, July 2019

Guidance on the calibration of weighing machinesused in testing and calibration laboratories

Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Standard Weight Set F1	MASS-WE-25	23M91	15 January 2024

Condition of this result of calibration

1. This result of calibration was found accurate as shown on date and place of calibration for this item only
2. This certificate can be traceable to International System of Unit :
   - Through Technology Promotion Association (Thailand-Japan)

Approved by :

☐ Mr.Suphachai Saksri ☐ Mr.Phayak Tootit ☑ Miss Tantaraporn Pettong

The reported uncertainty is based on a standard uncertainty multiplied by a converage factor k = 2 providing a level of confidence level of approximately 95 %

This certificate may not be reproduced other than in full except with the prior written approval of the S K Sales And Service Company Limited.

Description of UUC

Capacity : 1200 g

Resolution : 0.01 g

Calibration Result

1.Repeatability of reading

Applied weight (g)	Standard Deviation of reading (g)
100	0.000
1000	0.000

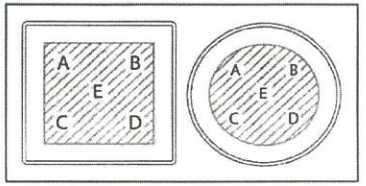
2.Departure from nominal value

Without adjustment

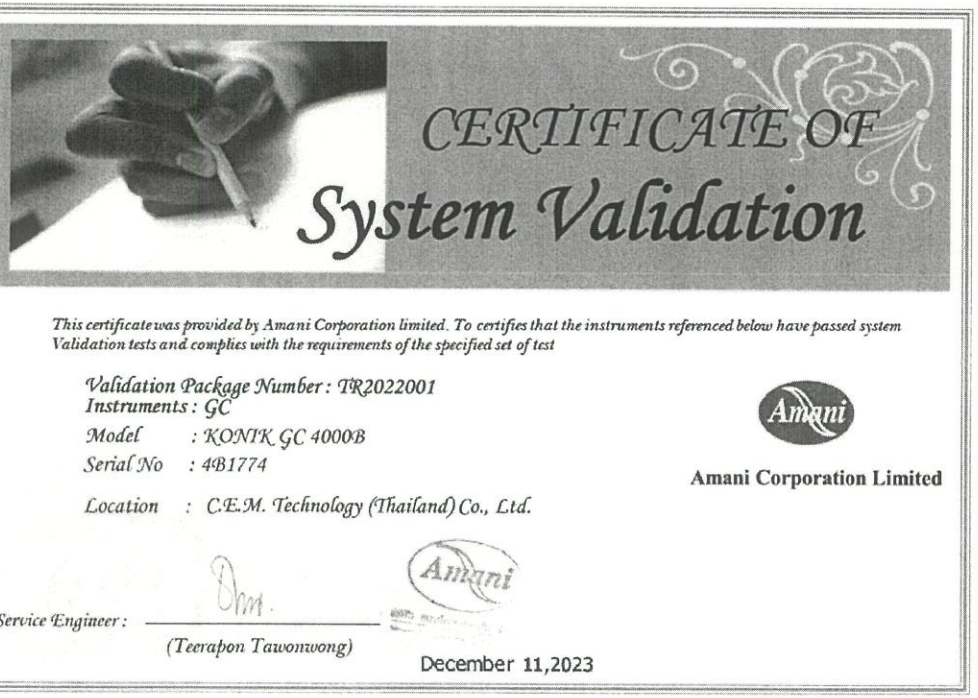
Applied weight (g)	Balance reading (g)	Correction (g)	Uncertainty (± g)
Zero setting	0.00	0.00	0.0082
1	1.00	0.00	0.0082
100	100.00	0.00	0.0082
200	200.00	0.00	0.0082
300	300.00	0.00	0.0082
400	400.00	0.00	0.0082
500	500.00	0.00	0.0083
600	600.00	0.00	0.0083
700	700.00	0.00	0.0091
800	800.00	0.00	0.0091
900	900.00	0.00	0.0091
1000	1000.00	0.00	0.0091
1200	1200.00	0.00	0.0091

3.Effect of off-center loading : Used weight 400 g was place to various position on the pan

Position	Balance reading (g)
E	400.00
A	400.00
B	400.00
C	400.00
D	400.00
Maximum Difference	0.00



** End of Calibration Report **



CERTIFICATE OF System Validation

This certificate was provided by Amani Corporation limited. To certifies that the instruments referenced below have passed system Validation tests and complies with the requirements of the specified set of test

Validation Package Number : TR2022001
Instruments : GC
Model : KONIK GC 4000B
Serial No : 4B1774
Location : C.E.M. Technology (Thailand) Co., Ltd.

Amani Corporation Limited

Service Engineer : _____
(Teerapon Tawonwong)

December 11,2023

Amani Corporation Limited.
201/220 MOO 6, PRAVATE, PRAVATE, BANGKOK 10250
TEL. 02-322 4421-3 FAX. 02-322 6705

Calibration Result

Instruments Information			
Calibration Package Number		TR2022001	
Instruments Type		Gas Chromatograph	
Serial Number	4B1774	Model	KONIK GC 4000B
Installation Date		End of Warranty	
S.O. Number		P.O. Number	
Firmware Version		DPFC Rom Ver.	
Left Injection	-	Right Injector	S/SL
Left DPFC	-	Right DPFC	-
Left Detector	-	Right Detector	FID
Left DGFC	-	Right DGFC	-
Auxiliary Detector	-	Valve/Valve Oven	-
Last Validation	December 11,2023	Next Validation	December 21,2024
Last Preventive Maintenance	December 11,2023	Next Preventive Maintenance	December 11,2024
Data System Type	N2000	Data System Version	3.1.1

Gases Information			
Injector			
Left Carrier	-	Right Carrier	Helium,3.0mL/min
Detector			
Left Detector	-	Right Detector	FID
Gas 1	-	Gas 1(Hydrogen)	Hydrogen,40mL/min
Gas 2	-	Gas 2 (Make-up)	Nitrogen,30mL/min
Gas 3	-	Gas 3 (Air)	Air Zero, 350mL/min

Service Engineer Signature: .....
(Teerapon Tawonwong)

Date: 11.12.2023

Amani Corporation Limited.
201/220 MOO 6, PRAVATE, PRAVATE, BANGKOK 10250
TEL. 02-322 4421-3 FAX. 02-322 6705

Gases Flow Rate Validation Result

Carrier Gases

Set point (mL/min)	Measured (mL/min)	Criteria (mL/min)	Status
25	25.0	24.0-26.0	☒ Passed ☐ Fail

Detector Gases

Reference Gas

Set point (mL/min)		Measured (mL/min)	Criteria (mL/min)	Status
Low	9	9.3	8.0-12.0	☒ Passed ☐ Fail
High	50	46.7	45.0-55.0	☒ Passed ☐ Fail

Make-up Gas

Set point (mL/min)		Measured (mL/min)	Criteria (mL/min)	Status
Low	9	9.7	8.0-12.0	☒ Passed ☐ Fail
High	30	31.3	28.0-32.0	☒ Passed ☐ Fail

Service Engineer Signature: .....
(Teerapon Tawonwong)

Date: 11.12.2023

Amani Corporation Limited.
201/220 MOO 6, PRAVATE, PRAVATE, BANGKOK 10250
TEL. 02-322 4421-3 FAX. 02-322 6705

Temperature Validation Result

Injector Temperature

Set point (°C)	Measured (°C)	Status	Note
60 +/- 1.0	60.0	☒ Passed ☐ Fail	

Detector Temperature

Block Temp

Set point (°C)	Measured (°C)	Status	Note
60 +/- 1.0	60.0	☒ Passed ☐ Fail	

Transfer Temp

Set point (°C)	Measured (°C)	Status	Note
60 +/- 1.0	60.0	☒ Passed ☐ Fail	

Column Oven

Set point (°C)	Measured (°C)	Status	Note
40 +/- 1	40.0	☒ Passed ☐ Fail	RTD OFFSET = 6.2
120 +/- 1	120.0	☒ Passed ☐ Fail	

Service Engineer Signature: .....
(Teerapon Tawonwong)

Date: 11.12.2023

Amani Corporation Limited.
201/220 MOO 6, PRAVATE, PRAVATE, BANGKOK 10250
TEL. 02-322 4421-3 FAX. 02-322 6705

Parts Referenced

Part	Description	Note
Analytical Column	Capillary Column RTX-5 Film : 0.25 um Length : 7 Meter Diameter : 0.32 mmID	Reference With : Restek
Standard Sample	FID Performance Evaluation Sample Kit	Manufactured By Agilent Technologies. 5080-8842 Lot: 0006604151
Sample Injection	Syringe 10 ul	Manufactured By SGE



Service Engineer Signature: .....
(Teerapon Tawonwong)

Date: 11.12.2023

Amani Corporation Limited.
201/220 MOO 6, PRAVATE, PRAVATE, BANGKOK 10250
TEL. 02-322 4421-3 FAX. 02-322 6705

Operating Condition

Parameter	Condition
Environmental	Temperature 25.0 °C Relative Humidity 45.7 °C
Instrument Condition	**Gases** - Carrier Gas : Helium = 1ml/min - Hydrogen = 35 ml/min - Air = 350 ml/min - Make-up Gas: Nitrogen = 30ml/min **Oven** - Initial Temperature = 50°C - Initial Time = 1 minute - Ramp 1 = 20 °C/minute - Final Temperature = 200°C - Final Time = 1 minute **Injector** - Operating Mode = Spilt - Temperature = 230 °C - Split Flow 40 ml/min - Purge Flow rate = 5 ml/min **Detector** - Base Temperature = 250 °C - Detector Signal Range = 10° **Injected Volume** - 1 µl + needle of Test Mixture

Service Engineer Signature: .....
(Teerapon Tawonwong)

Date: 11.12.2023

Certificate of Calibration

EQUIPMENT	:	ION SPECIFIC ELECTRODE
MANUFACTURER	:	HEWETT PACKARD
MODEL	:	ISE
SERIAL No.	:	16290
RECEIVED DATE	:	December 15, 2023
CALIBRATED DATE	:	December 16, 2023
EXPIRY DATE	:	December 14, 2024

1. CALIBRATION

1.1 OPTICAL : CHECK THAT PMT EHT IS WITHIN THE NORMAL OPERATING RANGE FOR SELECTED HC LAMP FOR COPPER AT 324.5 nm, 4 mA, 0.5 nm SLIT WIDTH,EHT = 246.6V.

1.2 ANALYTICAL PERFORMANCE

1.2.1 STANDARD SOLUTION COPPER FROM HIGHT- PURITY STANDARD CHEM SERVICE CO.,LTD.

1.2.2 CONDITLONS

POSIITIVE ION : 26.19 nm

NEGATIVE ION : 28.30 nm

FUEL FLOW RATE (ACETYLENE) : 1.8 l/min

OXIDANT FLOW RATE (AIR) : 12.3 l/min

CONCENTRATION (ppm)	SPECIFICATION (ABS)	READ (ABS)	REMARK
1	≥ 0.08	0.144	PASS
3	≥ 0.26	0.420	PASS
5	≥ 0.48	0.704	PASS

2. CHECK

INTERLOCK AND MICRO SWITCHES	☒	PASS	☐	FAIL
EXTERNAL OPTICAL SURFACES	☒	PASS	☐	FAIL
SENSITIVITY	☒	PASS	☐	FAIL

3. CLEAN & CHANGE

☒ CHANGE O-RINGS AND SEALS IN THE SPRAY CHAMBER.

☒ CLEAN THE SPRAY CHAMBER, LIQUID TRAP.

☒ CLEAN EXTERNALOPTICAL SURFACES.

This report certificates that all calibration equipment used in the test is traceable to Quest supervision and calibration procedure and applies only to the unit under EQUIPMENT above.

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Calibrated by .....

(Lee David. Technical Engineer)

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
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AC-3093

Certificate of Calibration

Certificate No. STCR-2311033-5
Work Order No. STCR-2311033

Customer Name : CEM Technology Thailand Co., Ltd.
31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210

Equipment Name	:	Sound Level Meter
Manufacturer	:	Pulsar
Model	:	44
Serial Number	:	PN2297
Control Number	:	NS-08-001
Received Date	:	Nov 15, 2023
Calibration Date	:	Nov 16, 2023
Recommended Due Date	:	Nov 16, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01

Environmental Conditions

Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Nov 17, 2023
Calibrated by : A. Somchai

Approved by :
(M. Somchai Wongsaeng)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2311033-5

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Bord.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2311033-5

UUC Range : (20 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.6 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	92.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.6 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.6 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	92.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	112.6 dB	113.9 dB	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TH

SMART TECH CALIBRATION & SERVICES CO., LTD.
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Certificate of Calibration

Certificate No. STCR-2307040-1
Work Order No. STCR-2307040

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	pulsar
Model	:	44
Serial Number	:	PN2308
Control Number	:	NS-08-002
Received Date	:	Jul 20, 2023
Calibration Date	:	Jul 21, 2023
Recommended Due Date	:	Jul 21, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co.,Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Jul 21, 2023 **Approved by :**
Calibrated by : S. Sompoch
(Mr.Chaiya Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co.,Ltd.

Certificate No.: STCR-2307040-1

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	551220085447862	Nov 2, 2023	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Bord.

STC TM

Calibration Report

Smart Tech Calibration & Services Co.,Ltd.

Certificate No.: STCR-2307040-1

UUC Range : (20 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	93.3 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	113.1 dB	113.9 dB	0.15 dB	0.40 dB
SLOW	94.07 dB	93.3 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	113.2 dB	113.9 dB	0.15 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.07 dB	93.4 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	113.2 dB	114.0 dB	0.05 dB	0.40 dB
SLOW	94.07 dB	93.3 dB	94.0 dB	0.07 dB	0.40 dB
	114.05 dB	113.2 dB	113.9 dB	0.15 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

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Certificate of Calibration

Certificate No. STCR-2311033-4
Work Order No. STCR-2311033
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Pulsar
Model	:	44
Serial Number	:	PN2319
Control Number	:	NS-08-003
Received Date	:	Nov 15, 2023
Calibration Date	:	Nov 16, 2023
Recommended Due Date	:	Nov 16, 2024
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

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Date of Issue : Nov 17, 2023
Calibrated by : A. Somchai

Approved by :
(Mr.Chayut Wongleang)
Laboratory Manager

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2311033-4

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Bord.

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Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2311033-4

UUC Range : (20 to 140) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.7 dB	93.9 dB	0.19 dB	0.40 dB
	114.07 dB	112.8 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	92.7 dB	93.9 dB	0.19 dB	0.40 dB
	114.07 dB	112.8 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.8 dB	93.9 dB	0.19 dB	0.40 dB
	114.07 dB	112.8 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	92.8 dB	93.9 dB	0.19 dB	0.40 dB
	114.07 dB	112.8 dB	113.9 dB	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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Certificate of Calibration

Certificate No. STCR-2402038-12
Work Order No. STCR-2402038
Page 1 of 3

Customer Name	:	CEM Technology Thailand Co., Ltd. 31/8 Moo.13 Raikhing Sub-district, Samphran District, Nakhonpathom, 73210
Equipment Name	:	Sound Level Meter
Manufacturer	:	Pulsar
Model	:	44
Serial Number	:	PN2362
Control Number	:	NS-08-004
Received Date	:	Feb 16, 2024
Calibration Date	:	Feb 21, 2024
Recommended Due Date	:	Feb 21, 2025
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Feb 22, 2024
Calibrated by : S. Sompoch

Approved by :

([illegible] Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-12

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975186	5523631030478623	Nov 9, 2024	ANAB : AC-1969

Traceability

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

- ANAB : The ANSI National Accreditation Board.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2402038-12

UUC Range : (30 to 130) dB Resolution : 0.1 dB

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

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.8 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.7 dB	114.0 dB	0.07 dB	0.40 dB
SLOW	94.09 dB	94.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.7 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

Trade & Engineering

TSP High Volume Sampler
TE-5000 TSP Sampler Verification

Site Information

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

Site Conditions

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

Calibration Orifice

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

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	7.40	1.675	60.5	58.62
2	5.90	1.496	56.7	54.94
3	4.80	1.351	52.2	50.58
4	4.00	1.234	46.7	45.25
5	3.50	1.155	40.3	39.05

Linear Regression

Slope: 36.1315
Intercept: -0.2465
Corr. Coeff: 0.9689

# of Observations: 5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC =I[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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

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

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

Trade & Engineering

PM10 High Volume Sampler Verification

Site Information

Location: -
Site ID: -
Date: 2 October 2023
Sampler: TE-6070 PM10
Serial No: 3115
Tech: Tong P.

Site Conditions

Barometric Pressure (in Hg): 26.60
Temperature (deg F): 75.3
Average Press. (in Hg): 26.65
Average Temp. (deg F): 76.5

Corrected Pressure (mm Hg): 675.6
Temperature (deg K): 297.1
Corrected Average (mm Hg): 676.9
Average Temp. (deg K): 297.7

Calibration Orifice

Make: Tisch Environmental, Inc.
Model: TE-5028A
Serial#: 1179

Qstd Slope: 1.58304
Qstd Intercept: -0.01520
Calibration Due Date: 12 Dec 23

Calibration Data

Plate or Test #	In H2O	Qa (m3/min)	I (chart)	IC (corrected)
1	9.80	1.321	60.5	40.12
2	7.35	1.145	55.7	36.93
3	6.60	1.086	50.8	33.68
4	5.35	0.978	45.5	30.17
5	4.60	0.908	39.3	26.06

Linear Regression
Slope 33.7625
Intercept -3.3283
Corr. Coeff 0.9758
SFR 1.130
SSP 52.50

# of Observations: 5

Calculations

Qa = 1/m(Sqrt((H2O)(Ta/Pa))-b)
IC = I(Sqrt(Ta/Pa))

Qa = actual flow rate
IC = corrected chart response
m = calibrator slope
b = calibrator intercept
Ta = actual temperature (deg K)
Pa = actual pressure (mm Hg)
For subsequent calculation of sampler flow:

SFR = 1.13(Ps/Pa)(Ta/Ts)
SSP = (m*SFR+b)(Sqrt(Pa/Ta))

SFR = sampler set point flow rate
SSP = sampler chart set point
m = sampler slope
b = sampler intercept
Ta = actual temperature (deg K)
Pa = actual pressure (mm Hg)
Ts = Average temperature (deg K)
Ps = Average pressure (mm Hg)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

Average I(chart): 50.4
Average Flow over Sample (m3/min)
1.088579793
Enter Total Time (Hrs): 24.0
Total flow over sample (m3/min)
1567.554902
Total flow over sample (CFM)
55350.36359

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

Trade & Engineering

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

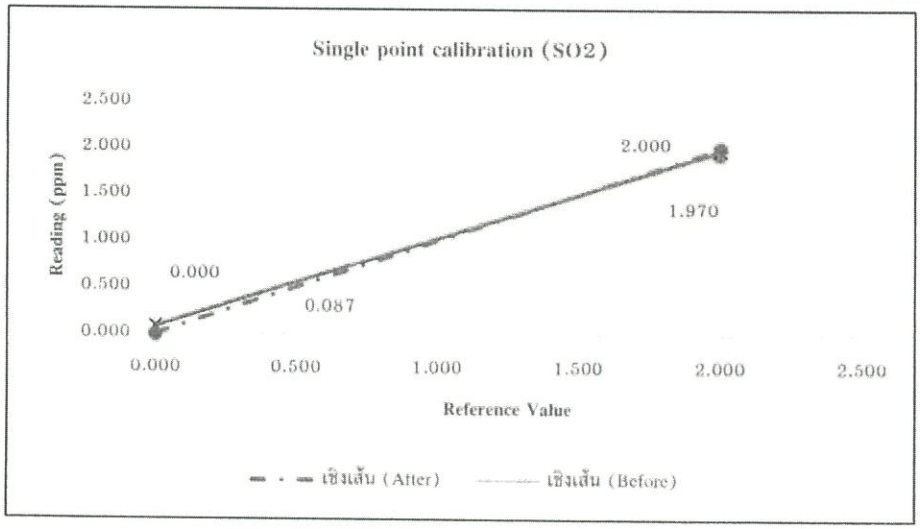
Gas Calibration	:	Thermo Environmental		Zero Air Generator	: API
Model	:	146C		Model	: 701
Serial No.	:	514811458		Serial No.	: 179

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)

Trade & Engineering

Certificate of Analyzer Performance Testing

Calibrated Date : 26-Aug-23

Certificate No. : 0823-001

Analyzer Instruments

Analyzer Type	:	NO/NO/NOx Analyzer	Manufacturer	:	Thermo Environmental
Model	:	42C	Serial No.	:	66193-351

Environmental

Temperature	:	25.3	°C
Humidity	:	40.2	%RH

Calibration System

Calibrator Units

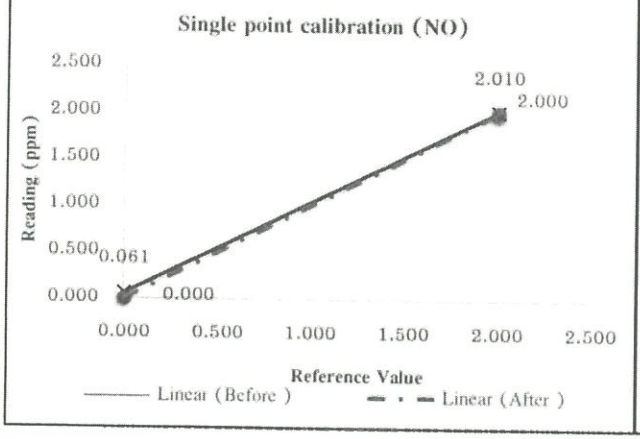
Gas Calibration	:	Thermo Environmental	Zero Air Generator	:	API
Model	:	146C	Model	:	701
Serial No.	:	514811458	Serial No.	:	179

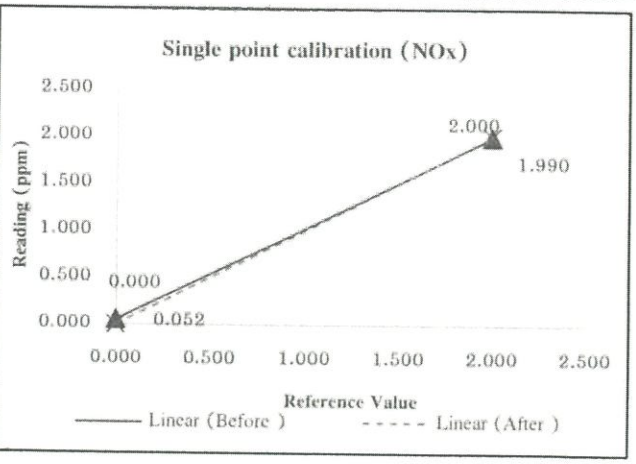
Standard Gas

NO Conc.	:	2	ppm	Cylinder No.	:	CC750227
SO2	:	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						
NO	0.061	0.000	0.06	2.01	2.00	0.50
NOx	0.052	0.000	0.05	1.99	2.00	-0.50
.						
NO	0.000	0.000	0.00	2.00	2.00	0.00
NOx	0.000	0.000	0.00	2.00	2.00	0.00





Calibrated by :

(Mr. Tong Piima)

Trade & Engineering

TSP High Volume Sampler
TE-5000 TSP Sampler Verification

Site Information

Location: -	**Site ID:** -	**Date:** 18 Oct 23
Sampler: TE-5000 TSP	**Serial No:** 3279	**Tech:** Tong.P

Site Conditions

Barometric Pressure (in Hg): 28.50	**Corrected Pressure (mm Hg):** 723.9
Temperature (deg F): 76.0	**Temperature (deg K):** 297.6
Average Press. (in Hg): 26.00	**Corrected Average (mm Hg):** 660.4
Average Temp (Deg F): 76.5	**Average Temp: (Deg K):** 297.9

Calibration Orifice

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

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	7.30	1.676	60.3	58.89
2	6.10	1.533	55.8	54.50
3	5.10	1.403	50.7	49.51
4	4.00	1.243	46.2	45.12
5	3.50	1.164	42.5	41.51

Linear Regression
Slope: 33.4101
Intercept: 2.9989
Corr. Coeff: 0.9982

# of Observations: 5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC =I[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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

Enter Average I (chart): 51.1
Average Flow Calculation m3/min
1.336282554
Average Flow Calculation in cfm
47.1851178
Sample Time (Hrs): 24.0
Total flow in 24 hours m3/min
1924.246877
Total flow in 24 hours cfm
67946.56964

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

Trade & Engineering

PM10 High Volume Sampler Verification

Site Information

Location: -
Site ID: -
Date: 2 October 2023
Sampler: TE-6070 PM10
Serial No: 3286
Tech: Tong P.

Site Conditions

Barometric Pressure (in Hg): 26.70
Temperature (deg F): 75.4
Average Press. (in Hg): 26.55
Average Temp. (deg F): 76.5

Corrected Pressure (mm Hg): 678.2
Temperature (deg K): 297.1
Corrected Average (mm Hg): 674.4
Average Temp. (deg K): 297.7

Calibration Orifice

Make: Tisch Environmental, Inc.
Model: TE-5028A
Serial#: 1179

Qstd Slope: 1.58304
Qstd Intercept: -0.01520
Calibration Due Date: 12 Dec 23

Calibration Data

Plate or Test #	In H2O	Qa (m3/min)	I (chart)	IC (corrected)
1	9.60	1.305	60.3	39.91
2	7.70	1.170	55.6	36.80
3	6.65	1.088	50.6	33.49
4	5.40	0.981	45.7	30.25
5	4.55	0.901	39.4	26.08

Linear Regression
Slope 33.9429
Intercept -3.6602
Corr. Coeff 0.9904
SFR 1.121
SSP 51.97

# of Observations: 5

Calculations

Qa = 1/m(Sqrt((H2O)(Ta/Pa))-b)
IC = I(Sqrt(Ta/Pa))

Qa = actual flow rate
IC = corrected chart response
m = calibrator slope
b = calibrator intercept
Ta = actual temperature (deg K)
Pa = actual pressure (mm Hg)
For subsequent calculation of sampler flow:

SFR = 1.13(Ps/Pa)(Ta/Ts)
SSP = (m*SFR+b)(Sqrt(Pa/Ta))

SFR = sampler set point flow rate
SSP = sampler chart set point
m = sampler slope
b = sampler intercept
Ta = actual temperature (deg K)
Pa = actual pressure (mm Hg)
Ts = Average temperature (deg K)
Ps = Average pressure (mm Hg)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

Average I(chart): 50.3
Average Flow over Sample (m3/min)
1.092468669
Enter Total Time (Hrs): 24.0
Total flow over sample (m3/min)
1573.154884
Total flow over sample (CFM)
55548.09895

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

Trade & Engineering

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

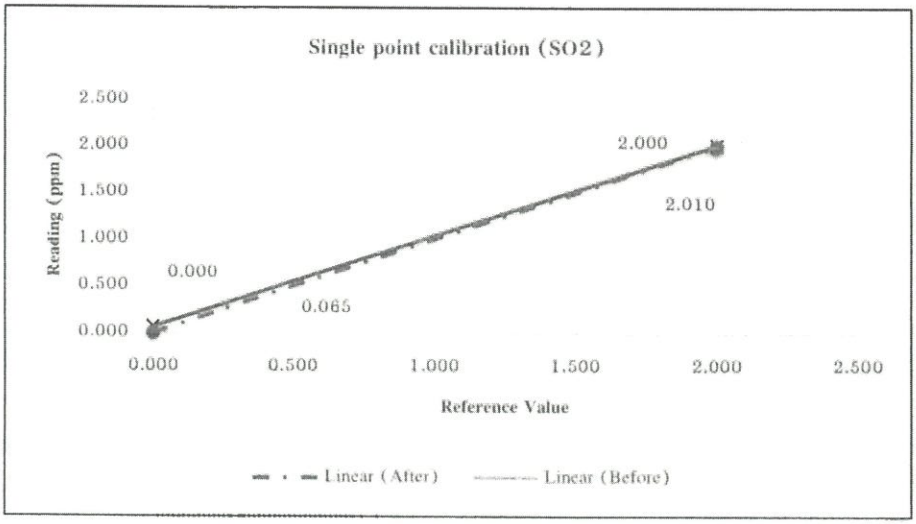
Gas Calibration	:	Thermo Environmental		Zero Air Generator	: API
Model	:	146C		Model	: 701
Serial No.	:	514811458		Serial No.	: 179

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)

Trade & Engineering

Certificate of Analyzer Performance Testing

Calibrated Date : 8-Mar-24

Certificate No. : 0324-006

Page : 1/1

Analyzer Instruments

Analyzer Type	:	NO/NO/NOx Analyzer	Manufacturer	:	Thermo Environmental
Model	:	42C	Serial No.	:	58926-320

Environmental

Temperature	:	25.7	°C
Humidity	:	44.6	%RH

Calibration System

Calibrator Units

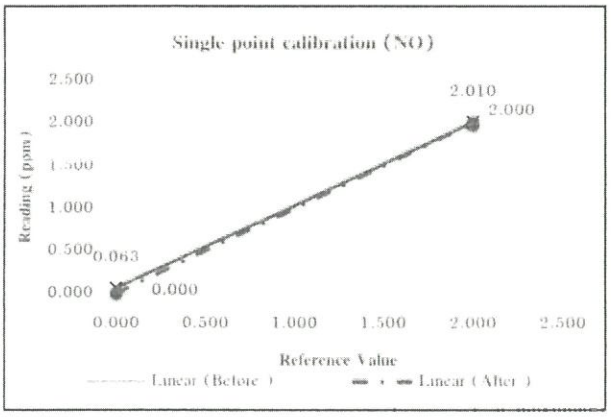
Gas Calibration	:	Thermo Environmental	Zero Air Generator	:	API
Model	:	146C	Model	:	701
Serial No.	:	514811458	Serial No.	:	179

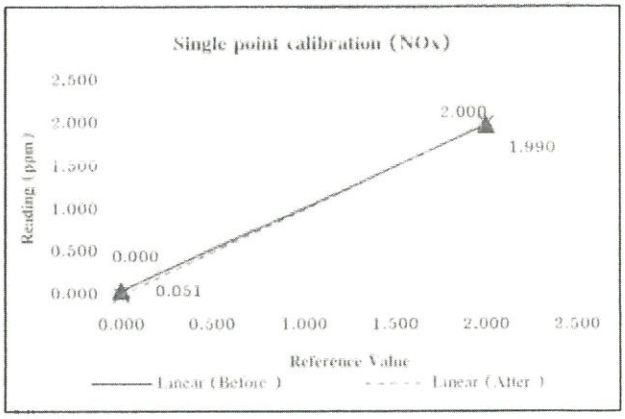
Standard Gas

NO Conc.	:	2	ppm	Cylinder No.	: 307199
SO2	:	2	ppm	Expire Date	: 10-Oct-25
CO Conc.	:	50	ppm		

Calibration Check

Gas	Zero			Span		
	Reading Value (ppm)	Expected Value (ppm)	Drift (%)	Reading Value (ppm)	Expected Value (ppm)	Drift (%)
Before						
NO	0.063	0.000	0.06	2.01	2.00	0.50
NOx	0.051	0.000	0.05	1.99	2.00	-0.50
After						
NO	0.000	0.000	0.00	2.00	2.00	0.00
NOx	0.000	0.000	0.00	2.00	2.00	0.00





Calibrated by :

(Mr. Tong Piima)

Trade & Engineering

CERTIFICATION OF NIST (NBS) TRACEABILITY

DRYCAL CELL VOLUME CERTIFICATION

The Dry Cal DC-1 and DC-2M are true primary flow standards: Calibration is neither required nor possible as accuracy is dependent upon the dimensions of the flow measuring cell and the accuracy of the internal computer's crystal clock. Verification of NIST traceability therefore depends upon verification of these dimensions.

BIOS International certifies that the following Dry Cal products have been tested against NIST-traceable measuring instruments which are periodically checked by approved testing laboratories:-

* Cell DC-1L Serial Number _____ I.D.0.3665 inch ± 0.0005 inch
* Cell DC-1S Serial Number 449 I.D.0.9445 inch ± 0.001 inch
* Cell DC-1H Serial Number _____ I.D.1.7495 inch ± 0.001 inch

Encoder Length 1.000 inches ± 0.001 inch

Certified with Mitutoyo Master Gage Blocks NIST Test Number 733/016498-88

Date: 21 November 2023 Expiry Date: 20 November 2024

By SURACHAI S. KAN N.

Trade & Engineering

TSP High Volume Sampler
TE-5000 TSP Sampler Verification

Site Information

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

Site Conditions

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

Calibration Orifice

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

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	7.00	1.628	60.5	58.58
2	6.20	1.532	56.4	54.61
3	5.70	1.470	50.7	49.09
4	4.80	1.350	44.3	42.89
5	3.80	1.202	40.1	38.82

Linear Regression
Slope: 48.3100
Intercept: -20.5901
Corr. Coeff: 0.9844
# of Observations: 5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC =I[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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

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

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

Trade & Engineering

PM10 High Volume Sampler Verification

Site Information

Location: - **Site ID:** - **Date:** 2 October 2023
Sampler: TE-6070 PM10 **Serial No:** 3211 **Tech:** Tong P.

Site Conditions

Barometric Pressure (in Hg): 27.10
Temperature (deg F): 75.3
Average Press. (in Hg): 26.55
Average Temp. (deg F): 76.2

Corrected Pressure (mm Hg): 688.3
Temperature (deg K): 297.0
Corrected Average (mm Hg): 674.4
Average Temp. (deg K): 297.6

Calibration Orifice

Make: Tisch Environmental, Inc.
Model: TE-5028A
Serial#: 1179

Qstd Slope: 1.58304
Qstd Intercept: -0.01520
Calibration Due Date: 12 Dec 23

Calibration Data

Plate or Test #	In H2O	Qa (m3/min)	I (chart)	IC (corrected)
1	9.60	1.295	60.7	39.87
2	7.50	1.146	55.5	36.46
3	6.45	1.063	50.8	33.37
4	5.35	0.969	45.9	30.15
5	4.60	0.900	39.2	25.75

Linear Regression
Slope 34.8028
Intercept -4.2838
Corr. Coeff 0.9827
SFR 1.105
SSP 52.02

# of Observations: 5

Calculations

Qa = 1/m(Sqrt((H2O)(Ta/Pa))-b)
IC = I(Sqrt(Ta/Pa))

Qa = actual flow rate
IC = corrected chart response
m = calibrator slope
b = calibrator intercept
Ta = actual temperature (deg K)
Pa = actual pressure (mm Hg)
For subsequent calculation of sampler flow:

SFR = 1.13(Ps/Pa)(Ta/Ts)
SSP = (m*SFR+b)(Sqrt(Pa/Ta))

SFR = sampler set point flow rate
SSP = sampler chart set point
m = sampler slope
b = sampler intercept
Ta = actual temperature (deg K)
Pa = actual pressure (mm Hg)
Ts = Average temperature (deg K)
Ps = Average pressure (mm Hg)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

Average I(chart): 50.4
Average Flow over Sample (m3/min)
1.085070646
Enter Total Time (Hrs): 24.0
Total flow over sample (m3/min)
1562.501731
Total flow over sample (CFM)
55171.9361

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

TOP
Trade & Engineering

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

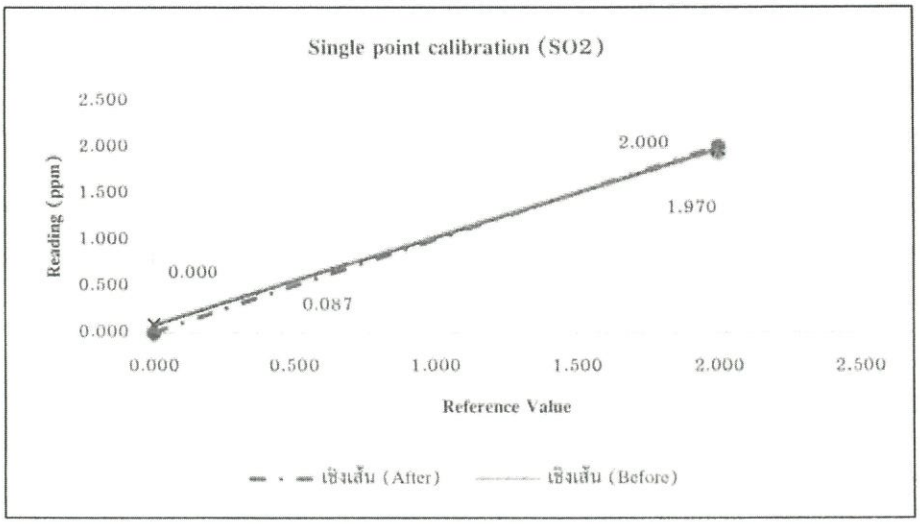
Gas Calibration	:	Thermo Environmental		Zero Air Generator	: API
Model	:	146C		Model	: 701
Serial No.	:	514811458		Serial No.	: 179

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)

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Trade & Engineering

Certificate of Analyzer Performance Testing

Calibrated Date	:	28-Mar-23		Certificate No.	: 0324-007
				Page	: 1/1

Analyzer Instruments

Analyzer Type	:	NO/NO/NOx Analyzer		Manufacturer	: Thermo Environmental
Model	:	42C		Serial No.	: 72454-371

Environmental

Temperature	:	25.3	°C
Humidity	:	40.2	%RH

Calibration System

Calibrator Units

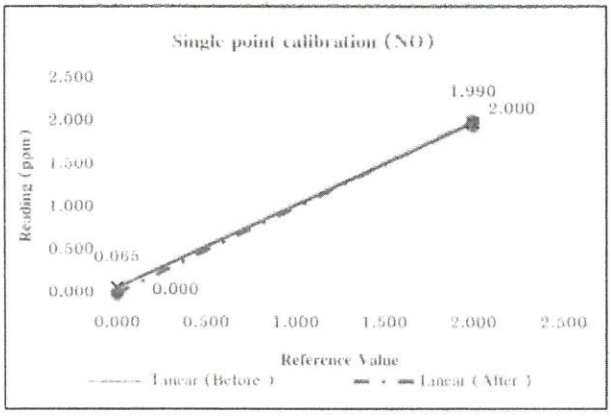
Gas Calibration	:	Thermo Environmental		Zero Air Generator	: API
Model	:	146C		Model	: 701
Serial No.	:	514811458		Serial No.	: 179

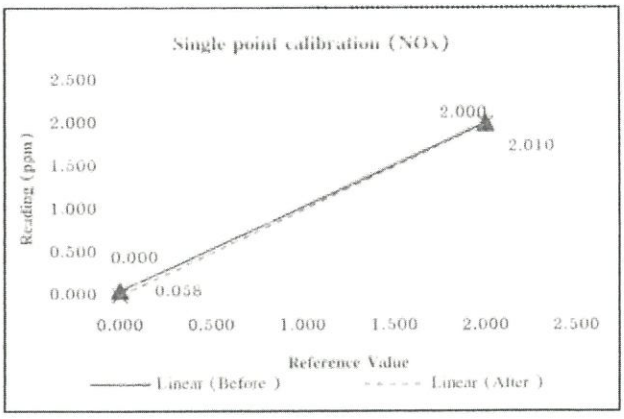
Standard Gas

NO Conc.	:	2	ppm	Cylinder No.	: 307199
SO2	:	2	ppm	Expire Date	: 10-Oct-25
CO Conc.	:	50	ppm		

Calibration Check

Gas	Zero			Span		
	Reading Value (ppm)	Expected Value (ppm)	Drift (%)	Reading Value (ppm)	Expected Value (ppm)	Drift (%)
Before						
NO	0.065	0.000	0.07	1.99	2.00	-0.50
NOx	0.058	0.000	0.06	2.01	2.00	0.50
After						
NO	0.000	0.000	0.00	2.00	2.00	0.00
NOx	0.000	0.000	0.00	2.00	2.00	0.00





Calibrated by :

(Mr. Tong Piima)

TOP
Trade & Engineering

Certificate of Analyzer Performance Testing

Calibrated Date : 4-Jul-23

Certificate No. : 0723-001

Page : 1/1

Analyzer Instruments

Analyzer Type	:	NO/NO/NOx Analyzer	Manufacturer	:	Thermo Environmental
Model	:	42C	Serial No.	:	63470-339

Environmental

Temperature	:	25.1	°C
Humidity	:	40.4	%RH

Calibration System

Calibrator Units

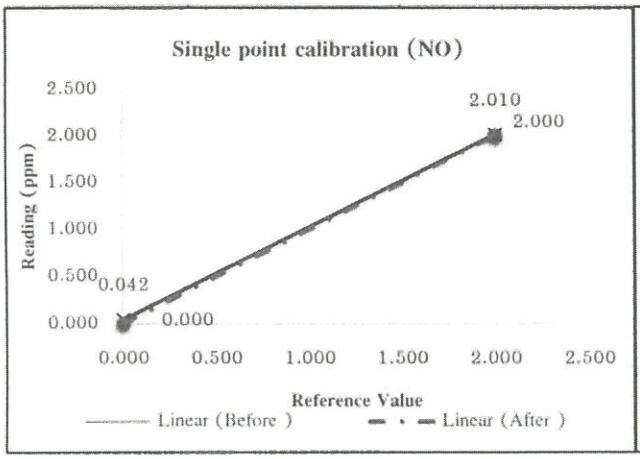
Gas Calibration	:	Thermo Environmental	Zero Air Generator	:	API
Model	:	146C	Model	:	701
Serial No.	:	514811458	Serial No.	:	179

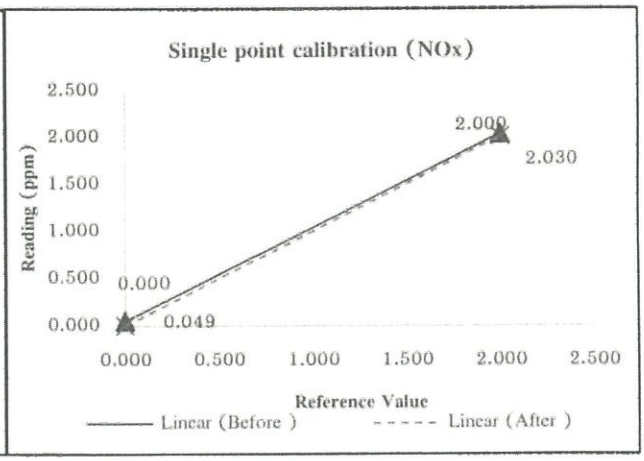
Standard Gas

NO Conc.	:	2	ppm	Cylinder No.	:	CC750227
SO2	:	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						
NO	0.042	0.000	0.04	2.01	2.00	0.50
NOx	0.049	0.000	0.05	2.03	2.00	1.50
After						
NO	0.000	0.000	0.00	2.00	2.00	0.00
NOx	0.000	0.000	0.00	2.00	2.00	0.00





Calibrated by :

(Mr. Tong Piima)

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METHOD 5 CONSOLE CALIBRATION
USING REFERENCE WET TEST METER W-NK-2.5B No.545141
5-POINT METRIC UNIT

Meter Console Information	
Console Model Number	XD-502-V
Console Serial Number	1901001
DGM Model Number	SK25EX-100B
DGM Serial Number	20226818

Calibration Conditions			
Date	Time	6-Oct-23	9:00 AM
Calibration Reference No.		SE66AP016	
Barometric Pressure		759.00	mm Hg
Calibration Meter Gamma		1.001	

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K_1	0.386	
Console Leak Check		PASS

Calibration Data

Run Time	Metering Console					Calibration Meter			
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final
(θ)	(P_m)	(V_m)	(V_m)	(t_m)	(t_m)	(Vwi)	(Vwf)	(t_w)	(t_w)
min	mm H_2O	m^3	m^3	°C	°C	m^3	m^3	°C	°C
13.10	13.0	0.0000	0.1401	22	22	543.141380	543.283420	22	22
13.07	13.0	0.1401	0.2801	22	23	543.283420	543.423000	22	22
8.78	26.0	0.2868	0.4284	23	23	543.430700	543.572980	22	22
8.95	26.0	0.4284	0.5684	23	24	543.572980	543.713240	22	22
13.68	40.0	0.5877	0.8677	24	25	543.732420	544.010600	22	22
13.65	40.0	0.8677	1.1477	25	25	544.010600	544.286700	22	21
12.20	50.0	1.7392	2.0192	25	26	544.870120	545.149120	21	21
12.17	50.0	2.0192	2.2992	26	26	545.149120	545.425800	21	21
10.38	70.0	2.3161	2.5961	27	27	546.442460	545.725780	21	21
10.37	70.0	2.5961	2.8761	27	28	545.725780	546.006660	21	21

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Environmental Solution Integrator Co., Ltd.

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METHOD 5 CONSOLE CALIBRATION
USING REFERENCE WET TEST METER W-NK-2.5B No.545141
5-POINT METRIC UNIT

Calibration Data

Results

Standardised Data				Calibration Factor		Dry Gas Meter Flowrate		
Dry Gas Meter		Calibration Meter		Value	Variation	Std & Corr	.0212 m^3_{std}/min	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vw_{(std)}$)	($Qw_{(std)}$)	(Y)	(ΔY)	($Q_{std(corr)}$)	(ΔH@)	(ΔΔH@)
m^3	m^3/min	m^3	m^3/min			m^3/min	mm H2O	
0.139	0.011	0.141	0.011	1.014	0.017	0.011	50.293	4.710
0.139	0.011	0.139	0.011	0.997	0.000	0.011	51.817	6.234
0.141	0.016	0.141	0.016	1.003	0.006	0.016	45.179	-0.403
0.139	0.016	0.139	0.016	1.000	0.004	0.016	45.089	-0.493
0.279	0.020	0.276	0.020	0.991	-0.006	0.020	44.249	-1.334
0.279	0.020	0.275	0.020	0.983	-0.014	0.020	44.624	-0.959
0.280	0.023	0.278	0.023	0.993	-0.004	0.023	43.647	-1.936
0.280	0.023	0.276	0.023	0.984	-0.012	0.023	44.140	-1.443
0.281	0.027	0.282	0.027	1.006	0.009	0.027	43.089	-2.494
0.281	0.027	0.280	0.027	0.997	0.001	0.027	43.700	-1.883
				0.997	Y Average		45.583	ΔH@ Average

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Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
Note: For $\Delta H_@$, orifice pressure differential that equates to 0.75cfm (0.0212m^3/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is +-0.2inches (5.1mm) H_2O.

Calibrated by : Kiatkawin Approved by : Bradley Saylor Date 6-Oct-23

Environmental Solution Integrator Co.,Ltd.
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THERMOCOUPLES SYSTEM CALIBRATION

Samplig System Equipment Information	
Console Model Number	XD-502-V
Console Serial Number	1901001
DGM Model Number	SK25EX-100B
DGM Serial Number	20226818
Meter Box Model Number	TC8
Meter Box Serial Number	181213-02

Calibration Conditions			
Date	Time	05-Oct-23	11:00 AM
Calibration Reference No.		SE66AP016	
Reference Thermometer		FLUKE 714	
Serial Number		1812153	
Dry Box Calibrator		Pyros 650	
Serial Number		K38111	

Results

Console Thermocouple Simulator

Channal and test point	Meter Box Channal Temperature Reading (°C)											
	-18.0	25.0	38.0	93.0	149.0	260.0	371.0	482.0	593.0	816.0	1038.0	
Stack	-18	26	39	95	150	261	372	482	594	817	1040	
Filter	-17	26	39	95	150							
Aux	-17	26	39	95	150							
Probe	-17	26	39	95	150							
Oven	-16	26	39	95	150							
Exit	-16	26	39									

OUTLET DGM Thermocouple			
Set Point	Reference Thermocouple	Probe Thermpcouple	Difference
30	30.0	28	0.66
40	40.0	38	0.64
50	50.0	47	0.93

Sample Probe Thermocouple			
Set Point	Reference Thermocouple	Probe Thermocouple	Difference
100	100.0	98	0.54
250	250.0	249	0.19
300	300.0	296	0.70
350	350.0	348	0.32

Tolerances Range

Stack	± 1.50% Absolute	Meter	± 3.0 °C
DGM	± 3.0 °C	Filter	± 3.0 °C
Probe	± 3.0 °C	Exit	± 2.0 °C

Environmental Solution Integrator Co., Ltd.

Calibrated by : Kiatkawin

Approved by : Teradej Sangthong

Environmental Solution Integrator Co.,Ltd.
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THERMOCOUPLES SYSTEM CALIBRATION

Samplig System Equipment Information
Console Model Number: XD-502-V
Console Serial Number: 1901001
DGM Model Number: SK25EX-100B
DGM Serial Number: 20226818
Meter Box Model Number: TC8
Meter Box Serial Number: 181213-02

Calibration Conditions
Date | Time: 05-Oct-23 | 11:00 AM
Calibration Reference No.: SE66AP016
Reference Thermometer: FLUKE 714
Serial Number: 1812153
Dry Box Calibrator: Pyros 650
Serial Number: K38111

Results
Console Thermocouple Simulator

Channal and test point	Meter Box Channal Temperature Reading (°C)											
	-18.0	25.0	38.0	93.0	149.0	260.0	371.0	482.0	593.0	816.0	1038.0	
Stack	-18	26	39	95	150	261	372	482	594	817	1040	
Filter	-17	26	39	95	150							
Aux	-17	26	39	95	150							
Probe	-17	26	39	95	150							
Oven	-16	26	39	95	150							
Exit	-16	26	39									

OUTLET DGM Thermocouple

Set Point	Reference Thermocouple	Probe Thermpcouple	Difference
30	30.0	28	0.66
40	40.0	38	0.64
50	50.0	47	0.93

Sample Probe Thermocouple

Set Point	Reference Thermocouple	Probe Thermocouple	Difference
100	100.0	98	0.54
250	250.0	249	0.19
300	300.0	296	0.70
350	350.0	348	0.32

Tolerances Range

Stack	± 1.50% Absolute	Meter	± 3.0 °C
DGM	± 3.0 °C	Filter	± 3.0 °C
Probe	± 3.0 °C	Exit	± 2.0 °C

Environmental Solution Integrator Co., Ltd.

Calibrated by : Kiatkawin

Approved by : Teradej Sangthong

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PITOT TUBE CALIBRATION

Samplig System Equipment Information	
Console Model Number	XD-502-V
Console Serial Number	1901001
DGM Model Number	SK25EX-100B
DGM Serial Number	20226818
Pitot tube Number	A7637

Calibration Conditions			
Date	Time	06-Oct-23	9:00 AM
Calibration Reference No.		SE66AP016	
Barometric Pressure		759	mm Hg
Pitit Tube Type		S	
size (OD)		3/8	inch
Standard Pitot Tube ID Number		160-12	
C_p(std)		0.99	

Results

"A" SIDE CALIBRATION

RUN No.	Δp std	Δp (s)	Cp (s)	DEVIATION Cp(s)-Cp(A)
	mm H_2O	mm H_2O		
1	6.4	8.6	0.854	0.004
2	16.4	22.4	0.847	-0.003
3	30.8	42.0	0.848	-0.002
	AVERAGE	Cp (SIDE A)	0.850	0.001

Results

"B" SIDE CALIBRATION

RUN No.	Δp std	Δp (s)	Cp (s)	DEVIATION Cp(s)-Cp(B)
	mm H_2O	mm H_2O		
1	6.4	8.8	0.844	0.002
2	16.4	22.8	0.840	-0.003
3	30.8	42.4	0.844	0.001
	AVERAGE	Cp (SIDE B)	0.843	-0.001

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

Note: Average deviation must be < 0.01

Environmental Solution Integrator Co., Ltd.

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NOZZLE CALIBRATION

Samplig System Equipment Information		Calibration Conditions			
Console Model Number	XD-502-V	Date	Time	05-Oct-23	9:00 AM
Console Serial Number	1901001	Calibration Reference No.		SE66AP016	
DGM Model Number	SK25EX-100B	Barometric Pressure		759	mm Hg
DGM Serial Number	20226818	Calibration		Vernier ,0-150mm	0.01 mm increments
Nozzle Types	Stainless	Method Reference		US.EPA Method	

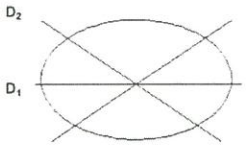
Calibration Data					Results	
Nozzle ID	Nozzle Diameter				Different	$(D_1 + D_2 + D_3)/3$
Sizes		D_1	D_2	D_3	ΔD	Davg
	mm	mm	mm	mm	mm	mm
4	3.0	2.84	2.86	2.85	0.010	2.850
5	3.9	3.94	3.95	3.94	0.006	3.943
6	4.6	4.57	4.55	4.58	0.010	4.580
8	6.2	6.13	6.15	6.17	0.020	6.150
9	7.0	6.70	6.73	6.74	0.021	6.723
12	9.4	9.48	9.47	9.50	0.015	9.483
14	10.9	10.74	10.72	10.74	0.012	10.733

Where :

D1, D2, D3 = There difference nozzle diamiters , mm ; diameter must be within 0.025 mm

ΔD = Maximum difference between any two diameters, must be ≤ 0.100 mm

Davg = $(D_1 + D_2 + D_3)/3$



D3

Environmental Solution Integrator Co., Ltd.

Calibrated by : Kiatkawin

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