

ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



right solutions.
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0213	26-Jan-23	26-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0027	13-Jan-23	13-Jan-24	12
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0213	26-Jan-23	26-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0618	20-Oct-22	20-Oct-23	12
Workplace	Glutaraldehyde	Field Rotameter	RYG_FS0198	2-Oct-23	2-Jan-24	3

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-451/1 Sinitthorn Rd., Banglumru, Bangplud Bangkok 10700 THAILAND
Tel:0-2435-8809 Fax:0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com



Cert. No. : ACC23009

Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-74
Serial No.: 34176121
ID No.: RYG-PS0213

Condition As Found : GOOD

Customer : A+ LABORATORY GROUP (THAILAND) CO., LTD.
103 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3.0) °C
Pressure : (01.3 ± 3.0) kPa
Relative Humidity : (50.0 ± 20.0) %

Received Date : 24 JANUARY 2023
Calibration Date : 26 JANUARY 2023
Date of Issue : 27 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchuraj*
(Thanakul Petchuraj)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

QC-ISO-17025-01/02/03/04

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACC23009

Job No. : VC66AC0031

Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment was calibrated by based on IEC-60942-2003 Standard.

The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphone.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52502742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	FFI.BP. 03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MA1-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KA1	34560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-22	07-Feb-23

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

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

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

QC-ISO-17025-01/02/03/04

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACC23009
Job No. : VC66AC0031
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.16	0.16	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1003.2	0.3	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.97	0.10	3.0

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %.

End of Calibration Certificate

QI-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

45/1-45/1/1 Sirinthon Rd., Bangbunru, Bangpuud Bangkok 10700 THAILAND.
Tel:0-2435-8800 Fax:0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com



Cert. No. : ACL23041
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NI-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00734221 / 145286 / 34371
ID No.: RYG_FS0027

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 06 JANUARY 2023
Calibration Date : 13-18 JANUARY 2023
Date of Issue : 19 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchumai*
(Thanakul Petchumai)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

QI-TS12-04-04-020664

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
Job No. : VC66AC0024
Pages : 2 of 3

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-3:2013 Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAI-1076	62100114	EF-9009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	24560495	AA-3005-22	22-Feb-23

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. P. K.

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
Job No. : VC66AC0024
Pages : 3 of 3

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

T. P. K.

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
 Job No. : VC66AC0024
 Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.1

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Measured value (dB)
A - weight	13.4
C - weight	19.6
Flat	25.5

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.4	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	1.5	1.6	1.6	±5.0

T. Petch

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
 Job No. : VC66AC0024
 Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	0.0	-
C - weight	94.0	0.0	± 0.2
Flat	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	+ 0.1
Leq	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SUM Display at initial (dB)	SUM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

T. Petch

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
Job No. : VC66AC0024
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
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	38.9	-0.1	± 1.1
34.0	33.9	-0.1	± 1.1
30.0	30.9	0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.8	-0.2	± 1.1

T. B. Loh

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
Job No. : VC66AC0024
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	± 1.1

9. Tone burst response

Time Weighting	Tone burst duration, 1b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	± 1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	± 1.0
SFL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	± 1.0

10. Peak C' sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.0	-0.4	± 3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.2	-0.2	± 2.0
Negative half cycle	135.4	135.2	-0.2	± 2.0

T. B. Loh

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23041
Job No. : VC66AC0024
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

QF-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Rd., Bangbunru, Bangplud Bangkok 10700 THAILAND.
Tel: 0-2435-8800 Fax: 0-2433-1679 e-mail: cal-center@sithiporn.com http://www.sithiporn.com



Cert. No. : ACL22239
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623393 / 198640 / 26421
ID No.:

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHUET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 07 OCTOBER 2022
Calibration Date : 20-21 OCTOBER 2022
Date of Issue : 21 OCTOBER 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced
other than in full, except with the prior written approval of the head of Calibration Laboratory.

QF-TS12-04-04-020664

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
Job No. : VC65AC0089
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
Job No. : VC65AC0089
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
Job No. : VC65AC0089
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Measured value (dB)
A - weight	11.2
C - weight	17.5
Flat	23.3

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.0	0.0	0.0	±5.0

Handwritten signature

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
Job No. : VC65AC0089
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	0.0	-
C - weight	94.0	0.0	± 0.2
Flat	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	± 0.1
Leq	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

Handwritten signature

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
Job No. : VC65AC0089
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
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	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
Job No. : VC65AC0089
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5; -5.0
	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.6	-0.8	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

SITHIPORN SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22239
 Job No. : VC65AC0089
 Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate



ROTA METER CALIBRATION RESULT OCTOBER 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS0577	02 Oct 23	$Y = 1.2862x - 1.2952$	0.9963
BKK_FS0579	02 Oct 23	$Y = 1.2546x + 0.0065$	0.9946
BKK_FS0583	03 Oct 23	$Y = 1.0773x - 2.4138$	0.9989
BKK_FS0584	02 Oct 23	$Y = 0.9787x + 12.569$	0.9999
BKK_FS0585	18 Oct 23	$Y = 1.0322x + 3.7767$	0.9998
BKK_FS0586	02 Oct 23	$Y = 0.9777x + 15.405$	0.9997
BKK_FS0587	18 Oct 23	$Y = 1.0175x + 14.717$	0.9997
BKK_FS0589	03 Oct 23	$Y = 1.0148x + 2.4143$	1.0000
BKK_FS0590	03 Oct 23	$Y = 1.0088x + 0.8429$	1.0000
BKK_FS0591	02 Oct 23	$Y = 1.0733x - 88.805$	0.9989
BKK_FS0592	18 Oct 23	$Y = 1.0037x + 10.388$	1.0000
BKK_FS0593	02 Oct 23	$Y = 1.0538x - 60.63$	0.9996
BKK_FS0594	18 Oct 23	$Y = 1.0052x + 5.3238$	0.9999
BKK_FS0596	03 Oct 23	$Y = 1.0449x - 48.241$	0.9996
BKK_FS0597	03 Oct 23	$Y = 1.0697x - 83.62$	0.9994
BKK_FS1004	02 Oct 23	$Y = 0.9855x + 14.75$	0.9992
BKK_FS1005	02 Oct 23	$Y = 1.02x + 1.7167$	0.9996
BKK_FS1006	02 Oct 23	$Y = 1.1762x - 3.5619$	0.9999
BKK_FS1007	18 Oct 23	$Y = 1.1405x + 2.6044$	0.9993
BKK_FS1008	18 Oct 23	$Y = 1.1267x + 4.8333$	0.9991
BKK_FS1010	03 Oct 23	$Y = 1.0027x + 2.5832$	0.9986
BKK_FS1011	02 Oct 23	$Y = 1.3811x - 6.2068$	0.9998
BKK_FS1012	02 Oct 23	$Y = 1.0017x + 0.9$	1.0000
BKK_FS1013	02 Oct 23	$Y = 1.0593x - 46.02$	0.9994
BKK_FS1014	03 Oct 23	$Y = 1.0961x - 1.6895$	0.9983
BKK_FS1015	03 Oct 23	$Y = 0.9979x + 6.2595$	0.9993
BKK_FS1016	03 Oct 23	$Y = 1.0683x - 82.491$	0.9995
BKK_FS1017	06 Oct 23	$Y = 0.9981x - 2.2235$	0.9998
BKK_FS1018	06 Oct 23	$Y = 0.9817x - 20.653$	0.9999
BKK_FS1019	06 Oct 23	$Y = 1.0152x - 64.485$	0.9998
BKK_FS1020	02 Oct 23	$Y = 1.2691x - 2.4721$	0.9983
BKK_FS1021	02 Oct 23	$Y = 1.0036x + 2.3286$	0.9999
BKK_FS1022	02 Oct 23	$Y = 1.0633x - 73.265$	0.9990
BKK_FS1023	03 Oct 23	$Y = 1.0879x - 1.0694$	0.9984
BKK_FS1024	02 Oct 23	$Y = 1.0035x + 1.4857$	1.0000
BKK_FS1025	03 Oct 23	$Y = 1.0558x - 58.597$	0.9999
BKK_FS1026	02 Oct 23	$Y = 1.2894x - 1.497$	0.9970
BKK_FS1027	02 Oct 23	$Y = 1.0032x + 1.5167$	1.0000
BKK_FS1028	02 Oct 23	$Y = 1.0433x - 30.012$	0.9994



ROTA METER CALIBRATION RESULT OCTOBER 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS1029	02 Oct 23	$Y = 1.3494x - 3.5078$	0.9981
BKK_FS1030	02 Oct 23	$Y = 1.0015x + 1.2214$	1.0000
BKK_FS1031	02 Oct 23	$Y = 1.0516x - 56.996$	0.9994
BKK_FS1039	02 Oct 23	$Y = 0.9991x + 14.527$	0.9994
BKK_FS1040	02 Oct 23	$Y = 1.0049x - 2.4324$	1.0000
BKK_FS1041	02 Oct 23	$Y = 1.1692x - 2.1293$	1.0000
BKK_FS1042	02 Oct 23	$Y = 1.0051x + 6.2533$	0.9989
BKK_FS1043	02 Oct 23	$Y = 1.0022x + 3.96$	1.0000
BKK_FS1044	02 Oct 23	$Y = 1.0796x + 2.9806$	0.9993
BKK_FS1164	02 Oct 23	$Y = 1.2714x + 0.234$	0.9945
BKK_FS1165	02 Oct 23	$Y = 1.0029x + 3.3571$	0.9994
BKK_FS1168	02 Oct 23	$Y = 1.061x - 56.83$	1.0000
BKK_FS1200	02 Oct 23	$Y = 1.2803x - 1.4599$	0.9962
BKK_FS1201	02 Oct 23	$Y = 1.0374x - 6.1952$	1.0000
BKK_FS1202	02 Oct 23	$Y = 1.0486x - 44.05$	0.9997
PHK_FS0027	09 Oct 23	$Y = 1.1052x + 1.0293$	1.0000
PHK_FS0028	09 Oct 23	$Y = 1.0377x - 1.9833$	1.0000
PHK_FS0029	09 Oct 23	$Y = 1.0021x + 7.5248$	1.0000
RYG_FS0197	02 Oct 23	$Y = 1.0036x + 9.0133$	1.0000
RYG_FS0198	02 Oct 23	$Y = 0.9991x + 17.568$	1.0000
RYG_FS0199	02 Oct 23	$Y = 1.0814x - 1.2993$	0.9997
RYG_FS0654	02 Oct 23	$Y = 1.1168x - 2.1207$	1.0000
RYG_FS0655	02 Oct 23	$Y = 1.0086x + 6.2733$	0.9991
RYG_FS0656	02 Oct 23	$Y = 1.0009x + 8.48$	1.0000
RYG_FS0657	02 Oct 23	$Y = 1.0435x + 2.6459$	0.9999
RYG_FS0658	02 Oct 23	$Y = 0.9788x + 10.283$	0.9992
RYG_FS0659	02 Oct 23	$Y = 1.0074x - 6.621$	1.0000
SGK_FS0135	18 Oct 23	$Y = 0.9831x + 14.843$	0.9994
SGK_FS0138	06 Oct 23	$Y = 1.0831x - 0.8401$	0.9998
SGK_FS0139	06 Oct 23	$Y = 0.9826x + 8.6567$	1.0000
SGK_FS0140	06 Oct 23	$Y = 1.0011x + 7.6095$	1.0000
SGK_FS0141	06 Oct 23	$Y = 1.125x - 1.2259$	0.9998
SGK_FS0142	06 Oct 23	$Y = 0.9956x + 10.257$	0.9997
SGK_FS0143	06 Oct 23	$Y = 1.004x + 3.3105$	1.0000

Review By :

(Mr. Wichan Choonharat)

Enviro Field Services Manager

Approved By :

(Mr. Sarayuth Jitranont)

Assistant General Manager