
ภาคผนวก ง

สำเนาใบรับรองการสอบเทียบเครื่องมือการตรวจวัด

HORIBA

HORIBA (THAILAND) LIMITED

46/8 Rungrojthanakul Bld., 1st, 2nd Fl., Ratchadapisek Rd., Hual Khwang, Hual Khwang, Bangkok 10310 THAILAND
Telephone: +66 (0) 2861 5995, +66 (0) 2734-4434 Facsimile: +66 (0) 2861 5200
Website : <http://www.horiba.com>

MULTI-POINT GAS TEST REPORT OF NITRIC OXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	21-Nov-24
Model	HORIBA PG-350	Background	0
Serial Number	V40KV0LD	Coefficient	0.9444
		Room Temperature	23.3 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	17K686056	Cylinder Number	ND58962
Component	N2	Component	NO
Concentration	99.999 %	Concentration	89.94 ppm
Expiration Date	-	Expiration Date	28-Sep-30

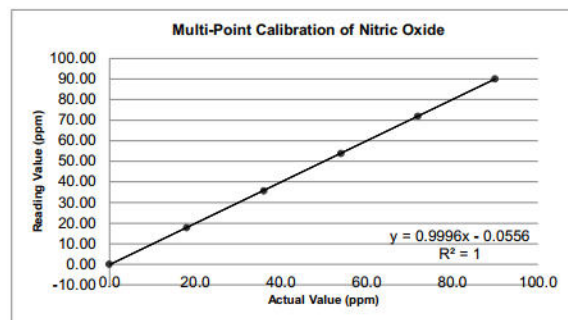
Measurement Range	100
% Measurement Range	89.94

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.1	0.1	0.1	0.10	0.10	
20%	17.99	17.80	18.00	17.90	17.90	-0.09	0.49
40%	35.98	36.00	35.50	35.70	35.73	-0.24	0.67
60%	53.96	54.10	53.50	53.80	53.80	-0.16	0.30
80%	71.95	71.70	72.00	71.90	71.87	-0.09	0.12
100%	89.94	89.80	90.00	90.10	89.97	0.03	0.03
Average						0.32	
Result						PASS	

Slope	0.9996	Interception	-0.0556	Correlation Coefficient	1.0000
%Slope	-0.0445%	% Interception	-0.0556%	% Correlation Coefficient	-0.0007%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date

2-Dec-24

Date

2-Dec-24

HORIBA

HORIBA (THAILAND) LIMITED

46/8 Rungrojthanakul Bld., 1st, 2nd Fl., Ratchadapisek Rd., Hual Khwang, Hual Khwang, Bangkok 10310 THAILAND
Telephone: +66 (0) 2861 5995, +66 (0) 2734-4434 Facsimile: +66 (0) 2861 5200
Website : <http://www.horiba.com>

MULTI-POINT GAS TEST REPORT OF SULFUR DIOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	21-Nov-24
Model	HORIBA PG-350	Background	1
Serial Number	V40KV0LD	Coefficient	1.2894
		Room Temperature	23.3 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	17K686056	Cylinder Number	ND58962
Component	N2	Component	SO2
Concentration	99.999 %	Concentration	89.58 ppm
Expiration Date	-	Expiration Date	28-Sep-30

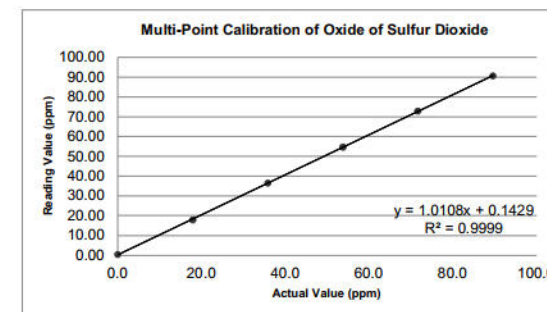
Measurement Range	200
% Measurement Range	44.79

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.4	0.2	0.4	0.33	0.33	
20%	17.92	18.20	17.60	17.80	17.87	-0.05	0.28
40%	35.83	37.00	36.20	36.10	36.43	0.60	1.68
60%	53.75	54.30	54.80	54.50	54.53	0.79	1.46
80%	71.66	72.80	73.10	72.60	72.83	1.17	1.63
100%	89.58	90.20	90.60	90.70	90.50	0.92	1.03
Average						1.21	
Result						PASS	

Slope	1.0108	Interception	0.1429	Correlation Coefficient	1.0000
%Slope	1.0802%	% Interception	0.0714%	% Correlation Coefficient	-0.0026%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date

2-Dec-24

Date

2-Dec-24

HORIBA

HORIBA (THAILAND) LIMITED

46/8 Rungrojthanakul Bld., 1st, 2nd Fl., Ratchadapisek Rd., Hual Khwang, Hual Khwang, Bangkok 10310 THAILAND
Telephone: +66 (0) 2861 5995, +66 (0) 2734-4434 Facsimile: +66 (0) 2861 5200
Website : <http://www.horiba.com>

MULTI-POINT GAS TEST REPORT OF CARBON MONOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	21-Nov-24
Model	HORIBA PG-350	Background	0
Serial Number	V40KV0LD	Coefficient	1.4511
		Room Temperature	23.3 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	17K686056	Cylinder Number	ND58962
Component	N2	Component	CO
Concentration	99.999 %	Concentration	89.58 ppm
Expiration Date	-	Expiration Date	28-Sep-30

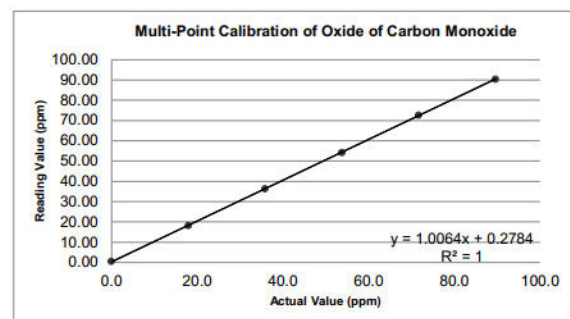
Measurement Range	200
% Measurement Range	44.79

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.5	0.6	0.4	0.50	0.50	
20%	17.92	18.00	18.10	18.20	18.10	0.18	1.03
40%	35.83	36.20	36.40	36.32	36.31	0.47	1.32
60%	53.75	54.20	54.11	54.34	54.22	0.47	0.87
80%	71.66	72.42	72.34	72.90	72.55	0.89	1.24
100%	89.58	90.10	90.80	90.50	90.47	0.89	0.99
						Average	1.09
						Result	PASS

Slope	1.0064	Interception	0.2784	Correlation Coefficient	1.0000
%Slope	0.6448%	% Interception	0.1392%	% Correlation Coefficient	-0.0012%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date

2-Dec-24

Date

2-Dec-24

HORIBA

HORIBA (THAILAND) LIMITED

46/8 Rungrojthanakul Bld., 1st, 2nd Fl., Ratchadapisek Rd., Hual Khwang, Hual Khwang, Bangkok 10310 THAILAND
Telephone: +66 (0) 2861 5995, +66 (0) 2734-4434 Facsimile: +66 (0) 2861 5200
Website : <http://www.horiba.com>

MULTI-POINT GAS TEST REPORT OF CARBON DIOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	21-Nov-24
Model	HORIBA PG-350	Background	1
Serial Number	V40KV0LD	Coefficient	1.0585
		Room Temperature	23.3 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	17K686056	Cylinder Number	ND11246
Component	N2	Component	CO2
Concentration	99.999 %	Concentration	21.02 %
Expiration Date	-	Expiration Date	8-Aug-30

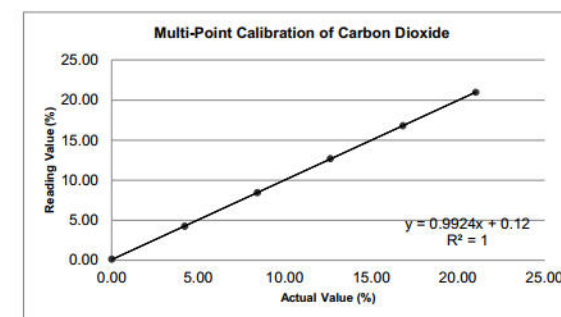
Measurement Range	30
% Measurement Range	70.07

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (%)				Difference	
		1	2	3	Average	%	%
0%	0.00	0.12	0.14	0.16	0.14	0.14	
20%	4.20	4.21	4.32	4.23	4.25	0.05	1.17
40%	8.41	8.44	8.46	8.48	8.46	0.05	0.62
60%	12.61	12.70	12.67	12.65	12.67	0.06	0.49
80%	16.82	16.83	16.80	16.77	16.80	-0.02	0.10
100%	21.02	20.95	20.97	21.00	20.97	-0.05	0.22
						Average	0.52
						Result	PASS

Slope	0.9924	Interception	0.1200	Correlation Coefficient	1.0000
%Slope	-0.7612%	% Interception	0.4000%	% Correlation Coefficient	-0.0006%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date

2-Dec-24

Date

2-Dec-24

HORIBA

HORIBA (THAILAND) LIMITED

46/8 Rungrojhanakul Bld., 1st, 2nd Fl., Ratchadapisek Rd., Hual Khwang, Hual Khwang, Bangkok 10310 THAILAND
Telephone: +66 (0) 2861 5995, +66 (0) 2734-4434 Facsimile: +66 (0) 2861 5200
Website : http://www.horiba.com

MULTI-POINT GAS TEST REPORT OF OXYGEN

Equipment Information

Manufacturer	Horiba	Calibration Date	21-Nov-24
Model	HORIBA PG-350	Background	25
Serial Number	V40KV0LD	Coefficient	1.0259
		Room Temperature	23.3 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	17K686056	Cylinder Number	ND60790
Component	N2	Component	O2
Concentration	99.999 %	Concentration	20.87 %
Expiration Date	-	Expiration Date	20-Jan-30

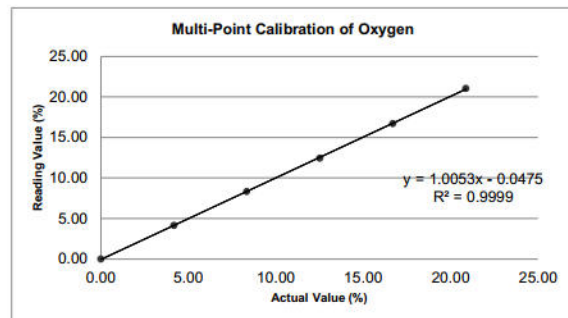
Measurement Range	25
% Measurement Range	83.48

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (%)				Difference	
		1	2	3	Average	%	%
0%	0.00	0.01	0.00	0.00	0.01	0.01	
20%	4.17	4.12	4.11	4.21	4.15	-0.03	0.65
40%	8.35	8.33	8.35	8.30	8.33	-0.02	0.26
60%	12.52	12.44	12.46	12.43	12.44	-0.08	0.63
80%	16.70	16.67	16.74	16.71	16.71	0.01	0.06
100%	20.87	21.00	21.02	21.05	21.02	0.15	0.73
Average						0.47	
Result						PASS	

Slope	1.0053	Interception	-0.0475	Correlation Coefficient	1.0000
%Slope	0.5294%	% Interception	-0.1898%	% Correlation Coefficient	-0.0036%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date 2-Dec-24 Date 2-Dec-24

HORIBA

HORIBA (THAILAND) LIMITED

46/8 Rungrojhanakul Bld., 1st, 2nd Fl., Ratchadapisek Rd., Hual Khwang, Hual Khwang, Bangkok 10310 THAILAND
Telephone: +66 (0) 2861 5995, +66 (0) 2734-4434 Facsimile: +66 (0) 2861 5200
Website : http://www.horiba.com

LOWER DETECTABLE LIMIT TESTING REPORT

Equipment Information

Manufacturer	Horiba	Calibration Date	21-Nov-24
Model	HORIBA PG-350	Room Temperature	23.3 °C
Serial Number	V40KV0LD		

Standard Gas Information

Zero Gas		Component	N2
Cylinder Number	17K686056	Concentration	99.999 %

Parameters	Measruement Range	Unit	Background	Coefficient
NO	100	ppm	1	0.9934
SO ₂	200	ppm	0	1.0684
CO	200	ppm	0	1.1705
CO ₂	30	%	0	1.004
O ₂	25	%	16	1.0078

TESTING REPORT RESULTS

Parameters	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	STDEV.
NO	0.20	0.20	0.30	0.20	0.10	0.30	0.20	0.30	0.10	0.10	0.082
SO ₂	0.30	0.20	0.30	0.40	0.40	0.40	0.50	0.60	0.50	0.40	0.115
CO	0.00	0.00	0.00	0.00	0.10	0.10	-0.10	0.10	-0.10	-0.10	0.082
CO ₂	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.01	0.02	0.007
O ₂	0.03	0.03	0.02	0.03	0.01	-0.01	-0.01	-0.02	-0.01	0.02	0.020

Conclusion

NO Lower detectable limit (LDL) value is	0.082	ppm
SO ₂ Lower detectable limit (LDL) value is	0.115	ppm
CO Lower detectable limit (LDL) value is	0.082	ppm
CO ₂ Lower detectable limit (LDL) value is	0.007	% Vol.
O ₂ Lower detectable limit (LDL) value is	0.020	% Vol.

Test By

Date 2-Dec-24 Date 2-Dec-24



Certificate of Conformity

BANGKOK INDUSTRIAL GAS CO.,LTD.
1 Park Silom Tower, 24th Floor, Convent Road
Silom, Bangrak, Bangkok 10500 Thailand
Tel : (662) 481-6789 Fax : (662) 481-6790

Customer Name : SGS (Thailand) Limited					Delivery Date : 03 Jul 2025		
Product : 1100060					Analysis Date :		
Product Name : CY N2 UHP 7M3 47S CGA580					Best if Use By : -		
Cylinder Type : 47 LITERS STEEL					Delivery Order : 3300010176		
Cylinder Valve : CGA 580					Inspection Lot : 40000005366		
Filling Pressure : 2000 PSIG @ 27°C					Gas Content : 7 M3		
COMPONENT	UNIT	LOWER LIMIT	UPPER LIMIT	NOMINAL VALUE	ACTUAL VALUE	ANALYTICAL ACCURACY	TEST METHOD

Purity	%	99.9990					
Oxygen	ppm(V)		<3.0000				
Moisture	ppm(V)		<3.0000				
Carbon Monoxide	ppm(V)		<1.0000				
Carbon Dioxide	ppm(V)		<1.0000				
Total Hydrocarbon as CH4	ppm(V)		<1.0000				

Batch : 010725N201
Sampling Cylinder :
Cylinder Serial Number : D892075,11D062106,D9143166,11D126047
Remark :

This certificate is issued electronically and is valid without a signature.



Meter Console Verification

Dry Gas Meter ID. : ENSS 046 Date of Calibration : 12-Aug-2025
Instrument Brand : Apex / Model 572 Calibrated By : SY

Wet gas meter Information

Wet gas Brand : Shinagawa Wet gas S/N : 544122
Wet gas Model : W-NK-2.5A Expire Date : 10-Jun-2027

Orifice Setting $\Delta H@$ (mm H ₂ O)	Wet gas		Metering System		Time (min)	Yi	$\Delta H@$
	V _w (L)	T _w (°C)	V _d (L)	T _m (°C)			
13	139.76	25.2	140.0	24.0	12.07	0.9932	46.505
13	139.18	25.0	140.0	24.5	12.11	0.9912	47.283
26	138.56	25.1	140.0	25.0	8.32	0.9869	46.820
26	138.24	25.1	140.0	25.0	8.32	0.9846	47.037
40	276.64	24.8	280.0	25.0	13.53	0.9848	47.800
40	276.54	24.6	280.0	25.5	13.46	0.9868	46.892
50	273.92	24.3	280.0	26.0	12.14	0.9791	47.047
50	273.22	24.1	280.0	26.0	12.14	0.9773	47.224
70	272.86	24.1	280.0	26.5	10.11	0.9757	45.946
70	272.28	24.1	280.0	27.0	10.06	0.9753	45.314
90	268.76	24.0	280.0	27.0	8.57	0.9611	47.014
90	268.66	23.9	280.0	27.0	8.58	0.9611	47.193
Average						0.9798	46.839

Remark :
 $Y_i \leq \pm 0.02$ from average
 $Y_i = 1.00 \pm 0.05$
 $\Delta H@ \leq \pm 5.08$ mm.H₂O from average
 $\Delta H@ = 46.7 \pm 6.4$ mm.H₂O

Checked By : 
(Chaowalit Srinan)
Position : Senior Inspector
Date : 12/8/2025

Approved By : 
(Thepsan Yommana)
Position : Technical Specialist Manager
Date : 14/08/2025



Temperature Display Verification

Dry Gas Meter ID. : ENSS 046
Instrument Brand : Apex / Model 572
Date of Calibration : 12-Aug-2025
Calibrated By : PK

Temperature Simulator Information

Simulator Brand : Handy Cal
Simulator Model : CA11E
Simulator S/N : T1L1015
Expire Date : 24-Jul-2026

Standard Value	Instrument Display				
	Stack	Probe	Filter	Aux	Exit
300	300	300	300	301	-
200	200	201	200	201	-
150	152	151	151	151	-
100	102	101	100	101	-
50	51	51	50	51	50
0	1	1	0	1	0
Difference	0.5%	1.0	1.0	1.0	0.0

Remark : Stack $\leq \pm 1.5\%$ Absolute
Probe $\leq \pm 3.0\text{ }^{\circ}\text{C}$
Filter $\leq \pm 3.0\text{ }^{\circ}\text{C}$
Aux $\leq \pm 3.0\text{ }^{\circ}\text{C}$
Exit $\leq \pm 3.0\text{ }^{\circ}\text{C}$

Checked By : 
(Chaowalit Srinan)

Position : Senior Inspector
Date : 12/8/2025

Approved By : 
(Thepsan Yommana)

Position : Technical Specialist Manager
Date : 14/08/2025



Prob Nozzle Diameter Calibration Data Sheet

Date : 04/01/2025
Personal : CS
Vernier (Digital) : Dial Caliper
Reference : ENSS 043
Nozzle ID : ENSS 089
Stainless Steel
Expire Date : 04/01/2026

Nozzle No.	Nozzle Diameter (mm)			Hi-Lo	D _{avg}
	D1	D2	D3	ΔD	
1	2.98	2.94	2.92	0.06	2.95
2	4.50	4.48	4.52	0.04	4.50
3	5.80	5.88	5.80	0.08	5.83
4	6.00	6.04	6.08	0.08	6.04
5	7.58	7.54	7.52	0.06	7.55
6	10.06	10.10	10.05	0.05	10.07
7	12.54	12.56	12.48	0.08	12.53

Remark : ΔD = Maximum distance between any two diameters, must be $\leq 0.100\text{ mm}$
D_{avg} = (D1+D2+D3)/3

Checked By : 
(Chaowalit Srinan)
Supervisor
Date : 4/01/25

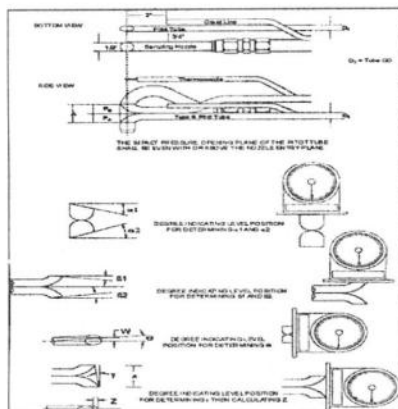
Approved By : 
(Phatsakorn soonthornwiphat)
CEMs Manager
Date : 4/1/25



Certificate of Calibration

S-Type Geometric Pitot Tube Calibration

See the Code of Federal Regulations, Title 40, Part 60, Appendix A,
Method 2, Item 4



Pitot tube/Probe No. No.59/A10404

Parameter	Value	Allowable Range	Check
Assembly Level?	Y	Yes or y	PASS
Ports Damaged?	N	No or n	PASS
$\alpha 1$	1.1	$-10^\circ < \alpha 1 < +10^\circ$	PASS
$\alpha 2$	-2.1	$-10^\circ < \alpha 1 < +10^\circ$	PASS
$\beta 1$	-1.2	$-5^\circ < \alpha 1 < +5^\circ$	PASS
$\beta 2$	-1.5	$-5^\circ < \alpha 1 < +5^\circ$	PASS
γ	-1.6	N/A	-
θ	-1.9	N/A	-
D_t	0.375	0.188" to 0.375"	PASS
A	0.966142	$2.1D_t \leq A \leq 3.0D_t$	PASS
$A/2D_t$	1.288189	$1.05 \leq P_A/D_t \leq 1.5$	PASS
$Z = A \tan \gamma$	-0.02699	$Z \leq 0.125"$	PASS
$W = A \tan \theta$	-0.03205	$W \leq 0.031"$	PASS

I certify that pitot tube/probe No.59/A10404 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification factor of 0.84. See 40 CFR Pt. 60, App A, EPA Method 2

Standard Device

Device Name Digital Inclinator
Manufacturer BASELINE
Model 12-1057
ID No. QC-1824

Expiration data 12-Dec-25
ENSS No. ENSS 22159

Certified by

Date

Approved by

Date



Airgas Specialty Gases
Airgas USA LLC
6141 Easton Road
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E3HA0032
Cylinder Number: GN0035133
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12025

Reference Number: 160-403431355-1
Cylinder Volume: 247.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Sep 22, 2025

Expiration Date: Sep 22, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.56 PPM	G1	+/- 0.7% NIST Traceable	09/15/2025, 09/22/2025
CARBON MONOXIDE	45.00 PPM	45.52 PPM	G1	+/- 0.7% NIST Traceable	09/15/2025
NITRIC OXIDE	45.00 PPM	45.54 PPM	G1	+/- 0.7% NIST Traceable	09/15/2025, 09/22/2025
SULFUR DIOXIDE	45.00 PPM	45.20 PPM	G1	+/- 0.9% NIST Traceable	09/15/2025, 09/22/2025
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	160402854396106	CC83388	49.78 PPM CARBON MONOXIDE/NITROGEN	+/- 0.5%	Jan 24, 2032
SRM	4-K-33	CAL016939	49.07 PPM CARBON MONOXIDE/NITROGEN	±0.4	Apr 22, 2029
GMIS	DCK1201202233	CC750375	49.07 PPM NITRIC OXIDE/NITROGEN	+/- 0.5%	May 03, 2026
PRM	12404	APEX 1324257	50.04 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Dec 22, 2023
GMIS	15310042024202	CC502382	9.897 PPM NITROGEN DIOXIDE/AIR	+/- 2.1%	Sep 18, 2027
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	160403186449106	CC359439	51.58 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.9%	Jan 28, 2033
NTRM	160610-01	CC473196	49.02 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Mar 22, 2028

The SRM, NTRM, PRM, or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Sep 11, 2025
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Sep 17, 2025
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Sep 04, 2025
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Aug 28, 2025



Triad Data Available Upon Request

NOTES: Gross Weight: 48.5 Kg
Net Weight: 8.1 Kg
PO# 4225003218



CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E3HA0031
Cylinder Number: GN0034388
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12025
Gas Code: CO,NO,NOX,SO2,BALN
Reference Number: 160-403431356-1
Cylinder Volume: 247.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Sep 22, 2025

Expiration Date: Sep 22, 2033

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	90.00 PPM	91.18 PPM	G1	+/- 0.6% NIST Traceable	09/15/2025, 09/22/2025
CARBON MONOXIDE	90.00 PPM	90.71 PPM	G1	+/- 0.6% NIST Traceable	09/15/2025
NITRIC OXIDE	90.00 PPM	91.14 PPM	G1	+/- 0.6% NIST Traceable	09/15/2025, 09/22/2025
SULFUR DIOXIDE	90.00 PPM	90.75 PPM	G1	+/- 0.9% NIST Traceable	09/15/2025, 09/22/2025
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	1604029545661	EB0087840	100.4 PPM CARBON MONOXIDE/NITROGEN	+/- 0.5%	Apr 04, 2032
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	± 0.3%	Feb 28, 2025
GMIS	01092025110	GN0021244	100.2 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 09, 2033
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	15310042024202	CC502382	9.897 PPM NITROGEN DIOXIDE/AIR	+/- 2.1%	Sep 18, 2027
NTRM	170604-46	CC486718	98.32 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 20, 2028
GMIS	160403186448120	XC022794B	101.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.9%	Apr 01, 2033

The SRM, NTRM, PRM, or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Sep 11, 2025
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Sep 17, 2025
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Sep 04, 2025
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Aug 28, 2025



Triad Data Available Upon Request

NOTES: Gross Weight: 48.6 Kg
Net Weight: 8.1 Kg
PO# 4225003218



CERTIFICATE OF ANALYSIS
Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI88E200000C
Cylinder Number: 5139908Y
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: O2,BALN
Reference Number: 160-402891090-1
Cylinder Volume: 216.6 CF
Cylinder Pressure: 2014 PSIG
Valve Outlet: 590
Certification Date: Nov 27, 2023

Expiration Date: Nov 27, 2031

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	12.00 %	12.05 %	G1	+/- 0.4% NIST Traceable	11/27/2023
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010205	K001516	23.2 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2024
ANALYTICAL EQUIPMENT					
Instrument/Make/Model		Analytical Principle		Last Multipoint Calibration	
SIEMENS OXYMAT 6 - N1-W5-951 - O2		PARAMAGNETIC		Nov 08, 2023	

Triad Data Available Upon Request

NOTES: Gross Weight: 59.3Kg
Net Weight: 7.2 Kg
PO# 5223006228



CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI79E20004DC
Cylinder Number: 4621366Y
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: O2,BALN

Reference Number: 160-402891088-1
Cylinder Volume: 218.0 CF
Cylinder Pressure: 2014 PSIG
Valve Outlet: 590
Certification Date: Nov 27, 2023

Expiration Date: Nov 27, 2031

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	21.00 %	20.85 %	G1	+/- 0.5% NIST Traceable	11/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010205	K001516	23.2 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2024

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Nov 08, 2023

Triad Data Available Upon Request

NOTES: Gross Weight: 59.0 Kg
Net Weight: 7.4 Kg
PO# 5223006228



Approved for Release

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

รุ่นของอุปกรณ์ / เครื่องมือ : T100

วันที่ : 26 กุมภาพันธ์ 2568

บริษัทผู้ผลิต : Teledyne API

หมายเลขอุปกรณ์ / เครื่องมือ : 1385

TEST VALUES					BEFORE	AFTER
API MODEL T100						
1	RANGE	50 - 20,000 PPB			500.0	500.0
2	SO ₂ STABILITY	≤ 1 PPB			0.1	0.2
3	PRESSURE	25 - 35 in - Hg-A			27.7	27.5
4	SAMPLE FLOW	700 ± 10% cc/min			660.0	655
5	PMT	mV			65.0	34.0
6	NORM PMT	mV			70.5	39.0
7	UV LAMP	1000 - 4800 mV			3589.0	3486.7
8	LAMP RATIO	30 To 120 %			96.4	94.4
9	STRAY LIGHT	≤ 100 PPB			108.7	18.5
10	DARK PMT	-50 ± 200 % mV			68.0	80.8
11	DARK LAMP	-50 ± 200 % mV			1.1	1.1
12	SO ₂ SLOPE	1.0 ± 0.3			3.551	1.005
13	SO ₂ OFFSET	< 250 mV			61.2	36.3
14	HVPS	400 - 900 V			614	531
15	RX CELL TEMP	50 ± 1 °C			50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C			32.4	31.6
17	PMT TEMP	7 ± 2 °C			8.6	8.7
18	SO ₂ SAMPLE READING	PPB			16.2	1.1
19	OPTIC TEST	2000 ± 1000 mV			3335.9	2256.8
20	ELECTRICAL TEST	2000 ± 1000 mV			1871.2	1870.4
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V			5.18/ 12.11 /16.31 /-15.31	5.18/ 12.11 /16.31 /-15.31
22	ZERO GAS	0.00 PPB			9.3	0.1
23	SPAN GAS	400.00 PPB			451.9	400.2

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น
- ทำการ Calibrate Multi-Point

(คุณอนาคคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณอนาคคม มหาอาจ

โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนวิภาวดีรังสิต แขวงจันทน์เกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : Teledyne - API

MODEL : T100

SERIAL NUMBER : 1385

STANDARD GAS CONCENTRATION (PPM) : 53.56

CYLINDER NO : EB0169291

CYLINDER PRESSURE (PSIG) : 2000

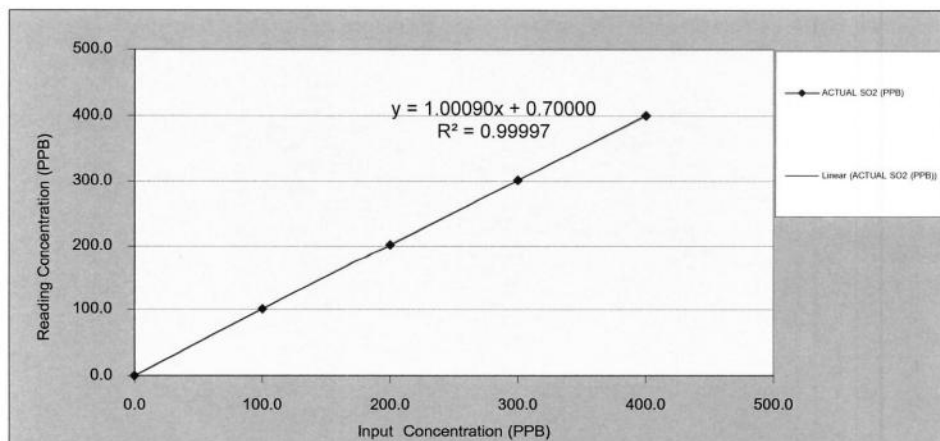
CERTIFIED DATE :Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO ₂ (PPB)	ERROR SO ₂ (PPB)	% ERROR SO ₂
ZERO	0.0	0.1	0.1	-
1	100.0	100.7	0.7	0.7
2	200.0	202.0	2.0	1.0
3	300.0	301.4	1.4	0.5
4	400.0	400.2	0.2	0.0
AVERAGE (%)				0.6



CALIBRATED BY : คุณธนาคม มหาอาจ

DATE :26 กุมภาพันธ์ 2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์: 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

KINETICS

บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

วันที่ : 19 มีนาคม 2568

รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T200

หมายเลขอุปกรณ์ / เครื่องมือ : 2199

TEST VALUES						
API MODEL T200			BEFORE	AFTER		
1	RANGE	50 - 20,000 PPB	500.0	500.0		
2	STABILITY	≤ 1 PPB	0.1	0.1		
3	SAMPLE FLOW	500 ± 10% cc/min	508	510		
4	OZONE FLOW	80 ± 10% cc/min	87	87		
5	PMT	mV	111.4	73.8		
6	NORM PMT	mV	-5.4	1.8		
7	A ZERO	-20 To 150 mV	12.3	74.7		
8	HPVS	400 - 900 V	669	661		
9	RX CELL TEMP	50 ± 1 °C	50.0	50.0		
10	BOX TEMP	AMBIENT ± 5 °C	29.8	30.2		
11	PMT TEMP	7 ± 2 °C	7.0	7.0		
12	MOLY TEMP	315 ± 5 °C	314.0	316.0		
13	RX CELL PRESSURE	<10 in - Hg-A	11.8	11.6		
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	28.9	29.3		
15	NOX SLOPE	1.0 ± 0.3	0.980	1.004		
16	NOX OFFSET	-50 To 150	26.3	-0.5		
17	NO SLOPE	1.0 ± 0.3	0.934	0.965		
18	NO OFFSET	-50 To 150	-2.7	-2.5		
19	NO SAMPLE READING	PPB	-1.0	2.5		
20	NO2 SAMPLE READING	PPB	-6.2	6.3		
21	NOX SAMPLE READING	PPB	-7.3	8.8		
22	OPTIC TEST	2000 ± 1000 mV	1962.4	1961.2		
23	ELECTRICAL TEST	2000 ± 1000 mV	2340.1	2238.3		
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.28 / 12.32 /15.88 /-15.07	5.28 / 12.32 /15.88 /-15.07		
25	ZERO GAS	NO/NOx 0.00/0.00 PPB	0.2 / -13.2	0.0 / 0.1		
26	SPAN GAS	NO/NOx 400.00/400.00 PPB	412.8 / 408.6	400.1 / 402.0		

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 3 ชิ้น, Spring 3 ชิ้น, O-ring 6 ชิ้น

- ทำการ Calibrate Multi-point

(คุณธนาคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางเทคนิค กรุณาติดต่อ : คุณธนาคม มหาอาจ โทรศัพท์: 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

MULTI-POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : NO_x Analyzer

MANUFACTURER : Teledyne - API

MODEL : T200

SERIAL NO : 2199

STANDARD GAS CONCENTRATION (PPM) : 53.16

CYLINDER NO : EB0169291

CYLINDER PRESSURE (psig) : 1550

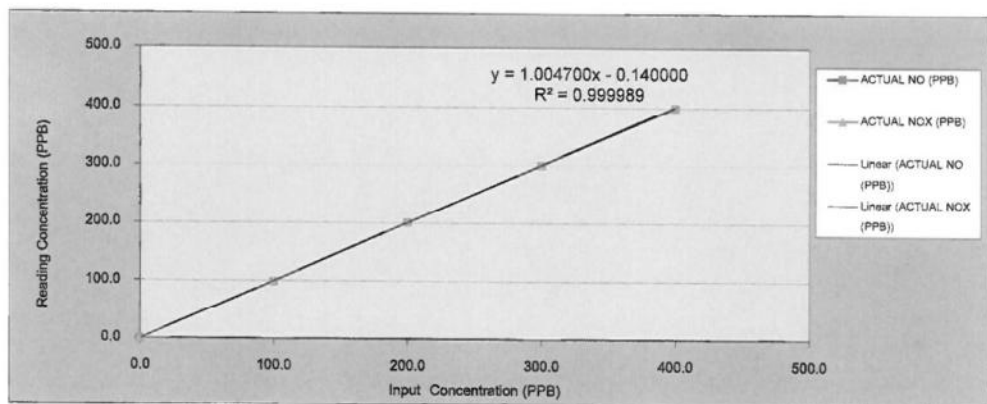
CERTIFIED DATE : Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO _x (PPB)	ERROR NO _x (PPB)	% ERROR NO _x
ZERO	0.0	0.0	0.0	-	0.1	0.1	-
1	100.0	98.8	-1.2	-1.2	99.8	-0.2	-0.2
2	200.0	201.0	1.0	0.5	201.4	1.4	0.7
3	300.0	300.2	0.2	0.1	300.7	0.7	0.2
4	400.0	400.1	0.1	0.0	402.0	2.0	0.5
AVERAGE (%)				0.5			0.4



CALIBRATED BY : คุณธนาคม มหาอาจ

DATE : 19 มีนาคม 2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

AQM 17005

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

วันที่ : 26 กุมภาพันธ์ 2568

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T100

หมายเลขอุปกรณ์ / เครื่องมือ : 1771

TEST VALUES

API MODEL T100		BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0
2	SO ₂ STABILITY	≤ 1 PPB	0.10
3	PRESSURE	25 - 35 in - Hg-A	27.7
4	SAMPLE FLOW	700 ± 10% cc/min	660.0
5	PMT	mV	51.5
6	NORM PMT	mV	63.4
7	UV LAMP	1000 - 4800 mV	3541.3
8	LAMP RATIO	30 To 120 %	86.3
9	STRAY LIGHT	≤ 100 PPB	56.8
10	DARK PMT	-50 ± 200 % mV	22.9
11	DARK LAMP	-50 ± 200 % mV	5.0
12	SO ₂ SLOPE	1.0 ± 0.3	1.850
13	SO ₂ OFFSET	< 250 mV	61.5
14	HVPS	400 - 900 V	577
15	RX CELL TEMP	50 ± 1 °C	50.0
16	BOX TEMP	AMBIENT ± 5 °C	31.5
17	PMT TEMP	7 ± 2 °C	8.5
18	SO ₂ SAMPLE READING	PPB	1.8
19	OPTIC TEST	2000 ± 1000 mV	1483.0
20	ELECTRICAL TEST	2000 ± 1000 mV	1004.0
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.19/ 11.66 /16.43 /-15.48
22	ZERO GAS	0.00 PPB	4.7
23	SPAN GAS	400.00 PPB	475.4

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น, Rebuild Kit Pump 1 set.

- ทำการ Calibrate Multi-Point

(คุณธนาคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางเทคนิค กรุณาติดต่อ : คุณธนาคม มหาอาจ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : Teledyne - API

MODEL : T100

SERIAL NUMBER : 1771

STANDARD GAS CONCENTRATION (PPM) : 53.79

CYLINDER NO : EB0169291

CYLINDER PRESSURE (PSIG) : 1550

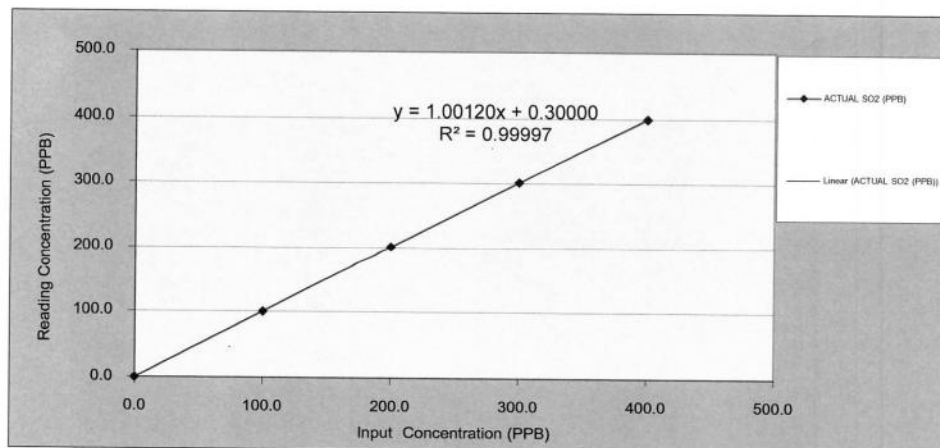
CERTIFIED DATE : Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO ₂ (PPB)	ERROR SO ₂ (PPB)	% ERROR SO ₂
ZERO	0.0	0.1	0.1	-
1	100.0	99.8	-0.2	-0.2
2	200.0	201.4	1.4	0.7
3	300.0	301.6	1.6	0.5
4	400.0	399.8	-0.2	0.0
AVERAGE (%)				0.4



CALIBRATED BY : คุณณนาค มหาวาจ

DATE :26 กุมภาพันธ์ 2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณณนาค มหาวาจ โทรศัพท์: 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์: 0-2515-8999 โทรสาร: 0-2515-8988 E-Mail: Info@kinetics.co.th



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

วันที่ : 16 กรกฎาคม 2568

รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T200

หมายเลขอุปกรณ์ / เครื่องมือ : 2975

		TEST VALUES		
		API MODEL T200	BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	STABILITY	≤ 1 PPB	0.0	0.3
3	SAMPLE FLOW	500 ± 10% cc/min	501	500
4	OZONE FLOW	80 ± 10% cc/min	82	82
5	PMT	mV	58.6	68.1
6	NORM PMT	mV	29.8	32.8
7	A ZERO	-20 To 150 MV	51.2	38.9
8	HPVS	400 - 900 V	775	775
9	RX CELL TEMP	50 ± 1 °C	50.0	50.0
10	BOX TEMP	AMBIENT ± 5 °C	28.4	28.1
11	PMT TEMP	7 ± 2 °C	7.4	7.5
12	MOLY TEMP	315 ± 5 °C	315.0	314.0
13	RX CELL PRESSURE	<10 in - Hg-A	4.9	4.9
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	29.0	29.0
15	NOX SLOPE	1.0 ± 0.3	1.031	0.996
16	NOX OFFSET	-50 To 150	24.0	1.8
17	NO SLOPE	1.0 ± 0.3	0.936	0.944
18	NO OFFSET	-50 To 150	-1.8	-1.1
19	NO SAMPLE READING	PPB	2.8	0.6
20	NO2 SAMPLE READING	PPB	9.1	2.5
21	NOX SAMPLE READING	PPB	11.9	3.1
22	OPTIC TEST	2000 ± 1000 mV	1131.2	1142.5
23	ELECTRICAL TEST	2000 ± 1000 mV	1256.0	1259.1
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.26 / 12.44 / 15.86 / -15.28	5.26 / 12.44 / 15.86 / -15.28
25	ZERO GAS NO/NOx	0.00/0.00 PPB	0.5 / -9.4	0.0 / 0.1
26	SPAN GAS NO/NOx	400.00/400.00 PPB	410.8 / 412.6	399.8 / 400.2

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 3 ชิ้น, Spring 3 ชิ้น, O-ring 6 ชิ้น

-ทำการ Calibrate Multi-point

(คุณณนาค มหาวาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางเทคนิค กรุณาติดต่อ : คุณณนาค มหาวาจ โทรศัพท์: 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์: 0-2515-8999 โทรสาร: 0-2515-8988 E-Mail: Info@kinetics.co.th

MULTI-POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : NO_x Analyzer

MANUFACTURER : Teledyne - API

MODEL : T200

SERIAL NO : 2975

STANDARD GAS CONCENTRATION (PPM) : 53.16

CYLINDER NO : EB0169291

CYLINDER PRESSURE (psig) : 1550

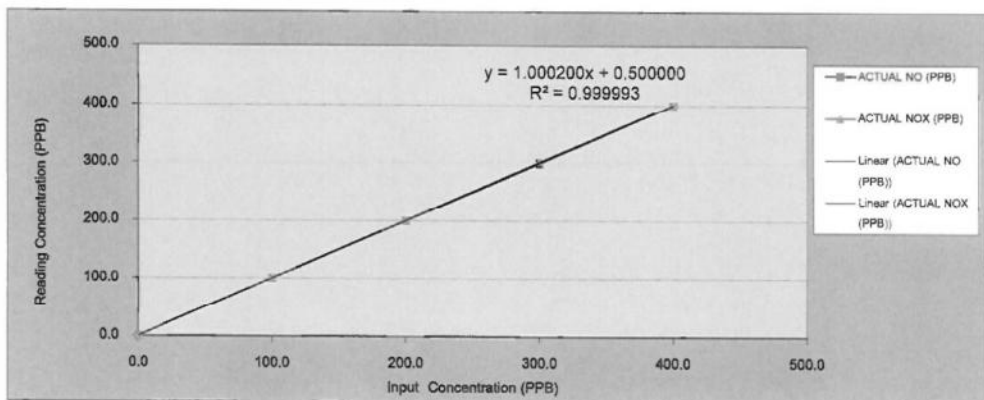
CERTIFIED DATE : Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO _x (PPB)	ERROR NO _x (PPB)	% ERROR NO _x
ZERO	0.0	0.0	0.0	-	0.1	0.1	-
1	100.0	100.2	0.2	0.2	101.0	1.0	1.0
2	200.0	199.7	-0.3	-0.2	200.4	0.4	0.2
3	300.0	298.9	-1.1	-0.4	301.0	1.0	0.3
4	400.0	399.8	-0.2	0.0	400.2	0.2	0.0
AVERAGE (%)				0.2			0.4



CALIBRATED BY : คุณธนาคม มหาอาจ

DATE : 16 กรกฎาคม 2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์ : 02-515-8997

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรมาน เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

AAG-M 22002

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

วันที่ : 26 กุมภาพันธ์ 2568

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T100

หมายเลขอุปกรณ์ / เครื่องมือ : 6200

TEST VALUES					BEFORE	AFTER
API MODEL T100						
1	RANGE	50 - 20,000 PPB			500.0	500.0
2	SO ₂ STABILITY	≤ 1 PPB			0.18	0.09
3	PRESSURE	25 - 35 in - Hg-A			29.6	29.5
4	SAMPLE FLOW	700 ± 10% cc/min			660.9	661
5	PMT	mV			30.4	95.6
6	NORM PMT	mV			38.7	125.5
7	UV LAMP	1000 - 4800 mV			2405.0	2429.5
8	LAMP RATIO	30 To 120 %			78.7	79.5
9	STRAY LIGHT	≤ 100 PPB			66.3	69.5
10	DARK PMT	-50 ± 200 % mV			178.0	132.4
11	DARK LAMP	-50 ± 200 % mV			1.7	1.4
12	SO ₂ SLOPE	1.0 ± 0.3			3.313	1.069
13	SO ₂ OFFSET	< 250 mV			40.0	130.1
14	HVPS	400 - 900 V			653	645
15	RX CELL TEMP	50 ± 1 °C			50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C			32.1	31.4
17	PMT TEMP	7 ± 2 °C			8.2	8.3
18	SO ₂ SAMPLE READING	PPB			-1.744	0.524
19	OPTIC TEST	2000 ± 1000 mV			2385.0	2381.6
20	ELECTRICAL TEST	2000 ± 1000 mV			2775.0	2774.8
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V			5.18/ 12.08 /15.65 /-15.18	5.18/ 12.08 /15.65 /-15.18
22	ZERO GAS	0.00 PPB			-1.942	0.128
23	SPAN GAS	400.00 PPB			421.792	399.086

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น

- ทำการ Calibrate Multi-Point

(คุณธนาคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางเทคนิค กรุณาติดต่อ : คุณธนาคม มหาอาจ

โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรมาน เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : Teledyne - API

MODEL : T100

SERIAL NUMBER : 6200

STANDARD GAS CONCENTRATION (PPM) : 53 53.56

CYLINDER NO : EB0169291

CYLINDER PRESSURE (PSIG) : 2000

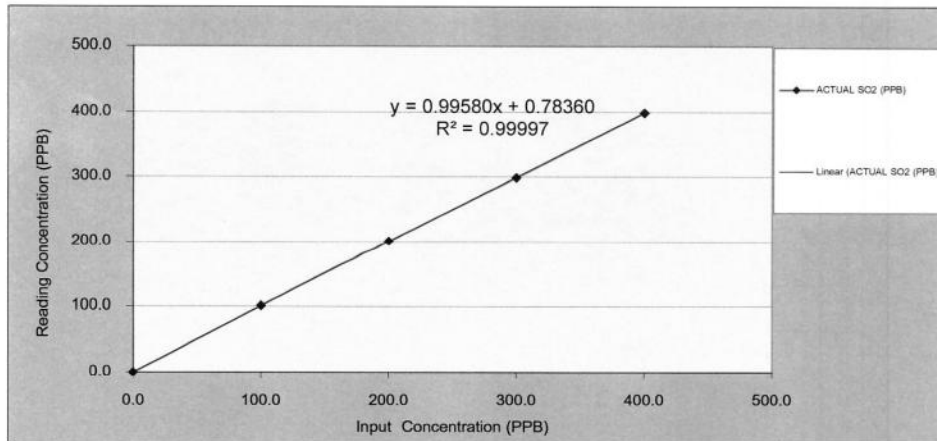
CERTIFIED DATE : Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO ₂ (PPB)	ERROR SO ₂ (PPB)	% ERROR SO ₂
ZERO	0.000	0.128	0.13	-
1	100.000	100.786	0.79	0.79
2	200.000	201.048	1.05	0.52
3	300.000	298.669	-1.33	-0.44
4	400.000	399.086	-0.91	-0.23
AVERAGE (%)				0.49



CALIBRATED BY : คุณณาคม มหาอาจ

DATE : 26 กุมภาพันธ์ 2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณณาคม มหาอาจ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

AGM 22009

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน :SGS (Thailand) Co., Ltd.

วันที่ : 26 กุมภาพันธ์ 2568

รายชื่ออุปกรณ์ / เครื่องมือ : SO₂ Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T100

หมายเลขอุปกรณ์ / เครื่องมือ : 6201

TEST VALUES						
API MODEL T100					BEFORE	AFTER
1	RANGE	50 - 20,000 PPB			500.0	500.0
2	SO ₂ STABILITY	≤ 1 PPB			0.00	0.02
3	PRESSURE	25 - 35 in - Hg-A			26.9	26.6
4	SAMPLE FLOW	700 ± 10% cc/min			675.0	671
5	PMT	mV			78.9	15.7
6	NORM PMT	mV			70.2	18.7
7	UV LAMP	1000 - 4800 mV			4344.7	4321.8
8	LAMP RATIO	30 To 120 %			123.6	92.2
9	STRAY LIGHT	≤ 100 PPB			41.5	7.8
10	DARK PMT	-50 ± 200 % mV			xxx	120.0
11	DARK LAMP	-50 ± 200 % mV			4.5	4.3
12	SO ₂ SLOPE	1.0 ± 0.3			1.694	1.003
13	SO ₂ OFFSET	< 250 mV			49.0	15.7
14	HVPS	400 - 900 V			560	529
15	RX CELL TEMP	50 ± 1 °C			50.0	50.0
16	BOX TEMP	AMBIENT ± 5 °C			33.1	31.7
17	PMT TEMP	7 ± 2 °C			8.4	8.4
18	SO ₂ SAMPLE READING	PPB			0.018	1.041
19	OPTIC TEST	2000 ± 1000 mV			5003.0	2116.3
20	ELECTRICAL TEST	2000 ± 1000 mV			3228.0	2660.5
21	VOLTAGE TEST	+5 V +12 V +15 V -15 V			5.10/ 12.09 /15.48 /-15.15	5.10/ 12.09 /15.48 /-15.15
22	ZERO GAS	0.00 PPB			4.750	0.406
23	SPAN GAS	400.00 PPB			460.218	400.026

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น

- ทำการ Calibrate Multi-Point

(คุณณาคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางเทคนิค กรุณาติดต่อ : คุณณาคม มหาอาจ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME :SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : Teledyne - API

MODEL : T100

SERIAL NUMBER : 6201

STANDARD GAS CONCENTRATION (PPM) : 53.79

CYLINDER NO : EB0169291

CYLINDER PRESSURE (PSIG) : 1550

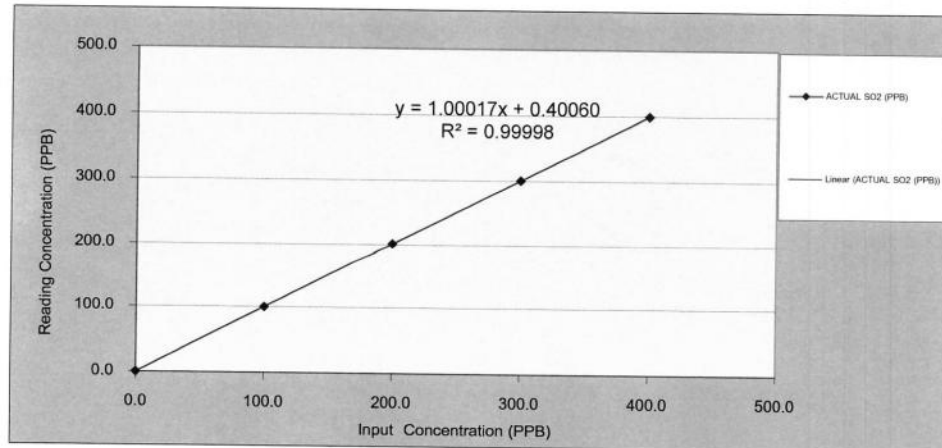
CERTIFIED DATE : Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL (PPB)	ACTUAL SO ₂ (PPB)	ERROR SO ₂ (PPB)	% ERROR SO ₂
ZERO	0.000	0.406	0.4	-
1	100.000	99.712	-0.3	-0.3
2	200.000	201.387	1.4	0.7
3	300.000	300.642	0.6	0.2
4	400.000	400.026	0.0	0.0
AVERAGE (%)				0.3



CALIBRATED BY : คุณอนาคม มหาอาจ

DATE : 26 กุมภาพันธ์ 2568

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณอนาคม มหาอาจ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

KINETICS
Environmental science business Unit

Customer service report

บริษัท เอส จี เอส (ประเทศไทย) จำกัด

Manufacturer

Teledyne API

Equipment

NOx Analyzer

Model

T200

S/N

7533

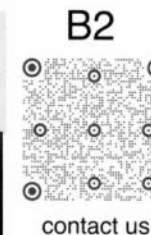
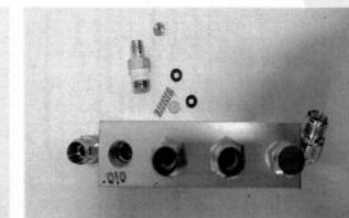
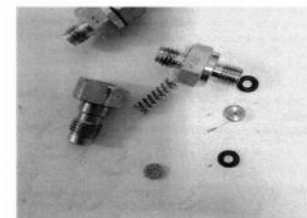
Quotation

● Checking Date ●

6/02/2568

● Problem

Preventive Maintenance



● Correlation working / Remark

1. ทำการเปลี่ยน Sintered Filter 3 ชิ้น , Spring 3 ชิ้น O-ring 6 ชิ้น

2. ทำการ Calibrate Multi-point

● Repair parts ●

Sintered Filter 3 ชิ้น , Spring 3 ชิ้น , O-ring 6 ชิ้น

Technician / Engineer

Mr. Thanakom



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

วันที่ : 6 กุมภาพันธ์ 2568

รายชื่ออุปกรณ์ / เครื่องมือ : NO_x Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T200

หมายเลขอุปกรณ์ / เครื่องมือ : 7533

TEST VALUES

API MODEL T200			BEFORE	AFTER
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	STABILITY	≤ 1 PPB	1.04	0.17
3	SAMPLE FLOW	500 ± 10% cc/min	493	473
4	OZONE FLOW	80 ± 10% cc/min	125	82
5	PMT	mV	250.0	86.5
6	NORM PMT	mV	67.8	19.6
7	A ZERO	-20 To 150 MV	xxx	86.7
8	HPVS	400 - 900 V	660	754
9	RX CELL TEMP	50 ± 1 °C	50.1	50.0
10	BOX TEMP	AMBIENT ± 5 °C	31.4	31.7
11	PMT TEMP	7 ± 2 °C	6.8	6.8
12	MOLY TEMP	315 ± 5 °C	314.4	315.0
13	RX CELL PRESSURE	<10 in - Hg-A	2.9	2.8
14	SAMPLE PRESSURE	2b - 3b in - Hg-A	28.5	28.6
15	NOX SLOPE	1.0 ± 0.3	1.243	1.048
16	NOX OFFSET	-50 To 150	4.7	-1.3
17	NO SLOPE	1.0 ± 0.3	1.238	1.032
18	NO OFFSET	-50 To 150	1.7	0.5
19	NO SAMPLE READING	PPB	40.0	0.2
20	NO2 SAMPLE READING	PPB	15.3	10.5
21	NOX SAMPLE READING	PPB	55.2	10.7
22	OPTIC TEST	2000 ± 1000 mV	2677.9	2670.4
23	ELECTRICAL TEST	2000 ± 1000 mV	2663.9	2661.5
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.27 /12.32/ 15.96/ -15.17	5.27 /12.32/ 15.96/ -15.17
25	ZERO GAS	NO/NO _x	0.00/0.00 PPB	30.1 / 30.4
26	SPAN GAS	NO/NO _x	400.00/400.00 PPB	480.6 / 489.2
				400.5 / 402.0

หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 3 ชิ้น, Spring 3 ชิ้น, O-ring 6 ชิ้น

- ทำการ Calibrate Multi-Point

(คุณธนาคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณธนาคม มหาอาจ โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : NO_x Analyzer

MANUFACTURER : Teledyne - API

MODEL : T200

SERIAL NO : 7533

STANDARD GAS CONCENTRATION (PPM) : 53.16

CYLINDER NO : EB0169291

CYLINDER PRESSURE (psig) : 2000

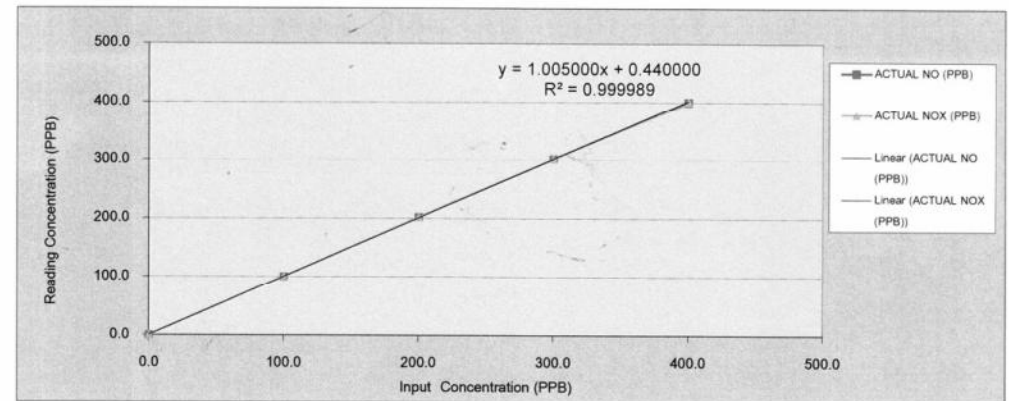
CERTIFIED DATE : Nov 08,2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08,2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO _x (PPB)	ERROR NO _x (PPB)	% ERROR NO _x
ZERO	0.0	0.0	0.0	-	0.1	0.1	-
1	100.0	100.5	0.5	0.5	100.8	0.8	0.8
2	200.0	202.0	-0.7	1.0	202.3	2.3	1.2
3	300.0	301.6	1.6	0.5	302.0	2.0	0.7
4	400.0	400.5	0.5	0.1	402.0	2.0	0.5
AVERAGE (%)				0.5			0.8



CALIBRATED BY : คุณธนาคม มหาอาจ

DATE : 6 /02 /2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณธนาคม มหาอาจ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

Customer service report

บริษัท เอส ซี เอส (ประเทศไทย) จำกัด

Manufacturer
Teledyne API

Equipment
NOx Analyzer

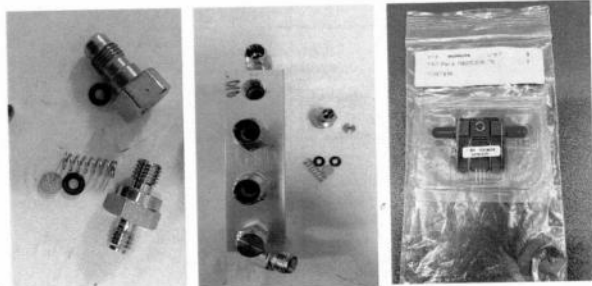
Model
T200

S/N
7534

Quotation

● Checking Date ●
6/02/2568

- Problem
- O3 Flow Warning



● Correlation working / Remark

1. ทำการเปลี่ยน Flow Meter 1 ชิ้น, Sintered Filter 3 ชิ้น, Spring 3 ชิ้น O-ring 6 ชิ้น
2. ทำการ Calibrate Multi-point

● Repair parts ●

Flow Meter 1 ชิ้น, Sintered Filter 3 ชิ้น, Spring 3 ชิ้น, O-ring 6 ชิ้น

บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.

วันที่ : 6 กุมภาพันธ์ 2568

รายชื่ออุปกรณ์ / เครื่องมือ : NOx Analyzer

บริษัทผู้ผลิต : Teledyne API

รุ่นของอุปกรณ์ / เครื่องมือ : T200

หมายเลขอุปกรณ์ / เครื่องมือ : 7534

TEST VALUES				
	API MODEL T200	BEFORE	AFTER	
1	RANGE	50 - 20,000 PPB	500.0	500.0
2	STABILITY	≤ 1 PPB	0.12	0.09
3	SAMPLE FLOW	500 ± 10% cc/min	469	481
4	OZONE FLOW	80 ± 10% cc/min	0	80
5	PMT	mV	114.5	72.9
6	NORM PMT	mV	-5.9	55.3
7	A ZERO	-20 To 150 MV	xxx	71.8
8	HPVS	400 - 900 V	650	642
9	RX CELL TEMP	50 ± 1 °C	50.0	50.0
10	BOX TEMP	AMBIENT ± 5 °C	31.0	30.0
11	PMT TEMP	7 ± 2 °C	7.0	7.1
12	MOLY TEMP	315 ± 5 °C	315.2	315.1
13	RX CELL PRESSURE	<10 in - Hg-A	4.1	4.1
14	SAMPLE PRESSURE	25 - 35 in - Hg-A	28.5	28.8
15	NOX SLOPE	1.0 ± 0.3	0.891	1.000
16	NOX OFFSET	-50 To 150	-31.4	-4.2
17	NO SLOPE	1.0 ± 0.3	0.877	0.990
18	NO OFFSET	-50 To 150	-31.00	-5.60
19	NO SAMPLE READING	PPB	11.0	7.7
20	NO2 SAMPLE READING	PPB	0.5	22.5
21	NOX SAMPLE READING	PPB	11.5	30.2
22	OPTIC TEST	2000 ± 1000 mV	2068.2	2071.3
23	ELECTRICAL TEST	2000 ± 1000 mV	2405.6	2455.6
24	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.17 / 12.00 / 15.38 / -15.16	5.17 / 12.00 / 15.38 / -15.16
25	ZERO GAS NO/NOx	0.00/0.00 PPB	9.2 / 10.6	0.1 / 0.1
26	SPAN GAS NO/NOx	400.00/400.00 PPB	480.1 / 482.0	401.0 / 402.0

หมายเหตุ

- O3 Flow Warning
- ทำการเปลี่ยน Flow Meter 1 ชิ้น, Sintered Filter 3 ชิ้น, Spring 3 ชิ้น, O-ring 6 ชิ้น
- ทำการ Calibrate Multi-Point

(คุณณาคม มหาอาจ)

ลงนามเจ้าหน้าที่ (Signature)

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณณาคม มหาอาจ

โทรศัพท์ : 0-2515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทราภิรม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.

EQUIPMENT NAME : NO_x Analyzer

MANUFACTURER : Teledyne - API

MODEL : T200

SERIAL NO : 7534

STANDARD GAS CONCENTRATION (PPM) : 53.16

CYLINDER NO : EB0169291

CYLINDER PRESSURE (psig) : 2000

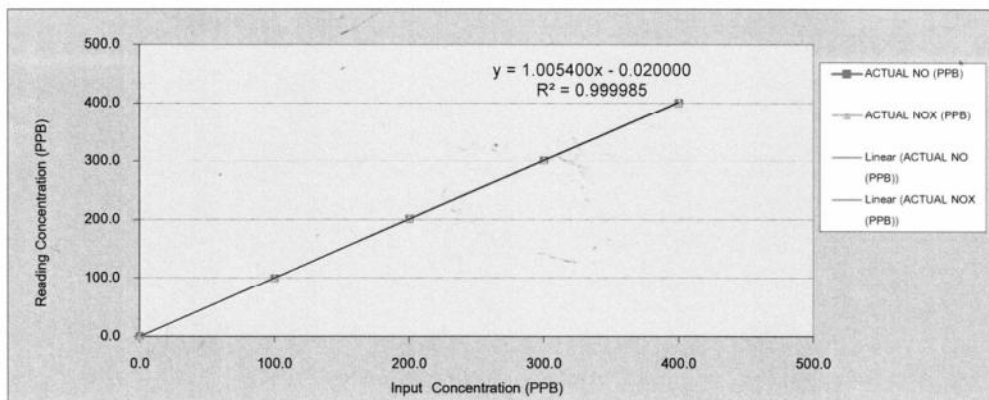
CERTIFIED DATE : Nov 08, 2023

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Nov 08, 2031

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO _x (PPB)	ERROR NO _x (PPB)	% ERROR NO _x
ZERO	0.0	0.1	0.1	-	0.1	0.1	-
1	100.0	99.7	-0.3	-0.3	99.8	-0.2	-0.2
2	200.0	201.4	1.4	0.7	202.0	2.0	1.0
3	300.0	300.8	0.8	0.3	301.4	1.4	0.5
4	400.0	401.0	1.0	0.3	402.0	2.0	0.5
AVERAGE (%)				0.4	0.6		



CALIBRATED BY : คุณอนาคมน มหาอาจ

DATE : 6 /02 /2568

ต้องการข้อมูลเพิ่มเติมทางเทคนิคเพิ่มเติม : คุณอนาคมน มหาอาจ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th



บริษัท ไอแอนค็อคเคอเนชั่นส์ (ประเทศไทย) จำกัด
1035/66 ถนนชินคันท์ แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10250
โทรศัพท์ : 023221852 อีเมล : info@iecth.com

I&E CONSULTANT (THAILAND) CO., LTD.
1035/66 Srinakharin Road, Onnut Suanluang, Bangkok 10250
Tel. +66 2322 1852 email: info@iecth.com

รายงานผลการปรับเทียบระบบควบคุมอัตราการไหลอากาศบริสุทธิ์

MASS FLOW CONTROL ZERO AIR CALIBRATION REPORT

Calibration Instrument

เครื่องมือตรวจวัด : เครื่องปรับเทียบความถูกต้องของก๊าซ (Calibrator)

Instrument

รุ่น : T700

Model

ยี่ห้อ : TELEDYNE API

Manufacturer

หมายเลขเครื่อง : 3013

Serial No

ย่านการตรวจวัด : 0 - 10 LPM

Measuring Range

ลูกค้า : SGS (THAILAND) LIMITED

Customer

วันที่เข้าปรับเทียบ : 18 มีนาคม 2568

Date of Calibration

Result of Calibration

Flow Rate Volume (Multi Gas Calibrator Display)		Sensor Reading			
		Before		After	
Flow Set (LPM)	Monitor (LPM)	LPM	%Error	LPM	%Error
1.00	1.000	1.041	3.939	1.020	1.961
2.00	2.000	2.056	2.675	2.016	0.744
3.00	3.000	3.076	2.471	3.019	0.629
4.00	4.000	4.054	1.332	4.022	0.547
5.00	5.000	5.066	1.303	5.025	0.498
6.00	6.000	6.054	0.892	6.028	0.464
7.00	7.000	7.067	0.948	7.024	0.342
8.00	8.000	8.088	1.088	8.019	0.237
9.00	9.000	9.089	0.979	9.011	0.122
10.00	10.000	10.096	0.951	9.995	-0.050
AVERAGE DIFFERENCE (%)		1.6577		0.5494	
Interception		-0.0410		-0.0259	
Correlation		1.0000		1.0000	

Calibration Tolerance

% Difference be should + / - 1 % of Full Scal
User Manual of Reference

Reference Standard Instrument

เครื่องมือสอบเทียบ : DayCal (High)

Instrument

รุ่น : DCL-MH

Model

ยี่ห้อ : BIOS

Manufacturer

หมายเลขเครื่อง : 3222

Serial No.

ย่านการตรวจวัด : 30 l/min

Measuring Range

เครื่องมือสอบเทียบ : DryCal (Low)

Instrument

รุ่น : Defender 520-L

Model

ยี่ห้อ : BIOS

Manufacturer

หมายเลขเครื่อง : 122189

Serial No.

ย่านการตรวจวัด : 500ml/min

Measuring Range

Result

☒ Accepted

☐ Not Accepted

ผู้ดำเนินการ :

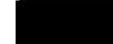
Service By



(สุริยะ เลี้ยงโฮง)
Service Engineer

ผู้ตรวจสอบ :

Approved By



(สุชาติ พุทธิชัย)
Service Manager



บริษัท ไอแอลอีคอนซัลแทนท์ (ประเทศไทย) จำกัด
1035/66 ถนนศรีนครินทร์ แขวงคลองจั่น เขตสวนหลวง กรุงเทพมหานคร 10250
โทรศัพท์ : 023221852 อีเมล : info@iecth.com

I&E CONSULTANT (THAILAND) CO., LTD.
1035/66 Srinakharin Road, Onnut Suanluang, Bangkok 10250
Tel. +66 2322 1852 email: info@iecth.com

รายงานผลการปรับเทียบระบบควบคุมอัตราการไหลอากาศบริสุทธิ์

MASS FLOW CONTROL STANDARD GAS CALIBRATION REPORT

Calibration Instrument

เครื่องมือตรวจวัด : เครื่องปรับเทียบความถูกต้องของก๊าซ (Calibrator)
Instrument :
รุ่น : T700
Model :
ยี่ห้อ : TELEDYNE API
Manufacturer :
หมายเลขเครื่อง : 3013
Serial No :
ย่านการตรวจวัด : 0 - 100 CCPM
Measuring Rang :
ลูกค้า : SGS (THAILAND) LIMITED
Customer :

วันที่เข้าปรับเทียบ : 18 มีนาคม 2568
Date of Calibration :

Result of Calibration

Flow Rate Volume (Multi Gas Calibrator Display)		Sensor Reading			
		Before		After	
Flow Set (CCPM)	Monitor (CCPM)	CCPM	%Error	CCPM	%Error
10.00	10.00	10.26	2.53	9.88	-1.21
20.00	20.00	21.31	6.15	19.95	-0.25
30.00	30.00	32.21	6.86	29.96	-0.13
40.00	40.00	41.44	3.47	40.02	0.05
50.00	50.00	53.38	6.33	49.89	-0.22
60.00	60.00	63.41	5.38	60.05	0.08
70.00	70.00	74.34	5.84	69.78	-0.32
80.00	80.00	85.11	6.00	79.77	-0.29
90.00	90.00	95.04	5.30	89.84	-0.18
100.00	100.00	104.77	4.55	99.91	-0.09
AVERAGE DIFFERENCE (%)		5.2425		-0.2558	
Interception		-0.1070		0.0285	
Correlation		0.9999		1.0000	

Calibration Tolerance : % Difference be should + / - 1 % of Full Scal
User Manual of Reference

Reference Standard Instrument

เครื่องมือสอบเทียบ : DeyCal (High)
Instrument :
รุ่น : DCL-MH
Model :
ยี่ห้อ : BIOS
Manufacturer :
หมายเลขเครื่อง : 3222
Serial No. :
ย่านการตรวจวัด : 30 l/min
Measuring Range :
เครื่องมือสอบเทียบ : DryCal (Low)
Instrument :
รุ่น : Defender 520-L
Model :
ยี่ห้อ : BIOS
Manufacturer :
หมายเลขเครื่อง : 122189
Serial No. :
ย่านการตรวจวัด : 500ml/min
Measuring Range :

Result : ☒ Accepted
☐ Not Accepted

ผู้ดำเนินการ : 
Service By : (สุริยะ เลื่อยไธสง)
Service Engineer

ผู้ตรวจสอบ : 
Approved By : (สุชาติ พุทธิธรรมชัย)
Service Manager



บริษัท ไอแอลอีคอนซัลแทนท์ (ประเทศไทย) จำกัด
1035/66 ถนนศรีนครินทร์ แขวงคลองจั่น เขตสวนหลวง กรุงเทพมหานคร 10250
โทรศัพท์ : 023221852 อีเมล : info@iecth.com

I&E CONSULTANT (THAILAND) CO., LTD.
1035/66 Srinakharin Road, Onnut Suanluang, Bangkok 10250
Tel. +66 2322 1852 email: info@iecth.com

รายงานผลการปรับเทียบระบบผลิตก๊าซโอโซน

OZONE GENERATOR CALIBRATION REPORT

Calibration Instrument

เครื่องมือตรวจวัด : เครื่องปรับเทียบความถูกต้องของก๊าซ (Calibrator)
Instrument :
รุ่น : T700
Model :
ยี่ห้อ : TELEDYNE API
Manufacturer :
หมายเลขเครื่อง : 3013
Serial No :
ย่านการตรวจวัด : 0 - 100 CCPM
Measuring Rang :
ลูกค้า : SGS (THAILAND) LIMITED
Customer :

วันที่เข้าปรับเทียบ : 18 มีนาคม 2568
Date of Calibration :

Result of Calibration

Ozone Concentration (Multi Gas Calibrator Display)		Sensor Reading			
		Before		After	
Ozone Set (PPB)	Monitor (PPB)	PPB	%Error	PPB	%Error
0.0	0.0	0.0	0.0	0.0	0.0
100.0	100.0	98.0	-2.0	99.0	-1.0
200.0	200.0	199.0	-1.0	199.0	-1.0
300.0	300.0	299.0	-1.0	300.0	0.0
400.0	400.0	400.0	0.0	399.0	-1.0
500.0	500.0	501.0	1.0	500.0	0.0
600.0	600.0	600.0	0.0	600.0	0.0
700.0	700.0	700.0	0.0	701.0	1.0
800.0	800.0	801.0	1.0	800.0	0.0
AVERAGE DIFFERENCE (%)		-0.2500		-0.2500	
Interception		1.852804		1.213361	
Correlation		0.999997		0.999998	

Calibration Tolerance : % Difference be should + / - 3 PPB At 5 LPM
User Manual of Reference

Reference Standard Instrument

เครื่องมือสอบเทียบ : Ozone Primary Standard
Instrument :
รุ่น : SA2-734
Model :
ยี่ห้อ : Tanabyte Engineering Inc.
Manufacturer :
ย่านการตรวจวัด : 0 - 1500 PPB
Measuring Range :
รุ่น : SA2-734
Model :
หมายเลขเครื่อง : 0140
Serial No. :

Result : ☒ Accepted
☐ Not Accepted

ผู้ดำเนินการ : 
Service By : (สุริยะ เลื่อยไธสง)
Service Engineer

ผู้ตรวจสอบ : 
Approved By : (สุชาติ พุทธิธรรมชัย)
Service Manager



THAI METEOROLOGICAL DEPARTMENT

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

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 17 February, 2025

Certification No. 103/25

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Mode No. : 6152C Model No. : 6152C

Mfg Code : Display AZ170619046 Transmitter AZ170619046

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1013.2 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board

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

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

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

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

STANDARD BAROMETER : Digital Barometer Type PTB220 No. V1220015

Calibrated by : [Redacted] Sign

Mr. Watcharapol Suwan

Mechanical Engineer

Mr. [Redacted]

(Authorised Signatory)

for the Chief

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 103/25

17 February, 2025

Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.0	0.00
9.02	-	-	-	9.0	0.02
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.1	-0.09
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.1	-0.08

Vane Angel Bench Stand Model 18112

Young Meteorological Instruments

WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

Mr. Watcharapol Suwan

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 103/25

17 February, 2025

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
755.42	756.7	-1.28
755.59	756.9	-1.31
755.84	757.0	-1.16
756.16	757.3	-1.14
756.71	757.9	-1.19
757.88	759.0	-1.12
758.60	759.7	-1.10
758.35	759.6	-1.25
758.10	759.3	-1.20
757.79	759.0	-1.21
757.42	758.8	-1.38
756.76	758.1	-1.34
757.07	758.3	-1.23
757.48	758.8	-1.32
757.99	759.2	-1.21
758.62	759.7	-1.08
759.29	760.5	-1.21
757.37	758.6	-1.23
758.06	759.4	-1.34
758.32	759.5	-1.18

Average

1.22

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 103/25

17 February, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.5	0.0
30.4	30.4	0.0
15.6	15.6	0.0

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 103/25

17 February, 2025

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading	Correction
	% R.H.	% R.H.
45.1	45	0.10
64.2	63	1.20
92.5	90	2.50

Calibrated by :

Mr. Watcharapol Subwat
Mechanical Engineer



Date of Issue 17 February, 2025

Certification No. 103/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152C Mfg. Code. AZ170619046 ทำการสอบเทียบกับแก้ววัดฝนแบบ แก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in./TIP)



ลงชื่อ

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

ENAB 19183



THAI METEOROLOGICAL DEPARTMENT

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

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 1 April, 2025

Certification No. 195/25

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415073 Transmitter BD190415073

Customer : SGS (Thailand) Limited.
238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.4 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112

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

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

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

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

STANDARD BAROMETER : Digital Barometer Type PTB220 No. V1220015

Calibrated by : [Redacted Signature]

Sig

Mr. Watcharapol

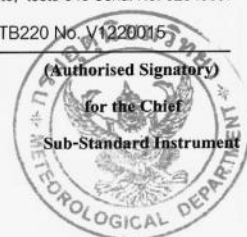
Mr.

Mechanical Engineer

(Authorised Signatory)

for the Chief

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 195/25

1 April, 2025

Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.1	-0.09
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Vane Angel Bench Stand Model 18112

Young Meteorological Instruments

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 195/25

1 April, 2025

Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction (mmHg)
756.43	757.5	-1.07
756.82	757.9	-1.08
755.58	756.8	-1.22
754.01	755.2	-1.19
754.14	755.3	-1.16
755.39	756.4	-1.01
755.65	756.6	-0.95
755.72	756.7	-0.98
755.83	756.8	-0.97
755.96	757.0	-1.04
756.93	757.8	-0.87
758.38	759.4	-1.02
758.59	759.7	-1.11
758.30	759.5	-1.20
757.85	759.0	-1.15
757.59	758.6	-1.01
756.14	757.2	-1.06
756.28	757.4	-1.12
756.44	757.6	-1.16
756.99	758.2	-1.21

Average

-1.08

Calibrated by :

Mr. Watcharapol Subwat
Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 195/25

1 April, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.3	45.5	-0.2
30.3	30.4	-0.1
15.4	15.4	0.0

Calibrated by :

Mr. Watcharapol Subwat
Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 195/25

1 April, 2025

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
86.24	89	-2.76
65.28	66	-0.72
45.16	44	1.16

Calibrated by :



Mr. Watcharapol Subwat
Mechanical Engineer



Date of Issue 1 April, 2025

Certification No. 195/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152C Mfg. Code. BD190415073 ทำการสอบเทียบกับแก้ววัดฝนแบบ แก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in./TIP)



ลงชื่อ...



(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

ENAB 19134

THAI METEOROLOGICAL DEPARTMENT



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

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 1 April, 2025

Certification No. 194/25

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415074 Transmitter A111101P016

Customer : SGS (Thailand) Limited.
238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.6 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112

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

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

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

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

STANDARD BAROMETER : Digital Type PTB220 No. V1220015

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

(Authorised Signatory)

for the Chief

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT



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

The Result of Calibration

Certification No. 194/25

1 April, 2025

Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.3	0.72

Vane Angel Bench Stand Model 18112 Young Meteorological Instruments	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 194/25

1 April, 2025

Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction (mmHg)
756.43	757.7	-1.27
756.82	758.2	-1.38
755.58	757.1	-1.52
754.01	755.5	-1.49
754.14	755.6	-1.46
755.39	756.8	-1.41
755.65	757.0	-1.35
755.72	757.1	-1.38
755.83	757.2	-1.37
755.96	757.3	-1.34
756.93	758.2	-1.27
758.38	759.7	-1.32
758.59	759.9	-1.31
758.30	759.7	-1.40
757.85	759.3	-1.45
757.59	759.0	-1.41
756.14	757.5	-1.36
756.28	757.6	-1.32
756.44	757.8	-1.36
756.99	758.4	-1.41

Average

1.38

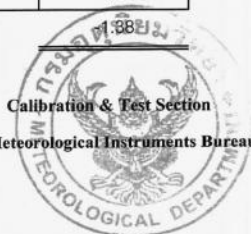
Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 194/25

1 April, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.3	45.4	-0.1
30.3	30.3	0.0
15.4	15.4	0.0

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 194/25

1 April, 2025

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
86.24	89	-2.76
65.28	67	-1.72
45.16	45	0.16

Calibrated by :



Mr. Watcharapol Subwat
Mechanical Engineer



Date of Issue 1 April, 2025

Certification No. 194/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชีท้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152CUK Mfg. Code. A111101P016 ทำการสอบเทียบกับแก้ววัดฝน แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)



ลงชื่อ



(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

THAI METEOROLOGICAL DEPARTMENT



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

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 17 February, 2025

Certification No. 104/25

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Mode No. : 6152C Model No. : 6152C

Mfg Code : Display BD190415090 Transmitter BD190415090

Customer : SGS (Thailand) Limited.
100 Nanglinchee Road, Chongnonsi,
Yannawa, Bangkok 10120.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1013.6 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board

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

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

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

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

STANDARD BAROMETER : Digital Barometer Type PTB220 No. V1220045

Calibrated by : [Redacted] Sign

Mr. Watcharapol Subwat
Mechanical Engineer

Sign

Mr. [Redacted]

(Authorised Signatory)

for the Chief

Sub-Standard Instrument



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 104/25

17 February, 2025

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure m/sec	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.0	0.00
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	12.9	0.11
15.01	-	-	-	15.0	0.01
17.02	-	-	-	16.9	0.12
20.02	-	-	-	20.0	0.02

Vane Angel Bench Stand Model 18112

Young Meteorological Instruments

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 104/25

17 February, 2025

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
755.42	756.7	-1.28
755.59	756.8	-1.21
755.84	757.0	-1.16
756.16	757.4	-1.24
756.71	757.9	-1.19
757.88	759.0	-1.12
758.60	759.7	-1.10
758.35	759.5	-1.15
758.10	759.2	-1.10
757.79	759.0	-1.21
757.42	758.6	-1.18
756.76	758.1	-1.34
757.07	758.4	-1.33
757.48	758.7	-1.22
757.99	759.1	-1.11
758.62	759.7	-1.08
759.29	760.3	-1.01
757.37	758.6	-1.23
758.06	759.3	-1.24
758.32	759.5	-1.18

Average

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 104/25

17 February, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.6	-0.1
30.4	30.5	-0.1
15.6	15.6	0.0

Calibrated by

Mr. Watcharapol Subwat

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 104/25

17 February, 2025

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading	Correction
	% R.H.	% R.H.
45.1	46	-0.90
64.2	64	0.20
92.5	94	-1.50

Calibrated by :

Mr. Watcharapol Subwat
Mechanical Engineer



Date of Issue 17 February, 2025

Certification No. 104/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชีห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152C Mfg. Code. BD190415090 ทำการสอบเทียบกับแก้ววัดฝนแบบ แก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in./TIP)



ลงชื่อ

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E80ACP0C
Cylinder Number: LL164665
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402557716-1
Cylinder Volume: 83.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Oct 21, 2022

Expiration Date: Oct 21, 2025

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.01 PPM	G1	+/- 1.3% NIST Traceable	10/13/2022, 10/21/2022
NITRIC OXIDE	45.00 PPM	45.01 PPM	G1	+/- 1.2% NIST Traceable	10/13/2022, 10/21/2022
SULFUR DIOXIDE	45.00 PPM	45.11 PPM	G1	+/- 0.9% NIST Traceable	10/13/2022, 10/21/2022
CARBON MONOXIDE	4500 PPM	4511 PPM	G1	+/- 0.8% NIST Traceable	10/14/2022
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	210607-21	CC708065	48.41 PPM NITRIC OXIDE/NITROGEN	+/- 1.2%	Sep 21, 2025
PRM	12395	D887860	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 22, 2022
GMIS	124206889110	CC322674	4.474 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 25, 2025
NTRM	160102-32	KAL004062	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
NTRM	08012355	KAL004734	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1KD579	NDIR	Sep 22, 2022
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Oct 20, 2022
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Oct 06, 2022
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Sep 29, 2022

Triad Data Available Upon Request

NOTES: PO# 5222004798

Gross Weight: 17.2 Kg

Net Weight: 2.7 Kg

Cylinder: 80A



Certificate of Calibration

Customer

Name: SGS (Thailand) Limited. Certificate No: 25-SLM-127
Address: 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No: Req-2025-0702
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item: Sound Level Meter Microphone Class: 2
Manufacturer: RION Microphone Model: UC-52
Model: NL-21 Microphone S/N: 123945
Serial Number: 00398390 Preamplifier Model: NH-21
ID: ENSL 052 Preamplifier S/N: 30053
Resolution: 0.1 dB Instrument Status: Used

Calibration Environment and Details

Temperature: 23 °C ± 2 °C
Humidity: 50 %RH ± 20 %RH
Barometric Pressure: 1013 hPa ± 10 hPa
Received Date: 21 March 2025
Calibrated Date: 4 April 2025
Calibration Procedure: In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration: Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Briel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By:
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By:
Mr. Pichet Mahavorn
Calibration Engineer Supervisor
Issue Date: 4 April 2025

Certificate No : 25-SLM-127
 Request No : Req-2025-0702

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY ($\pm$ dB)
FAST / A / 30-120	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.96	93.9	-0.06	94.0	0.04	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 80400

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / 20-80		
UUC Weighting	(dB)	($\pm$ dB)
A	16.4	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / 20-80		
UUC Weighting	(dB)	($\pm$ dB)
A	12.1	0.10
C	11.0	0.10
Z	13.6	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY ($\pm$ dB)
FAST / 30-130	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	($\pm$ dB)
125 Hz	-0.9	-0.8	-0.8	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	1.1	1.1	1.1	0.60
8000 Hz	-1.2	-0.8	-0.8	0.70

Certificate No : 25-SLM-127
 Request No : Req-2025-0702

5. Electrical signal test of frequency weightings, Weighting network responce with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY ($\pm$ dB)
FAST / 30-130	A (dB)	C (dB)	Z (dB)	
STD Setting	(dB)	(dB)	(dB)	($\pm$ dB)
63 Hz	-0.2	-0.2	-0.2	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.2	-0.1	-0.1	
500 Hz	-0.1	0.0	-0.1	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.1	
4000 Hz	0.0	0.0	0.1	
8000 Hz	0.1	0.1	0.0	
16000 Hz	-1.8	-1.8	-2.4	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)
FAST / 30-130		UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	($\pm$ dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)
30-120 / A		UUC	ERR	
UUC Time Responce	(dB)	(dB)	(dB)	($\pm$ dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-127
Request No : Req-2025-0702

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 30-120	UUC	
STD Setting	(dB)	($\pm$ dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	
		0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 30-120	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	($\pm$ dB)
126.00	126	126.0	0.0	0.30
125.00	125	125.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.1	0.1	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.1	0.1	
74.00	74	74.1	0.1	
69.00	69	69.1	0.1	
64.00	64	64.1	0.1	
59.00	59	59.1	0.1	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.1	0.1	
39.00	39	39.1	0.1	
34.00	34	34.1	0.1	
29.00	29	29.3	0.3	
28.00	28	28.3	0.3	
27.00	27	27.4	0.4	

Certificate No : 25-SLM-127
Request No : Req-2025-0702

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	($\pm$ dB)
30-120	32.20	32.4	0.2	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 30-120	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	($\pm$ dB)
Fast	200	116.0	116.0	0.0	0.20
	2	99.0	98.9	-0.1	
	0.25	90.0	89.9	-0.1	
Slow	200	109.6	109.5	-0.1	
	2	90.0	89.9	-0.1	
SEL	200	110.0	110.0	0.0	
	2	90.0	89.9	-0.1	
	0.25	81.0	80.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	($\pm$ dB)
Complete cycle	136.4	135.7	-0.70	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-127
Request No : Req-2025-0702

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 40-130	UUC	
STD Setting	(dB)	
Positive one-half cycle	139.2	
Negative one-half cycle	139.1	
Deviated	0.1	

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 40-130	UUC	
STD Setting	(dB)	
Initial	129.0	
Final	129.0	
Deviated	0.0	

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 24-SLM-341
Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok 10120 Request No : Req-2024-2329

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : RION Microphone Model : UC-52
Model : NL-21 Microphone S/N : 74032
Serial Number : 00598466 Preamplifier Model : NH-21
ID : ENSL 082 Preamplifier S/N : 04151
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 7 October 2024
Calibrated Date : 17 October 2024
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Brüel & Kjær	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Patch Manavorn
Calibration Engineer Supervisor
Issue Date : 17 October 2024

Certificate No : 24-SLM-341
Request No : Req-2024-2329

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)	Acceptance Limit (± dB)	Result
FAST / A / 30-120	Level	UUC	ERR	UUC	ERR			
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)			
1000 Hz 114 dB	113.76	113.5	-0.26	113.8	+0.04	0.20	0.30	Pass

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN. 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	17.6	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	13.9	0.10
C	17.4	0.10
Z	21.4	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY (± dB)	Acceptance Limit (± dB)	Result
	A	C	Z			
STD Setting	(dB)	(dB)	(dB)			
125 Hz	-0.1	0.0	0.0	0.60	1.5	Pass
1000 Hz	0.0	0.0	0.0	0.60	1.0	Pass
4000 Hz	0.1	0.1	0.1	0.60	3.0	Pass
8000 Hz	-0.9	-0.8	-0.9	0.70	5.0	Pass1

Certificate No : 24-SLM-341
Request No : Req-2024-2329

5. Electrical signal test of frequency weightings, Weighting network responce with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY (± dB)	Acceptance Limit (± dB)	Result
FAST / 30-120	A (dB)	C (dB)	Z (dB)			
STD Setting	(dB)	(dB)	(dB)			
63 Hz	-0.2	-0.1	-0.2	0.20	2.0	Pass
125 Hz	-0.1	-0.1	-0.1		1.5	Pass
250 Hz	-0.1	-0.1	-0.1		1.5	Pass
500 Hz	-0.1	0.0	0.0		1.5	Pass
1000 Hz	0.0	0.0	0.0		1.0	Pass
2000 Hz	0.1	0.1	0.1		2.0	Pass
4000 Hz	0.0	0.1	0.1		3.0	Pass
8000 Hz	0.1	0.1	0.1		5.0	Pass
16000 Hz	-1.8	-1.8	-2.4		+5, -INF.	Pass1

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (± dB)	Acceptance Limit (± dB)	Result
FAST / 30-120	REF	UUC	ERR			
UUC Weighting	(dB)	(dB)	(dB)			
A	114.00	114.0	0.0	0.20	0.20	Pass
C	114.00	114.0	0.0		0.20	Pass
Z	114.00	114.0	0.0		0.20	Pass

UUC Setting	STD	Measured		UNCERTAINTY (± dB)	Acceptance Limit (± dB)	Result
30-120 / A	REF	UUC	ERR			
UUC Time Responce	(dB)	(dB)	(dB)			
Fast	114.00	114.0	0.0	0.20	0.10	Pass1
Slow	114.00	114.0	0.0		0.10	Pass1
Leq	114.00	114.0	0.0		0.10	Pass1

Certificate No : 24-SLM-341
Request No : Req-2024-2329

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A / 30-120	UUC			
STD Setting	(dB)			
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.30	Pass

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A / 30-120	REF	UUC	ERR			
STD dB	(dB)	(dB)	(dB)			
126.00	126	126.1	0.1	0.30	1.1	Pass
125.00	125	125.1	0.1		1.1	Pass
124.00	124	124.1	0.1		1.1	Pass
119.00	119	119.0	0.0		1.1	Pass
114.00	114	114.0	0.0		1.1	Pass
109.00	109	109.0	0.0		1.1	Pass
104.00	104	104.0	0.0		1.1	Pass
99.00	99	99.0	0.0		1.1	Pass
94.00	94	94.0	0.0		1.1	Pass
89.00	89	89.0	0.0		1.1	Pass
84.00	84	84.1	0.1		1.1	Pass
79.00	79	79.0	0.0		1.1	Pass
74.00	74	74.0	0.0		1.1	Pass
69.00	69	69.0	0.0		1.1	Pass
64.00	64	64.0	0.0		1.1	Pass
59.00	59	59.0	0.0		1.1	Pass
54.00	54	54.0	0.0		1.1	Pass
49.00	49	49.0	0.0		1.1	Pass
44.00	44	44.0	0.0		1.1	Pass
39.00	39	39.0	0.0		1.1	Pass
34.00	34	34.0	0.0		1.1	Pass
29.00	29	28.9	-0.1		1.1	Pass
28.00	28	27.8	-0.2		1.1	Pass
27.00	27	26.8	-0.2		1.1	Pass

Certificate No : 24-SLM-341
Request No : Req-2024-2329

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A	REF	UUC	ERR			
UUC Range	(dB)	(dB)	(dB)			
30-120	32.70	32.7	0.0	0.30	1.1	Pass
	114	114.0	0.0		1.1	Pass

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
A / 30-120	Toneburst	Ref	UUC	ERR			
UUC Time Response	(ms)	(dB)	(dB)	(dB)			
Fast	200	116.0	116.0	0.0	0.20	1.0	Pass
	2	99.0	99.0	0.0		+1.0, -2.5	Pass
	0.25	90.0	89.9	-0.1		+1.5, -5.0	Pass
Slow	200	109.6	109.6	0.0		1.0	Pass
	2	90.0	90.0	0.0		+1.0, -5.0	Pass
SEL	200	110.0	110.0	0.0		1.0	Pass
	2	90.0	90.0	0.0		+1.0, -2.5	Pass
	0.25	81.0	80.9	-0.1		+1.5, -5.0	Pass

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / C / 55-141	REF	UUC	ERR			
STD Setting	(dB)	(dB)	(dB)			
Complete cycle	136.4	136.0	-0.40	0.20	3.0	Pass
Positive half cycle	135.4	135.0	-0.40		2.0	Pass
Negative half cycle	135.4	135.0	-0.40		2.0	Pass

Certificate No : 24-SLM-341
Request No : Req-2024-2329

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)	Acceptance	Result
FAST / A / 40-130	UUC		Limit	
STD Setting	(dB)		(± dB)	
Positive one-half cycle	139.3			
Negative one-half cycle	139.1			
Deviated	0.2	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)	Acceptance	Result
FAST / A / 40-130	UUC		Limit	
STD Setting	(dB)		(± dB)	
Initial	129.0			
Final	129.0			
Deviated	0.0	0.10	0.30	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
4. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz	0.70 dB
5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
6. Frequency and time weightings at 1kHz	0.20 dB
7. Long Term Stability	0.10 dB
8. Level linearity on the reference level range	0.30 dB
9. Level linearity including the level range control	0.30 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.35 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.10 dB

- Acceptance limit and Maximum-permitted Uncertainty was IEC 61672-1:2013

Certificate No : 24-SLM-341
Request No : Req-2024-2329

Decision Rule for Statements of Conformity

The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019; Guidelines on the

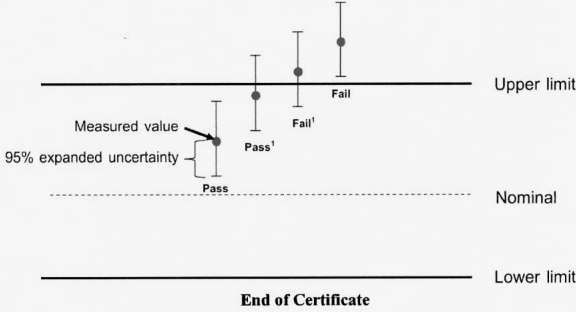
Reporting of Compliance with Specification as following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
 Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
 Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-SLM-317

Request No : Req-2025-2080

Unit Under Calibration Details

Measurement item : Sound Level Meter
 Manufacturer : RION
 Model : NL-21
 Serial Number : 00398394
 ID : ENSL 16005
 Resolution : 0.1 dB
 Microphone Class : 2
 Microphone Model : UC-52
 Microphone S/N : 118987
 Preamplifier Model : NH-21
 Preamplifier S/N : 26844
 Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
 Humidity : 50 %RH ± 20 %RH
 Barometric Pressure : 1013 hPa ± 10 hPa
 Received Date : 12 September 2025
 Calibrated Date : 23 September 2025
 Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
 Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Multifunction Acoustic Calibrator	Brüel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
 Mr. Noppadon Luangart
 Service Calibration Engineer

Approved By : 
 Mr. Noppadon Luangart
 Calibration Engineer Supervisor
 Issue Date : 23 September 2025

Certificate No : 25-SLM-317

Request No : Req-2025-2080

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 30-120	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 114 dB	93.95	93.8	-0.15	94.0	0.05	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR-515, SN. 81971

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	17.8	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	14.4	0.10
C	17.8	0.10
Z	22.7	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
FAST / 30-130	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.3	0.4	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.1	0.2	0.1	0.60
8000 Hz	-1.5	-1.5	-1.7	0.70

Certificate No : 25-SLM-317
 Request No : Req-2025-2080

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 30-130	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	($\pm$ dB)
63 Hz	-0.1	-0.1	-0.1	0.20
125 Hz	-0.1	0.0	-0.1	
250 Hz	-0.1	0.0	-0.1	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.1	
4000 Hz	0.0	0.0	0.1	
8000 Hz	0.1	0.1	0.0	
16000 Hz	-1.8	-1.8	-2.4	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 30-130	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	($\pm$ dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
30-120 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	($\pm$ dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Lcq	114.00	114.0	0.0	

Certificate No : 25-SLM-317
 Request No : Req-2025-2080

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 30-120	UUC	
STD Setting	(dB)	($\pm$ dB)
Initial	114.0	0.10
Final	114.0	
Deviated	0.0	

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 30-120	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	($\pm$ dB)
126.00	126	126.0	0.0	0.30
125.00	125	125.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.1	0.1	
74.00	74	74.1	0.1	
69.00	69	69.1	0.1	
64.00	64	64.1	0.1	
59.00	59	59.1	0.1	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.1	0.1	
39.00	39	39.1	0.1	
34.00	34	34.2	0.2	
29.00	29	29.7	0.7	
28.00	28	28.6	0.6	
27.00	27	28.0	1.0	

Certificate No : 25-SLM-317
 Request No : Req-2025-2080

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
30-120	31.60	31.9	0.3	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 30-120	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	116.0	116.0	0.0	0.20
	2	99.0	98.9	-0.1	
	0.25	90.0	89.8	-0.2	
Slow	200	109.6	109.5	-0.1	
	2	90.0	89.9	-0.1	
	0.25	81.0	80.8	-0.2	
SEL	200	110.0	109.9	-0.1	
	2	90.0	89.9	-0.1	
	0.25	81.0	80.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	136.4	135.8	-0.60	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-317
 Request No : Req-2025-2080

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 40-130	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	139.2	
Negative one-half cycle	139.0	
Deviated	0.2	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 40-130	UUC	
STD Setting	(dB)	(± dB)
Initial	129.0	
Final	129.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-SLM-318
Request No : Req-2025-2081

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : RION
Model : NL-21
Serial Number : 00398395
ID : ENSL 16006
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : UC-52
Microphone S/N : 94637
Preamplifier Model : NH-21
Preamplifier S/N : 10410
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 12 September 2025
Calibrated Date : 23 September 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Multifunction Acoustic Calibrator	Brüel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By :

Mr. Nopphat Suangart
Service Calibration Engineer

Approved By :

Mr. Mahavorn
Calibration Engineer Supervisor

Issue Date : 23 September 2025

Certificate No : 25-SLM-318
Request No : Req-2025-2081

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 30-120	Level (dB)	UUC	ERR	UUC	ERR	
Calibrator Setting		(dB)	(dB)	(dB)	(dB)	
1000 Hz 114 dB	93.95	93.8	-0.15	94.0	0.05	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR-515, SN. 81971

2. Self-generated noise, Microphone installed

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	23.8	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 20-80		
UUC Weighting	(dB)	(± dB)
A	18.2	0.10
C	22.3	0.10
Z	26.1	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
FAST / 30-130	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.1	0.1	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.7	0.8	0.8	0.60
8000 Hz	-0.3	-0.3	-0.4	0.70

Certificate No : 25-SLM-318
 Request No : Req-2025-2081

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 30-130	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.2	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	0.0	-0.1	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.1	
4000 Hz	0.0	0.0	0.1	
8000 Hz	0.1	0.1	0.0	
16000 Hz	-1.7	-1.7	-2.4	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 30-130	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	($\pm$ dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
30-120 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	($\pm$ dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-318
 Request No : Req-2025-2081

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 30-120	UUC	
STD Setting	(dB)	($\pm$ dB)
Initial	114.0	0.10
Final	114.0	
Deviated	0.0	

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 30-120	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	($\pm$ dB)
126.00	126	126.0	0.0	0.30
125.00	125	125.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.1	0.1	
44.00	44	44.1	0.1	
39.00	39	39.1	0.1	
34.00	34	34.3	0.3	
29.00	29	30.0	1.0	
28.00	28	29.0	1.0	
27.00	27	28.0	1.0	
26.00	26	27.0	1.0	

Certificate No : 25-SLM-318
 Request No : Req-2025-2081

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
30-120	30.00	31.1	1.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 30-120	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	116.0	116.0	0.0	0.20
	2	99.0	98.9	-0.1	
	0.25	90.0	89.9	-0.1	
Slow	200	109.6	109.6	0.0	
	2	90.0	89.9	-0.1	
	0.25	81.0	80.8	-0.2	
SEL	200	110.0	110.0	0.0	
	2	90.0	90.0	0.0	
	0.25	81.0	80.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	136.4	135.9	-0.50	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-318
 Request No : Req-2025-2081

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 40-130	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	139.2	
Negative one-half cycle	139.1	
Deviated	0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 40-130	UUC	
STD Setting	(dB)	(± dB)
Initial	129.0	
Final	129.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-ACT-034
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No : Req-2025-0591
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Acoustic Calibrator Class : 1
Manufacturer : Cirrus Range : 94 dB / 1000 Hz
Model : CR-515 Instrument Status : Used
Serial Number : 80400
ID : ENSL 17148

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 5 March 2025
Calibration Date : 7 March 2025
Location of Calibration : LAB 1 Acoustic
Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEL	12 June 2025
THD Multimeter	2015	1047765	NIMT	4 February 2026

Traceability : This certificate provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Pacht Mathavorn
Calibration Engineer Supervisor
Issue Date : 7 March 2025

Certificate No : 25-ACT-034

Request No : Req-2025-0591

Sound pressure level

Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)	Acceptance limit Class 1 (± dB)	Result
	Measured	Deviated value	Measured	Deviated value			
94 dB / 1000 Hz	93.96	-0.04	-	-	0.13	0.25	Pass

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value			
94 dB / 1000 Hz	1000.3	0.03	-	-	0.01	0.70	Pass

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
	Measured (%)	Measured (%)			
94 dB / 1000 Hz	1.45	-	0.40	2.5	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
Sound pressure level	0.15 dB
Frequency	0.20%
Total distortion+noise	0.50%

- Acceptance limit was IEC60942:2017 Class 1

- The calibration results exclude the calibrator pressure correction

- The calibration results exclude the microphone volume correction

Certificate No : 25-ACT-034

Request No : Req-2025-0591

Decision Rule for Statements of Conformity

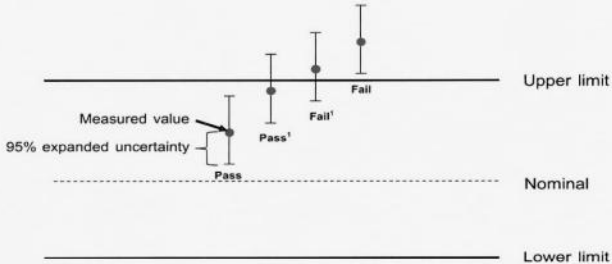
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019; Guidelines on the Reporting of Compliance with Specification as following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Calibration

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.

Certificate No : 25-ACT-092

Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,

Request No : Req-2025-1224

Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Acoustic Calibrator

Class : 1

Manufacturer : Cirrus

Range : 94 dB / 1000 Hz

Model : CR-515

Instrument Status : Used

Serial Number : 88336

ID : ENSL 19173

Calibration Environment and Details

Temperature : (23 ±2 °C)

Humidity : (50 ± 20 %RH)

Barometric Pressure : (1013 ±10.0 hPa)

Received Date : 30 May 2025

Calibration Date : 10 June 2025

Location of Calibration : LAB 1 Acoustic

Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEI	12 June 2025
THD Multimeter	2015	1047765	NIMT	4 February 2026

Traceability : This certificate provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Calibrated By :

Mr. Noppadon Luangart

Service Calibration Engineer

Approved By :

Mr. Pacit Mathavorn

Calibration Engineer Supervisor

Issue Date : 10 June 2025

Certificate No : 25-ACT-092

Request No : Req-2025-1224

Sound pressure level

Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	94.00	0.00	-	-	0.12

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	
94 dB / 1000 Hz	1000.0	0.00	-	-	0.01

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)
	Measured (%)	Measured (%)	
94 dB / 1000 Hz	2.20	-	0.17

Note :

- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

End of Calibration

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-SLM-056

Request No : Req-2025-0314

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : RION
Model : NL-52
Serial Number : 00710418
ID : ENSL 21180
Resolution : 0.1 dB
Microphone Class : 1
Microphone Model : UC-59
Microphone S/N : 188987
Preamplifier Model : NH-25
Preamplifier S/N : 21971
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 February 2025
Calibrated Date : 17 February 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Brüel & Kjær	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By :

Mr. Neppadee Luangart
Service Calibration Engineer

Approved By :

Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 17 February 2025

Certificate No : 25-SLM-056
 Request No : Req-2025-0314

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR			
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)			
1000 Hz 114 dB	113.76	113.8	0.04	113.8	+0.04	0.20	0.30	Pass

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN.58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured (dB)	UNCERTAINTY ($\pm$ dB)
FAST / 30-130		
UUC Weighting		
A	15.5	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured (dB)	UNCERTAINTY ($\pm$ dB)
FAST / 30-130		
UUC Weighting		
A	11.0	0.10
C	14.0	0.10
Z	17.9	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Resone curve			UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
	A	C	Z			
FAST / 30-130	(dB)	(dB)	(dB)			
STD Setting						
125 Hz	0.1	0.2	0.1	0.60	1.0	Pass
1000 Hz	0.0	0.0	0.0	0.60	0.7	Pass
4000 Hz	-0.2	-0.2	-0.2	0.60	1.0	Pass
8000 Hz	-0.5	-0.5	-0.6	0.70	+1.5 -2.5	Pass

Certificate No : 25-SLM-056
 Request No : Req-2025-0314

5. Electrical signal test of frequency weightings, Weighting network resone with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Resone curve			UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / 30-130	A (dB)	C (dB)	Z (dB)			
STD Setting						
63 Hz	-0.3	-0.1	-0.1	0.20	1.0	Pass
125 Hz	-0.2	-0.1	-0.1		1.0	Pass
250 Hz	-0.2	-0.1	-0.1		1.0	Pass
500 Hz	-0.1	0.0	-0.1		1.0	Pass
1000 Hz	0.0	0.0	0.0		0.7	Pass
2000 Hz	0.0	0.0	0.0		1.0	Pass
4000 Hz	0.0	0.0	0.0		1.0	Pass
8000 Hz	0.0	0.0	0.0		+1.5, -2.5	Pass
16000 Hz	-1.4	-1.4	0.0		+2.5, -16.0	Pass

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / 30-130	REF	UUC	ERR			
UUC Weighting	(dB)	(dB)	(dB)			
A	114.00	114.0	0.0	0.20	0.20	Pass
C	114.00	114.0	0.0		0.20	Pass
Z	114.00	114.0	0.0		0.20	Pass

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
30-130 / A	REF	UUC	ERR			
UUC Time Resone	(dB)	(dB)	(dB)			
Fast	114.00	114.0	0.0	0.20	0.10	Pass1
Slow	114.00	114.0	0.0		0.10	Pass1
Leq	114.00	114.0	0.0		0.10	Pass1

Certificate No : 25-SLM-056
Request No : Req-2025-0314

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A / 30-130	UUC			
STD Setting	(dB)			
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.10	Pass

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A / 30-130	REF	UUC	ERR			
STD dB	(dB)	(dB)	(dB)			
138.00	138	138.0	0.0	0.30	0.8	Pass
134.00	134	134.0	0.0		0.8	Pass
129.00	129	129.0	0.0		0.8	Pass
124.00	124	124.0	0.0		0.8	Pass
119.00	119	119.0	0.0		0.8	Pass
114.00	114	114.0	0.0		0.8	Pass
109.00	109	109.0	0.0		0.8	Pass
104.00	104	104.0	0.0		0.8	Pass
99.00	99	99.0	0.0		0.8	Pass
94.00	94	94.0	0.0		0.8	Pass
89.00	89	89.0	0.0		0.8	Pass
84.00	84	84.0	0.0		0.8	Pass
79.00	79	79.0	0.0		0.8	Pass
74.00	74	74.0	0.0		0.8	Pass
69.00	69	69.0	0.0		0.8	Pass
64.00	64	64.0	0.0		0.8	Pass
59.00	59	59.0	0.0		0.8	Pass
54.00	54	54.0	0.0		0.8	Pass
49.00	49	49.0	0.0		0.8	Pass
44.00	44	44.0	0.0		0.8	Pass
39.00	39	39.0	0.0		0.8	Pass
34.00	34	34.0	0.0		0.8	Pass
29.00	29	29.0	0.0		0.8	Pass
24.00	24	24.1	0.1		0.8	Pass

Certificate No : 25-SLM-056
Request No : Req-2025-0314

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / A	REF	UUC	ERR			
UUC Range	(dB)	(dB)	(dB)			
30-130	29.60	29.6	0.0	0.30	0.8	Pass
	114	114.0	0.0		0.8	Pass

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
A / 30-130	Toneburst	Ref	UUC	ERR			
UUC Time Response	(ms)	(dB)	(dB)	(dB)			
Fast	200	126.0	126.0	0.0	0.20	0.5	Pass
	2	109.0	108.9	-0.1		+1.0, -1.5	Pass
	0.25	100.0	99.8	-0.2		+1.0, -3.0	Pass
Slow	200	119.6	119.5	-0.1		0.5	Pass
	2	100.0	99.9	-0.1		+1.0, -3.0	Pass
SEL	200	120.0	120.0	0.0		0.5	Pass
	2	100.0	99.9	-0.1		+1.0, -1.5	Pass
	0.25	91.0	90.8	-0.2		+1.0, -3.0	Pass

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)	Acceptance Limit ($\pm$ dB)	Result
FAST / C / 55-141	REF	UUC	ERR			
STD Setting	(dB)	(dB)	(dB)			
Complete cycle	136.4	136.2	-0.20	0.20	2.0	Pass
Positive half cycle	135.4	135.2	-0.20		1.0	Pass
Negative half cycle	135.4	135.2	-0.20		1.0	Pass

Certificate No : 25-SLM-056
Request No : Req-2025-0314

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)	Acceptance	Result
FAST / A / 30-130	UUC		Limit	
STD Setting	(dB)		(± dB)	
Positive one-half cycle	139.5			
Negative one-half cycle	139.5			
Deviated	0.0	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)	Acceptance	Result
FAST / A / 30-130	UUC		Limit	
STD Setting	(dB)		(± dB)	
Initial	129.0			
Final	129.0			
Deviated	0.0	0.10	0.10	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
4. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz	0.70 dB
5. Electrical signal test of frequency weightings, Weighting network respone with relative to 1 kHz	0.20 dB
6. Frequency and time weightings at 1kHz	0.20 dB
7. Long Term Stability	0.10 dB
8. Level linearity on the reference level range	0.30 dB
9. Level linearity including the level range control	0.30 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.35 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.10 dB

- Acceptance limit and Maximum-permitted Uncertainty was IEC 61672-1:2013

Certificate No : 25-SLM-056
Request No : Req-2025-0314

Decision Rule for Statements of Conformity

The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019; Guidelines on the

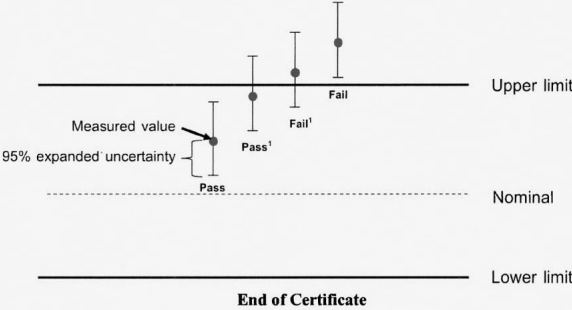
Reporting of Compliance with Specification as following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-SLM-175
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Request No : Req-2025-1165
Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : SCARLET Microphone Model : AWA14421
Model : ST-21D Microphone S/N : A-000225
Serial Number : 820706 Preamplifier Model : -
ID : ENSL 22178 Preamplifier S/N : -
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 26 May 2025
Calibrated Date : 30 May 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Brüel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Patch Mahavorn
Calibration Engineer Supervisor
Issue Date : 30 May 2025

Certificate No : 25-SLM-175
Request No : Req-2025-1165

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 28-138	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.77	93.4	-0.37	93.8	+0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN. 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 28-138		
UUC Weighting	(dB)	(± dB)
A	22.8	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 28-138		
UUC Weighting	(dB)	(± dB)
A	22.6	0.10
C	23.6	0.10
Z	28.5	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
FAST / 28-138	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.2	0.3	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.0	-0.1	-0.2	0.60
8000 Hz	-0.2	-0.2	0.0	0.70

Certificate No : 25-SLM-175
Request No : Req-2025-1165

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 28-138	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	-0.1	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.1	0.1	0.0	
4000 Hz	0.2	0.2	0.0	
8000 Hz	-0.1	-0.2	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)
FAST / 28-138	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)
28-138 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-175
Request No : Req-2025-1165

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / A / 28-138	UUC	
STD Setting	(dB)	
Initial	114.0	0.10
Final	114.0	
Deviated	0.0	

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY ($\pm$ dB)
FAST / A / 28-138	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	
135.00	135	135.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.1	0.1	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.1	0.1	
74.00	74	74.1	0.1	
69.00	69	69.1	0.1	
64.00	64	64.1	0.1	
59.00	59	59.1	0.1	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.1	0.1	
39.00	39	39.0	0.0	
35.00	35	34.9	-0.1	

Certificate No : 25-SLM-175
Request No : Req-2025-1165

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
28-138	40.30	40.3	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 28-138	Toneburst	Ref	UUC	ERR	
UUC Time Respo	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	134.0	134.0	0.0	0.20
	2	117.0	116.8	-0.2	
	0.25	108.0	107.8	-0.2	
Slow	200	127.6	127.6	0.0	
	2	108.0	108.0	0.0	
SEL	200	128.0	128.1	+0.1	
	2	108.0	108.1	+0.1	
	0.25	99.0	98.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 28-138	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	133.4	133.3	-0.10	0.20
Positive half cycle	132.4	132.3	-0.10	
Negative half cycle	132.4	132.3	-0.10	

Certificate No : 25-SLM-175
Request No : Req-2025-1165

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 28-138	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	137.5	
Negative one-half cycle	137.8	
Deviated	-0.3	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 28-138	UUC	
STD Setting	(dB)	(± dB)
Initial	137.0	
Final	137.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-SLM-197
Request No : Req-2025-1223

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : SCARLET
Model : ST-21D
Serial Number : 820707
ID : ENSL 22179
Resolution : 0.1 dB
Microphone Class : 2
Microphone Model : AWA14421
Microphone S/N : A-000236
Preamplifier Model : -
Preamplifier S/N : -
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 30 May 2025
Calibrated Date : 10 June 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By :



Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :



Mr. Noppadon Luangart
Calibration Engineer Supervisor

Issue Date : 10 June 2025

Certificate No : 25-SLM-197
Request No : Req-2025-1223

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 32-142	Level (dB)	UUC	ERR	UUC	ERR	
Calibrator Setting		(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	94.00	94.1	0.10	94.0	0.00	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 88336

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 32-142		
UUC Weighting	(dB)	(± dB)
A	25.3	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 32-142		
UUC Weighting	(dB)	(± dB)
A	24.8	0.10
C	25.1	0.10
Z	29.2	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.1	0.1	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	-0.1	0.0	-0.2	0.60
8000 Hz	0.1	0.3	0.4	0.70

Certificate No : 25-SLM-197
Request No : Req-2025-1223

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 32-142	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.1	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	-0.1	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.1	0.1	0.0	
4000 Hz	0.2	0.2	0.0	
8000 Hz	-0.1	-0.2	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / 32-142	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
32-142 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-197
Request No : Req-2025-1223

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 32-142	UUC	
STD Setting	(dB)	
Initial	114.0	0.10
Final	114.0	
Deviated	0.0	

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (± dB)
FAST / A / 32-142	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	
139.00	139	138.9	-0.1	0.30
134.00	134	133.9	-0.1	
129.00	129	128.9	-0.1	
124.00	124	123.9	-0.1	
119.00	119	118.9	-0.1	
114.00	114	114.0	0.0	
109.00	109	108.9	-0.1	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	43.9	-0.1	
39.00	39	38.6	-0.4	

Certificate No : 25-SLM-197
Request No : Req-2025-1223

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
32-142	44.00	44.0	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 32-142	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	138.0	138.1	+0.1	0.20
	2	121.0	120.9	-0.1	
	0.25	112.0	111.9	-0.1	
Slow	200	131.6	131.7	+0.1	
	2	112.0	112.0	0.0	
SEL	200	132.0	132.1	+0.1	
	2	112.0	112.1	+0.1	
	0.25	103.0	102.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 32-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	137.2	-0.20	0.20
Positive half cycle	136.4	136.3	-0.10	
Negative half cycle	136.4	136.3	-0.10	

Certificate No : 25-SLM-197
Request No : Req-2025-1223

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 32-142	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.7	
Negative one-half cycle	142.2	
Deviated	-0.5	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 32-142	UUC	
STD Setting	(dB)	(± dB)
Initial	141.0	
Final	141.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong
Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-SLM-181
Request No : Req-2025-1170

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : SCARLET
Model : ST-21D
Serial Number : 820708
ID : ENSL 22180
Resolution : 0.1 dB
Microphone Class : 2
Microphone Model : AWA14421
Microphone S/N : A-000470
Preamplifier Model : -
Preamplifier S/N : -
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 26 May 2025
Calibrated Date : 30 May 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	WK Electric

Note
The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Pichai Pathavorn
Calibration Engineer Supervisor
Issue Date : 30 May 2025

Certificate No : 25-SLM-181
Request No : Req-2025-1170

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 34-144	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.77	93.7	-0.07	93.8	+0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN. 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	28.4	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	28.0	0.10
C	28.5	0.10
Z	33.6	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.3	0.1	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.2	0.2	0.0	0.60
8000 Hz	0.9	1.0	1.2	0.70

Certificate No : 25-SLM-181
Request No : Req-2025-1170

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 34-144	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	0.0	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	-0.1	-0.1	
1000 Hz	0.0	-0.1	-0.1	
2000 Hz	0.1	0.0	-0.1	
4000 Hz	0.2	0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
		REF	ERR	
FAST / 34-144				(± dB)
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY
		REF	ERR	
34-144 / A				(± dB)
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-181
Request No : Req-2025-1170

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 34-144	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	0.10
Final	114.0	
Deviated	0.0	

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
		UUC	ERR	
FAST / A / 34-144	REF	(dB)	(dB)	(± dB)
STD dB	(dB)	(dB)	(dB)	
141.00	141	140.9	-0.1	0.30
140.00	140	140.0	0.0	
139.00	139	139.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	43.9	-0.1	
40.00	40	39.7	-0.3	

Certificate No : 25-SLM-181
Request No : Req-2025-1170

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
34-144	45.20	45.2	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 34-144	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	140.0	140.1	+0.1	0.20
	2	123.0	122.9	-0.1	
	0.25	114.0	113.9	-0.1	
Slow	200	133.6	133.7	+0.1	
	2	114.0	114.1	+0.1	
SEL	200	134.0	134.1	+0.1	
	2	114.0	114.1	+0.1	
	0.25	105.0	105.0	0.0	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 34-144	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	139.4	139.1	-0.30	0.20
Positive half cycle	138.4	138.2	-0.20	
Negative half cycle	138.4	138.2	-0.20	

Certificate No : 25-SLM-181
Request No : Req-2025-1170

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 34-144	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.8	
Negative one-half cycle	144.1	
Deviated	-0.3	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 34-144	UUC	
STD Setting	(dB)	(± dB)
Initial	143.0	
Final	143.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-SLM-196
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No : Req-2025-1222
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : SCARLET Microphone Model : AWA14421
Model : ST-21D Microphone S/N : A-000500
Serial Number : 820710 Preamplifier Model : -
ID : ENSL 22181 Preamplifier S/N : -
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 30 May 2025
Calibrated Date : 10 June 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

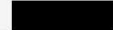
Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Euan Vithayakorn
Calibration Engineer Supervisor
Issue Date : 10 June 2025

Certificate No : 25-SLM-196

Request No : Req-2025-1222

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 29-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	94,00	93,5	-0,50	94,0	0,00	0,20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 88336

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 29-139	(dB)	(± dB)
UUC Weighting		
A	24,6	0,10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 29-139	(dB)	(± dB)
UUC Weighting		
A	23,5	0,10
C	24,5	0,10
Z	28,4	0,10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0,1	0,3	0,4	0,60
1000 Hz	0,0	0,0	0,0	0,60
4000 Hz	-0,2	-0,2	-0,4	0,60
8000 Hz	0,0	0,2	0,4	0,70

Certificate No : 25-SLM-196
 Request No : Req-2025-1222

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting		Deviation from various Frequency			UNCERTAINTY
FAST / 29-139		Weighting Response curve			
STD Setting		A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz		-0.2	-0.2	-0.1	0.20
125 Hz		-0.2	-0.1	-0.1	
250 Hz		-0.2	-0.1	-0.1	
500 Hz		-0.1	-0.1	-0.1	
1000 Hz		0.0	-0.1	-0.1	
2000 Hz		0.0	0.0	-0.1	
4000 Hz		0.2	0.1	-0.1	
8000 Hz		-0.2	-0.3	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 29-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	($\pm$ dB)
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY
29-139 / A	REF	UUC	ERR	
UUC Time Responce	(dB)	(dB)	(dB)	($\pm$ dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-196
 Request No : Req-2025-1222

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 29-139	UUC	
STD Setting	(dB)	($\pm$ dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 29-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	($\pm$ dB)
137.00	137	136.9	-0.1	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	38.8	-0.2	
38.00	38	37.8	-0.2	
41.00	41	36.8	-4.2	
40.00	40	35.7	-4.3	

Certificate No : 25-SLM-196
Request No : Req-2025-1222

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
29-139	41.90	41.8	-0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 29-139	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	135.0	135.0	0.0	0.20
	2	118.0	117.7	-0.3	
	0.25	109.0	108.9	-0.1	
Slow	200	128.6	128.6	0.0	
	2	109.0	109.0	0.0	
SEL	200	129.0	129.1	+0.1	
	2	109.0	109.1	+0.1	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 29-139	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	134.4	134.2	-0.20	0.20
Positive half cycle	133.4	133.3	-0.10	
Negative half cycle	133.4	133.3	-0.10	

Certificate No : 25-SLM-196
Request No : Req-2025-1222

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 29-139	UUC	
STD Setting	(dB)	
Positive one-half cycle	139.1	
Negative one-half cycle	139.6	
Deviated	-0.5	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 29-139	UUC	
STD Setting	(dB)	
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.

Certificate No : 25-SLM-177

Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong
Nonsi, Yannawa, Bangkok 10120

Request No : Req-2025-1166

Unit Under Calibration Details

Measurement item : Sound Level Meter

Microphone Class : 2

Manufacturer : SCARLET

Microphone Model : AWA14421

Model : ST-21D

Microphone S/N : A-000281

Serial Number : 820711

Preamplifier Model : -

ID : ENSL 22182

Preamplifier S/N : -

Resolution : 0.1 dB

Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C

Humidity : 50 %RH ± 20 %RH

Barometric Pressure : 1013 hPa ± 10 hPa

Received Date : 26 May 2025

Calibrated Date : 30 May 2025

Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests

Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

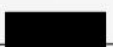
Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By :


Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :


Mr. Pancha Watanavorn
Calibration Engineer Supervisor

Issue Date : 30 May 2025

Certificate No : 25-SLM-177

Request No : Req-2025-1166

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 29-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.77	93.5	-0.27	93.8	+0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN. 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 29-139		
UUC Weighting	(dB)	(± dB)
A	24.5	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 29-139		
UUC Weighting	(dB)	(± dB)
A	23.7	0.10
C	25.1	0.10
Z	29.3	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.3	0.3	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	-0.9	-0.8	-1.0	0.60
8000 Hz	-1.0	-0.9	-0.8	0.70

Certificate No : 25-SLM-177
Request No : Req-2025-1166

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 29-139	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	29.8	-0.2	-0.1	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.2	-0.1	-0.1	
500 Hz	-0.1	-0.1	-0.1	
1000 Hz	0.0	-0.1	-0.1	
2000 Hz	0.0	0.0	-0.1	
4000 Hz	0.2	0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / 29-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
29-139 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-177
Request No : Req-2025-1166

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 29-139	UUC	
STD Setting	(dB)	
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (± dB)
FAST / A / 29-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	
136.00	136	136.0	0.0	0.30
135.00	135	135.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.1	0.1	
99.00	99	99.1	0.1	
94.00	94	94.1	0.1	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.1	0.1	
74.00	74	74.1	0.1	
69.00	69	69.1	0.1	
64.00	64	64.1	0.1	
59.00	59	59.1	0.1	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.1	0.1	
39.00	39	39.0	0.0	
38.00	38	38.0	0.0	
37.00	37	36.9	-0.1	
36.00	36	35.8	-0.2	

Certificate No : 25-SLM-177
Request No : Req-2025-1166

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
29-139	41.60	41.6	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 29-139	Toneburst	Ref	UUC	ERR	
UUC Time Responce	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	135.1	+0.1	0.20
	2	118.0	117.8	-0.2	
	0.25	109.0	108.8	-0.2	
Slow	200	128.6	128.6	0.0	
	2	109.0	109.0	0.0	
SEL	200	129.0	129.1	+0.1	
	2	109.0	109.1	+0.1	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 29-139	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	134.4	134.2	-0.20	0.20
Positive half cycle	133.4	133.3	-0.10	
Negative half cycle	133.4	133.3	-0.10	

Certificate No : 25-SLM-177
Request No : Req-2025-1166

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 29-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	139.1	
Negative one-half cycle	139.0	
Deviated	0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 29-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer
Name : SGS (Thailand) Limited. **Certificate No :** 25-SLM-229
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, **Request No :** Req-2025-1550
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : SCARLET Microphone Model : AWA14421
Model : ST-21D Microphone S/N : A-000220
Serial Number : 820714 Preamplifier Model : -
ID : ENSL 22185 Preamplifier S/N : -
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 7 July 2025
Calibrated Date : 17 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Multifunction Acoustic Calibrator	Bruel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Nop 
Service Calibration Engineer

Approved By : 
Mr. Pachi 
Calibration Engineer Supervisor
Issue Date : 17 July 2025

Certificate No : 25-SLM-229
Request No : Req-2025-1550

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 31-141	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	94.00	93.9	-0.10	94.0	0.00	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR-515, SN. 88336

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 31-141		
UUC Weighting	(dB)	(± dB)
A	24.6	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 31-141		
UUC Weighting	(dB)	(± dB)
A	24.1	0.10
C	25.3	0.10
Z	30.1	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY
FAST / 31-141	A	C	Z	(± dB)
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.2	0.2	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.0	0.0	-0.2	0.60
8000 Hz	0.6	0.7	0.7	0.70

Certificate No : 25-SLM-229
Request No : Req-2025-1550

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 31-141	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.1	0.20
125 Hz	-0.1	-0.1	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	-0.1	-0.1	
1000 Hz	0.0	-0.1	-0.1	
2000 Hz	0.1	0.0	-0.1	
4000 Hz	0.2	0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
		UUC	ERR	
FAST / 31-141	REF			(± dB)
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	0.20

UUC Setting	STD	Measured		UNCERTAINTY
		UUC	ERR	
31-141 / A	REF			(± dB)
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-229
Request No : Req-2025-1550

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 31-141	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
		UUC	ERR	
FAST / A / 31-141	REF	(dB)	(dB)	(± dB)
STD dB	(dB)	(dB)	(dB)	0.30
138.00	138	138.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.1	0.1	
104.00	104	104.1	0.1	
99.00	99	99.1	0.1	
94.00	94	94.1	0.1	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.1	0.1	
74.00	74	74.1	0.1	
69.00	69	69.1	0.1	
64.00	64	64.1	0.1	
59.00	59	59.1	0.1	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.0	0.0	
39.00	39	38.8	-0.2	
38.00	38	37.7	-0.3	

Certificate No : 25-SLM-229
Request No : Req-2025-1550

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
31-141	43.20	43.3	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 31-141	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	137.0	137.1	+0.1	0.20
	2	120.0	120.1	+0.1	
	0.25	111.0	110.9	-0.1	
Slow	200	130.6	130.7	+0.1	
	2	111.0	111.1	+0.1	
SEL	200	131.0	131.2	+0.2	
	2	111.0	111.2	+0.2	
	0.25	102.0	102.0	0.0	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 31-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	136.4	135.7	-0.70	0.20
Positive half cycle	135.4	135.3	-0.10	
Negative half cycle	135.4	135.3	-0.10	

Certificate No : 25-SLM-229
Request No : Req-2025-1550

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 31-141	UUC	
STD Setting	(dB)	
Positive one-half cycle	140.5	
Negative one-half cycle	140.9	
Deviated	-0.4	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 31-141	UUC	
STD Setting	(dB)	
Initial	140.0	
Final	140.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. **Certificate No :** 25-SLM-179
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120 **Request No :** Req-2025-1168

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : SCARLET Microphone Model : AWA14421
Model : ST-21D Microphone S/N : A-000303
Serial Number : 820716 Preamplifier Model : -
ID : ENSL 22187 Preamplifier S/N : -
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 26 May 2025
Calibrated Date : 30 May 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Pacit Mathavorn
Calibration Engineer Supervisor
Issue Date : 30 May 2025

Certificate No : 25-SLM-179
Request No : Req-2025-1168

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 34-144	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.77	93.5	-0.27	93.8	+0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN. 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting		
A	27.7	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting		
A	27.7	0.10
C	28.3	0.10
Z	31.3	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.1	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	-0.4	-0.3	-0.5	0.60
8000 Hz	-0.5	-0.4	-0.1	0.70

Certificate No : 25-SLM-179
 Request No : Req-2025-1168

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 34-144	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.1	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	-0.1	-0.1	
1000 Hz	0.0	-0.1	-0.1	
2000 Hz	0.0	0.0	-0.1	
4000 Hz	0.2	0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 34-144	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY
34-144 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd

FM-708-SLM-01 Rev.06 Issue date 17/2/25

Certificate No : 25-SLM-179
 Request No : Req-2025-1168

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 34-144	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 34-144	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
141.00	141	141.0	0.0	0.30
140.00	140	140.0	0.0	
139.00	139	139.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.1	0.1	
104.00	104	104.1	0.1	
99.00	99	99.1	0.1	
94.00	94	94.1	0.1	
89.00	89	89.1	0.1	
84.00	84	84.1	0.1	
79.00	79	79.1	0.1	
74.00	74	74.1	0.1	
69.00	69	69.1	0.1	
64.00	64	64.1	0.1	
59.00	59	59.1	0.1	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.0	0.0	
43.00	43	43.0	0.0	
42.00	42	41.9	-0.1	
41.00	41	40.8	-0.2	

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd

FM-708-SLM-01 Rev.06 Issue date 17/2/25

Certificate No : 25-SLM-179
 Request No : Req-2025-1168

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
34-144	46.10	46.1	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 34-144	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	140.0	140.1	+0.1	0.20
	2	123.0	122.9	-0.1	
	0.25	114.0	113.7	-0.3	
Slow	200	133.6	133.7	+0.1	
	2	114.0	114.1	+0.1	
SEL	200	134.0	134.2	+0.2	
	2	114.0	114.1	+0.1	
	0.25	105.0	105.0	0.0	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 34-144	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	139.4	139.0	-0.40	0.20
Positive half cycle	138.4	138.3	-0.10	
Negative half cycle	138.4	138.3	-0.10	

Certificate No : 25-SLM-179
 Request No : Req-2025-1168

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 34-144	UUC	
STD Setting	(dB)	
Positive one-half cycle	143.9	
Negative one-half cycle	143.9	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 34-144	UUC	
STD Setting	(dB)	
Initial	143.0	
Final	143.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-SLM-226
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No : Req-2025-1545
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 1
Manufacturer : RION Microphone Model : UC-59
Model : NL-53 Microphone S/N : 25579
Serial Number : 00541049 Preamplifier Model : NH-25
ID : ENSL 24102 Preamplifier S/N : 34002
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 7 July 2025
Calibrated Date : 17 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Multifunction Acoustic Calibrator	Bruel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Pacit Mathavorn
Calibration Engineer Supervisor
Issue Date : 17 July 2025

Certificate No : 25-SLM-226
Request No : Req-2025-1545

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.98	94.0	0.02	94.0	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 88373

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		
UUC Weighting	(dB)	(± dB)
A	14.7	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		
UUC Weighting	(dB)	(± dB)
A	11.2	0.10
C	13.7	0.10
Z	17.6	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Responce curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	0.60 0.60 0.60 0.70
125 Hz	0.2	0.3	0.3	
1000 Hz	0.0	0.0	0.0	
4000 Hz	-0.1	-0.1	-0.2	
8000 Hz	-0.5	-0.5	-0.6	

Certificate No : 25-SLM-226
Request No : Req-2025-1545

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 30-130	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	-0.1	
16000 Hz	-0.9	-0.9	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / 30-130	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
30-130 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-226
Request No : Req-2025-1545

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (± dB)
FAST / A / 30-130	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	
138.00	138	138.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.0	0.0	
34.00	34	34.0	0.0	
29.00	29	29.0	0.0	
24.00	24	23.9	-0.1	

Certificate No : 25-SLM-226
Request No : Req-2025-1545

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
30-130	29.70	29.7	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 30-130	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	126.0	126.1	+0.1	0.20
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	
Slow	200	119.6	119.6	0.0	
	2	100.0	100.0	0.0	
SEL	200	120.0	120.0	0.0	
	2	100.0	100.0	0.0	
	0.25	91.0	90.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	136.4	136.1	-0.30	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-226
Request No : Req-2025-1545

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Positive one-half cycle	139.4	
Negative one-half cycle	139.4	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	129.0	
Final	129.0	
Deviated	0.0	0.10

End of Certificate

CERTIFICATE OF CALIBRATION

Certificate No.: C0-1402008/25

Page 1 **of total** 2 **pages**
Customer SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment	pH Meter		
Manufacturer	EUTECH	Model	PCTestr 35
Serial No.	3173519	ID No.	ENWA24142
Description	Range : 0 - 14 pH, Resolution : 0.1 pH		

Environmental Conditions	Ambient Temperature:	(20 ± 2) °C
	Relative Humidity:	(50 ± 10) %
	Atmospheric Pressure:	-

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 14 February 2025

Calibration Date 15 February 2025

Date of Issue 17 February 2025

Condition of Artifacts Used conditions but can be calibrated

Checked by 

Act as Technical Manager

Approved by 

Representative of Managing Director

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(/) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: C0-1402008/25

Page 2 **of total** 2 **pages**
Reference Method:

- The calibration method used was CP-178 based on an in-house method.

- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	300824	Aug. 5, 2025	NIMT
	7.00	230524	Jul. 21, 2025	
	10.01	030924	Jul. 21, 2025	

Type	Serial No.	Certificate No.	Due Date	Traceability
Digital Thermometer with Sensor	1709138 / 4605984-005	10-0806001/24	Jun. 7, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:
Calibration of pH Electrode

pH Standard Solution (pH)	Measured Value		Uncertainty (± pH)
	(pH)	(mV)	
4.01	4.0	-	0.059
7.00	7.0	-	0.059
10.01	10.0	-	0.059

Note : Adjust Curve to Buffer Solution pH (4,7,10)

Temperature stability of micro bath : 25 ± 0.2°C

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by

Onnapa

REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: T0-1402028/25 **Page 1 of total 2 pages**

Customer SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment pH Meter
Manufacturer EUTECH **Model** PCTestr 35
Serial No. 3173519 **ID No.** ENWA24142
Description Temperature range : 20 °C to 50 °C, Resolution of UUC : 0.1 °C

Environmental Conditions Ambient Temperature: (23 ± 3) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: -

Calibration Location Blue Devils Laboratory (TL)

Received Date 14 February 2025

Calibration Date 15 February 2025

Date of Issue 17 February 2025

Condition of Artifacts Used conditions but can be calibrated

Checked by 
Act as Technical Manager

Approved by 
Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)
() (Patiphan K.) () (Onnapa P.)
(✓) (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: T0-1402028/25

Page 2 of total 2 pages

Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	B7C853	I0-2810001/24	Oct. 28, 2025	THC
Platinum Resistance Thermometer	4854	C0A30047	Oct. 22, 2025	FLUKE
Liquid Bath	XO111019	I0-2405001/23	May 25, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.
- FLUKE, Fluke Comporation, U.S.A.

Measurement Results: (X) Without Adjustment

Dimension of probe : Diameter 3 mm. Sensor Type : RTD (PT100)

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
70	20.00	20.0	0.00	0.065
70	30.00	30.0	0.00	0.065
70	50.00	50.0	0.00	0.065

UUC : Unit Under Calibration

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Phakkawan
REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: C0-0702003/25 **Page 1 of total 3 pages**

Customer SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment pH Meter
Manufacturer EUTECH **Model** PCTestr 35
Serial No. 3173614 **ID No.** ENWA24143
Description Range : 0 - 14 pH, Resolution : 0.1 pH

Environmental Conditions Ambient Temperature: (20 ± 2) °C
Relative Humidity: (50 ± 10) %
Atmospheric Pressure: -

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 7 February 2025

Calibration Date 7 February 2025

Date of Issue 8 February 2025

Condition of Artifacts Used conditions but can be calibrated

Checked by 
Act as Technical Manager

Approved by 
Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)
() (Patiphan K.) (✓) (Onnapa P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: C0-0702003/25

Page 2 of total 3 pages

Reference Method:

- The calibration method used was CP-178 based on an in-house method.

- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	300824	Aug. 5, 2025	NIMT
	7.00	230524	Jul. 21, 2025	
	10.01	030924	Jul. 21, 2025	

Type	Serial No.	Certificate No.	Due Date	Traceability
Digital Thermometer with Sensor	1709138 / 4605984-005	10-0806001/24	Jun. 7, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Calibration of pH Electrode

pH Standard Solution (pH)	Measured Value		Uncertainty (± pH)
	(pH)	(mV)	
4.01	4.0	-	0.059
7.00	7.0	-	0.059
10.01	10.0	-	0.059

Note : Adjust Curve to Buffer Solution pH (4,7,10)

Temperature stability of micro bath : 25 ± 0.2°C

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

Calibrated by

Kittipong

Certificate No.: C0-0702003/25

Page 3 **of total** 3 **pages**
Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	B7C853	I0-2810001/24	Oct. 28, 2025	THC
Platinum Resistance Thermometer	4854	C0A30047	Oct. 22, 2025	FLUKE
Liquid Bath	XO111019	I0-2405001/23	May 25, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.
- FLUKE, Fluke Comporation, U.S.A.

Measurement Results: (X) Without Adjustment

Dimension of probe : Diameter 2 mm. Sensor Type : RTD (PT100)

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
70	20.00	19.9	0.10	0.065
70	30.00	30.0	0.00	0.065
70	50.00	50.0	0.00	0.065

UUC : Unit Under Calibration

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by

Pongsak

REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: C0-1402009/25

Page 1 **of total** 2 **pages**
Customer

SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment

pH Meter

Manufacturer

EUTECH

Model

PCTestr 35

Serial No.

3190571

ID No.

ENWA24146

Description

Range : 0 - 14 pH, Resolution : 0.1 pH

Environmental Conditions

Ambient Temperature: (20 ± 2) °C

Relative Humidity: (50 ± 10) %

Atmospheric Pressure: -

Calibration Location

Jayhawks Laboratory (CL&GL)

Received Date

14 February 2025

Calibration Date

15 February 2025

Date of Issue

17 February 2025

Condition of Artifacts

Used conditions but can be calibrated

Checked by

Approved by

Act as Technical Manager

Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)

(Dr. Ekachai Puttitwong)

() (Patiphan K.) (/) (Onnapa P.)

() (Pongsak H.) () (Nitiphong K.)

() (Kanung C.) () (Nonthachai K.)

() (Pramong P.) () (Noppol P.)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: C0-1402009/25

Page 2 **of total** 2 **pages**
Reference Method:

- The calibration method used was CP-178 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	300824	Aug. 5, 2025	NIMT
	7.00	230524	Jul. 21, 2025	
	10.01	030924	Jul. 21, 2025	

Type	Serial No.	Certificate No.	Due Date	Traceability
Digital Thermometer with Sensor	1709138 / 4605984-005	10-0806001/24	Jun. 7, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:
Calibration of pH Electrode

pH Standard Solution (pH)	Measured Value		Uncertainty (± pH)
	(pH)	(mV)	
4.01	4.0	-	0.059
7.00	7.0	-	0.059
10.01	10.0	-	0.059

Note : Adjust Curve to Buffer Solution pH (4,7,10)

Temperature stability of micro bath : 25 ± 0.2°C

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Onnapa

REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: T0-1402029/25

Page 1 **of total** 2 **pages**
Customer

SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment

pH Meter

Manufacturer

EUTECH

Model

PCTestr 35

Serial No.

3190571

ID No.

ENWA24146

Description

Temperature range : 20 °C to 50 °C, Resolution of UUC : 0.1 °C

Environmental Conditions

Ambient Temperature: (23 ± 3) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: -

Calibration Location

Blue Devils Laboratory (TL)

Received Date

14 February 2025

Calibration Date

15 February 2025

Date of Issue

17 February 2025

Condition of Artifacts [Redacted] conditions but can be calibrated [Redacted]

Checked by

[Redacted] Act as Technical Manager

Approved by

[Redacted] Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)
() (Patiphan K.) () (Onnapa P.)
(✓) (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: T0-1402029/25

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	B7C853	I0-2810001/24	Oct. 28, 2025	THC
Platinum Resistance Thermometer	4854	C0A30047	Oct. 22, 2025	FLUKE
Liquid Bath	XO111019	I0-2405001/23	May 25, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.
- FLUKE, Fluke Comporation, U.S.A.

Measurement Results:

(X) Without Adjustment

Dimension of probe : Diameter 3 mm. Sensor Type : RTD (PT100)

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
70	20.00	20.0	0.00	0.065
70	30.00	30.0	0.00	0.065
70	50.00	50.0	0.00	0.065

UUC : Unit Under Calibration

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Phakkawan

REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: C0-2702013/25

Page 1 of total 2 pages
Customer

SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment

pH Meter

Manufacturer

EUTECH

Model

PCTestr 35

Serial No.

3198807

ID No.

ENWA 24147

Description

Range : 0 - 14 pH, Resolution : 0.1 pH

Environmental Conditions

Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: -

Calibration Location

Jayhawks Laboratory (CL&GL)

Received Date

27 February 2025

Calibration Date

27 February 2025

Date of Issue

3 March 2025

Condition of Artifacts

Used conditions but can be calibrated

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)
() (Patiphan K.) (✓) (Onnapa P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: C0-2702013/25

Page 2 **of total** 2 **pages**
Reference Method:

- The calibration method used was CP-178 based on an in-house method.

- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	300824	Aug. 5, 2025	NIMT
	7.00	230524	Aug. 25, 2025	
	10.01	030924	Aug. 25, 2025	

Type	Serial No.	Certificate No.	Due Date	Traceability
Digital Thermometer with Sensor	1709138 / 4605984-005	10-0806001/24	Jun. 7, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:
Calibration of pH Electrode

pH Standard Solution (pH)	Measured Value		Uncertainty (± pH)
	(pH)	(mV)	
4.01	4.0	-	0.059
7.00	7.0	-	0.059
10.01	10.0	-	0.059

Note : Adjust Curve to Buffer Solution pH (4,7,10)

Temperature stability of micro bath : 25 ± 0.2°C

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Athipat
REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: T0-2702044/25

Page 1 **of total** 2 **pages**
Customer

SGS (THAILAND) LIMITED (HEAD OFFICE)
238 TRR Tower, 19th - 21st Floor, Naradhiwas Rajanagarindra Road,
Chongnonsi, Yanawa, Bangkok 10120

Equipment

Digital Thermometer with Probe

Manufacturer

EUTECH

Model

PCTestr 35

Serial No.

3198807

ID No.

ENWA 24147

Description

Temperature range : 20 °C to 50 °C, Resolution of UUC : 0.1 °C

Environmental Conditions

Ambient Temperature: (23 ± 3) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: -

Calibration Location

Blue Devils Laboratory (TL)

Received Date

27 February 2025

Calibration Date

28 February 2025

Date of Issue

3 March 2025

Condition of Artifacts

Used conditions but can be calibrated

Checked by

Act as Technical Manager

Approved by

Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)
() (Patiphan K.) () (Onnapa P.)
(/) (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: T0-2702044/25

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	B7C853	I0-2810001/24	Oct. 28, 2025	THC
Platinum Resistance Thermometer	4854	C0A30047	Oct. 22, 2025	FLUKE
Liquid Bath	XO111019	I0-2405001/23	May 25, 2025	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.
- FLUKE, Fluke Comporation, U.S.A.

Measurement Results: (X) Without Adjustment

Dimension of probe : Diameter 2 mm. Sensor Type : RTD (PT100)

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
70	20.00	20.0	0.00	0.065
70	30.00	30.0	0.00	0.065
70	50.00	50.0	0.00	0.065

UUC : Unit Under Calibration

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Pongsak

REV.02 02/24/21

Certificate of Calibration
Customer

Name : SGS (Thailand) Limited.
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-TPM-074

Request No : Req-2025-0133

Page : 1/2

Unit Under Calibration Details

Calibration Parameter : Temperature
Instrument Name : Area Heat Stress Monitor
Manufacturer : 3M
Model : QT-34
Serial Number : TEM030023
Resolution : 0.1 °C
ID Number : ENWP 087
Range Calibration : 25 °C to 45 °C
Type of Sensor : RTD
Sensor Diameter (mm) : 4.5
Calibration Position (mm) : 67.5
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 15 %RH
Received Date : 16 January 2025
Calibrated Date : 6 February 2025
Calibration Procedure : In-house method CP-TPM-01 by Comparison with Standard Thermometer.

Reference Standard

Digital Thermometer with Sensor, Manufacturer: GINGO/GINGO, Model: GT11/ RTD100, SN: 08000057, ID: 02-TPM Which was calibrated on 1 March 2024, Calibration Certificate No. : QR24-0478

Traceability

This Certificate is traceable to SI Unit through Quality Reborn Co., Ltd., NSC-ONSC Accreditation No.: Calibration 0292

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Approved By :
Mr. Noppadon Luangart

Technical Manager

Issue Date :

6 February 2025

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-TPM-01 Rev.01 Issue date 13/02/20

Calibration Note
UUC Adjustment : Not Adjust

Certificate No : 25-TPM-074
Request No : Req-2025-0133
Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.033	25.0	0.0	0.13
	35.037	35.0	0.0	0.13
	45.039	45.0	0.0	0.13
DRY	25.032	24.9	+ 0.1	0.13
	35.035	34.9	+ 0.1	0.13
	45.041	45.0	0.0	0.13
GLOBE	25.033	25.0	0.0	0.13
	35.035	35.0	0.0	0.13
	45.038	45.0	0.0	0.13

End of Certificate

Calibrated By :
Mr. Sittichok Jirapukdeesakul

Certificate of Calibration

Customer
Name : SGS (Thailand) Limited.
Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok
10120

Certificate No : 24-TPM-412
Request No : Req-2024-1993
Page : 1/2

Unit Under Calibration Details

Calibration Parameter : Temperature
Instrument Name : Area Heat Stress Monitor
Manufacturer : 3M
Model : QT-34
Serial Number : TEM030027
Resolution : 0.1 °C
ID Number : ENWP 091

Range Calibration : 25 °C to 45 °C
Type of Sensor : RTD
Sensor Diameter (mm) : 4.5
Calibration Position (mm) : 67.5
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 15 %RH
Received Date : 27 August 2024
Calibrated Date : 9 September 2024
Calibration Procedure : In-house method CP-TPM-01 by Comparison with Standard Thermometer.

Reference Standard :
Digital Thermometer with Sensor, Manufacturer: GINGO/GINGO, Model: GT11/ RTD100, SN: 08000057, ID: 02-TPM Which was calibrated on 1 March 2024, Calibration Certificate No. : QR24-0478

Traceability : This Certificate is traceable to SI Unit through Quality Reborn Co., Ltd., NSC-ONSC Accreditation No.: Calibration 0292

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Approved By :
Mr. Noppadon Luangart
Technical Manager
Issue Date : 9 September 2024



Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 24-TPM-412

Request No : Req-2024-1993

Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.033	25.1	- 0.1	0.13
	35.036	35.1	- 0.1	0.13
	45.040	45.1	- 0.1	0.13
DRY	25.033	25.0	0.0	0.13
	35.036	35.0	0.0	0.13
	45.039	45.0	0.0	0.13
GLOBE	25.034	25.0	0.0	0.13
	35.036	35.0	0.0	0.13
	45.039	45.0	0.0	0.13

End of Certificate

Calibrated By :

Mr. Sitakul



Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.

Address : 238 TRR Tower, 19th -21st Floor, Naradhiwas Rajanagarindra Road,
Chong Nonsi, Yannawa, Bangkok 10120

Certificate No : 25-TPM-075

Request No : Req-2025-0132

Page : 1/2

Unit Under Calibration Details

Calibration Parameter : Temperature

Instrument Name : Area Heat Stress Monitor

Manufacturer : 3M

Model : QT-34

Serial Number : TEM030028

Resolution : 0.1 °C

ID Number : ENWP 092

Range Calibration : 25 °C to 45 °C

Type of Sensor : RTD

Sensor Diameter (mm) : 4.5

Calibration Position (mm) : 67.5

Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 3 °C

Humidity : 55 %RH ± 15 %RH

Received Date : 16 January 2025

Calibrated Date : 6 February 2025

Calibration Procedure : In-house method CP-TPM-01 by Comparison with Standard Thermometer.

Reference Standard

Digital Thermometer with Sensor, Manufacturer: GINGO/GINGO, Model: GT11/ RTD100, SN: 08000057, ID: 02-TPM Which was calibrated on 1 March 2024, Calibration Certificate No. : QR24-0478

Traceability

This Certificate is traceable to SI Unit through Quality Reborn Co., Ltd., NSC-ONSC Accreditation No.: Calibration 0292

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k=2$, providing a level of confidence approximately 95 %.

Approved By :

Mr. Noppadon Luangart

Technical Manager

Issue Date :

6 February 2025



Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 25-TPM-075

Request No : Req-2025-0132

Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.033	25.1	- 0.1	0.13
	35.037	35.1	- 0.1	0.13
	45.039	45.1	- 0.1	0.13
DRY	25.032	24.9	+ 0.1	0.13
	35.035	34.9	+ 0.1	0.13
	45.041	44.9	+ 0.1	0.13
GLOBE	25.033	24.9	+ 0.1	0.13
	35.035	34.9	+ 0.1	0.13
	45.038	44.9	+ 0.1	0.13

End of Certificate

Calibrated By :

Mr. Sitakul

Certificate of Calibration

Certificate No.: WK2502-400-350

Page 1 of 2

Customer : SGS (Thailand) Limited (Head Office)
 238 TRR Tower, 19th – 21st Floor, Naradhiwas Rajanagarindra Road,
 Chong Nonsi, Yannawa, Bangkok 10120

Instrument : DIGITAL LIGHT METER

Manufacturer : EXTECH

Model : 407026

Serial No. : A.056459

Identity No. : ENWP22214

Range : See to data

Resolution : See to data

Calibration Method : CP-WK-PR04

Ambient Temperature : (23 ± 2) °C

Humidity : (50 ± 15) %RH

Received Date : 10-Feb-25

Calibrated Date : 17-Feb-25

Issued Date : 18-Feb-25

Calibrated Location : In Lab

Reference standard instruments :

Instrument	Serial No.	Certificate No.	Due Date	Traceability to
Standard Light Meter	S.008960	23PH676	28-Feb-25	TPA

TPA : Technology Promotion Association (Thailand-Japan)

This result calibrate was found accurate as shown on date place of calibrate only

This certificate is traceability to the International System of Unit (SI)

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

Calibrated by : Mr. Chotiwat Thanakulphan

Approved by :

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

Calibration Results

Certificate No. : WK2502-400-350

Page 2 of 2

Calibration Result of the Accuracy

Function : Light Measurement

Unit : lux				
Range	STD Setting	UUC Reading	Error	Uncertainty (± lux)
2000	0	0	0	0.82
	50	49	-1	1.6
	250	251	1	6.5
	500	508	8	13
	1000	1021	21	26
	1950	1964	14	47
20000	2000	2010	10	48
	3000	2980	-20	72
	4000	3960	-40	96
	5000	4930	-70	0.12 klux

(X) Without Adjustment () After Adjustment

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

**** End of Certificate****