ภาคผนวก ข

เอกสารสอบเทียบเครื่องมือ

JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
63/14-15, 67/35-36
Petchkasem 7,7/1, Rd. Watthepra, Bangkolyai,
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Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Flow measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : COF-039-68

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: TISCH
MODEL/TYPE	: TE-5028A
SERIAL NUMBER	: 1547
ID NUMBER	: -
CONDITION AS-RECEIVED	: Used item
CUSTOMER	: SGS (Thailand) Limited (Head Office) 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120.
RECEIVED DATE	: 23 Sep 2025
MEASUREMENT DATE	: 24 Sep 2025
ISSUE DATE	: 24 Sep 2025

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

CALIBRATION CONDITION:

Preconditioning	: 24 hours at ambient conditions.
Measurement Condition	: The average values during measurement are 23.0 °C and 50.4 %RH.

NOTED: *The certificate is valid only to the item calibrated on date and place of calibration.*

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/IMC/M2 dp. The WI-CL-004 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0016-25.

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, Which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Jiranatee Associates Co., Ltd.

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number COF-039-68

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of *Q* Standard calibration data

Plate	Flow rate m³/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH₂O	Y	Standard Flow [Q_s] m³/min
1	0.702	752.272	22.79	22.18	41.514	0.969	0.983	0.663
2	1.001	752.276	23.14	22.54	28.186	2.150	1.463	0.962
3	1.118	752.254	23.32	22.84	23.157	2.749	1.654	1.081
4	1.163	752.233	23.28	22.90	21.278	3.014	1.732	1.127
5	1.412	752.178	23.32	22.91	13.073	4.622	2.145	1.383

Slope (*m*): **1.61333**
Intercept (*b*): **-0.08705**
Correlation coefficient (*r*): **0.99977**
Uncertainty (k=2): 0.015 m³/min

Table 2: The results of *Q* actual calibration data

Plate	Flow rate m³/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH₂O	Y	Standard Flow [Q_a] m³/min
1	0.702	752.272	22.79	22.18	41.514	0.969	0.617	0.664
2	1.001	752.276	23.14	22.54	28.186	2.150	0.920	0.966
3	1.118	752.254	23.32	22.84	23.157	2.749	1.041	1.085
4	1.163	752.233	23.28	22.90	21.278	3.014	1.090	1.132
5	1.412	752.178	23.32	22.91	13.073	4.622	1.350	1.389

Slope (*m*): **1.01034**
Intercept (*b*): **-0.05459**
Correlation coefficient (*r*): **0.99977**
Uncertainty (k = 2): 0.015 m³/min

Jiranatee Associates Co., Ltd.

ENAB 17108

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. 196/25

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display AZ170619023 Transmitter AZ170619023

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 1011.1 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

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 196/25

1 April, 2025

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H20	inches H20	m/sec	m/sec	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	-	-	-	12.9	0.11
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 DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180

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

The Result of Calibration

Certification No. 196/25

1 April, 2025 Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction (mmHg)
756.43	757.7	-1.27
756.82	758.0	-1.18
755.58	756.8	-1.22
754.01	755.3	-1.29
754.14	755.4	-1.26
755.39	756.7	-1.31
755.65	756.9	-1.25
755.72	757.0	-1.28
755.83	757.1	-1.27
755.96	757.2	-1.24
756.93	758.1	-1.17
758.38	759.5	-1.12
758.59	759.9	-1.31
758.30	759.6	-1.30
757.85	759.2	-1.35
757.59	758.9	-1.31
756.14	757.4	-1.26
756.28	757.5	-1.22
756.44	757.7	-1.26

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

The Result of Calibration

Certification No. 196/25

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

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

The Result of Calibration

Certification No. 196/25

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	47	-1.84

Date of Issue 1 April, 2025 Certification No. 196/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152C Mfg. Code. AZ170619023 ทำการสอบเทียบกับแก้ววัดฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเ

EN-0 17116

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 27 January, 2026 Certification No. 058/26

Object : Precision Weather Station

Manufacturer : Davis Instruments

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

Mfg Code : Display AZ170619046 Transmitter AZ170619046

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 1015.5 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

[redacted]

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 058/26

27 January, 2026

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H20	inches H20	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	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

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

[redacted]

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 058/26

27 January, 2026

Standard Barometer Pressure	Tested Barometer Pressure	Correction
759.45	759.6	-0.15
759.71	759.9	-0.19
759.86	760.0	-0.14
760.15	760.3	-0.15
760.52	760.7	-0.18
760.70	760.8	-0.10
760.97	761.1	-0.13
761.23	761.4	-0.17
761.55	761.7	-0.15
761.29	761.4	-0.11
761.10	761.2	-0.10
760.77	760.9	-0.13
760.49	760.6	-0.11
760.18	760.3	-0.12
759.85	760.0	-0.15
759.61	759.8	-0.19
759.41	759.6	-0.19
760.73	760.9	-0.17
760.61	760.7	-0.09

[redacted]

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 058/26

27 January, 2026

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
45.2	45.3	-0.1
30.6	30.7	-0.1
15.2	15.2	0.0

[redacted]

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 058/26

27 January, 2026

Page : 5 of 6

Standard	Relative Humidity Sensor Reading	
Humidity	Reading	Correction
% R.H.	% R.H.	% R.H.
46.2	48	-1.80
65.4	65	0.40
93.6	92	1.60

[redacted]

Date of Issue 27 January, 2026

Certification No. 058/26

Page: 6 of 6

ใบรับรอง

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

[redacted]

KINETICS

บริษัท ไคเนติคส์ คอร์ปอเรชัน 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	73.6
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
- ทำการCalibrate Multi-point

[redacted]

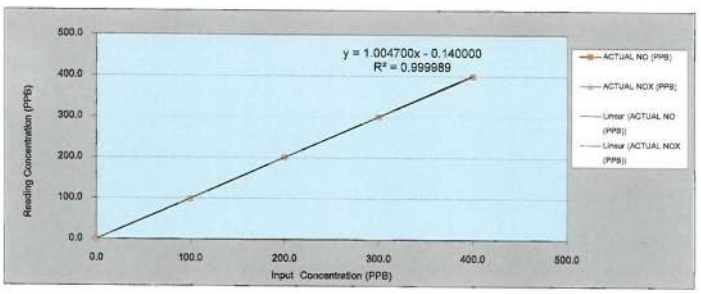
ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต[redacted]ที่ : 0-2515-8987
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรเกษม เข[redacted]2515-8999 โทรสาร : 0-2515-8988 E-Mail : Info@kinetics.co.th

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



CALIBR[redacted] DATE : 19 มีนาคม 2568

ต้องการ[redacted]

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

EMB 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

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

[redacted]

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

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	-	-	-	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 DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180

[redacted]

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

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

[redacted]

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

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

[redacted]

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

[redacted]

Date of Issue 1 April, 2025 Certification No. 194/25

Page: 6 of 6

ใบรับรอง

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

[redacted]

EMAR 19135

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 September, 2025 Certification No. 404/25

Page : 1 of 6

Object : Precision Weather Station

Manufacturer : Davis Instruments

Type : Vantage Pro 2 Model No. : 6152C

Mfg Code : Display BD190415075 Transmitter BD190415075

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

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1005.5 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

[redacted]

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 404/25

1 September, 2025 Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H20	inches H20	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	5.0	0.00
7.00	-	-	-	6.9	0.10
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 DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180

[redacted]

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

The Result of Calibration

Certification No. 404/25

1 September, 2025 Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.46	756.3	0.16
755.65	755.5	0.15
755.45	755.3	0.15
753.87	753.7	0.17
753.77	753.6	0.17
752.99	752.8	0.19
753.06	753.0	0.06
753.32	753.2	0.12
753.70	753.6	0.10
753.89	753.8	0.09
754.12	754.0	0.12
754.26	754.2	0.06
753.76	753.6	0.15
753.98	753.8	0.18
754.17	754.1	0.07
754.33	754.2	0.13
754.71	754.6	0.11
754.50	754.4	0.10
752.72	752.6	0.12

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

The Result of Calibration

Certification No. 404/25

1 September, 2025 Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.5	-0.3
30.1	30.2	-0.1
15.2	15.3	-0.1

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

The Result of Calibration

Certification No. 404/25

1 September, 2025 Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
92.32	97	-4.68
65.45	68	-2.55
45.68	47	-1.32

Date of Issue 1 September, 2025 Certification No. 404/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152C Mfg. Code. BD.190415075 ทำการสอบเทียบกับแก้ววัดฝนแบบแก้ววงง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in /TIP)

Equipment : SO_2 Analyzer
Brand/Model: Teledyne-API/T100, Thermo/43C
Serial No. : 2707, 2712, 3569,43C/F56056-306
Date of Calibrate : February 20, 2026

Reference Standard
Cylinder No.: EB0128767
Certification Date: October 29, 2019
Expiry Date: October 29, 2027
Component: SO2: 55.62 ppm , NO: 57.21 ppm , CO : 4,551 ppm

Calibration Check (Before adjust)

Serial No.	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)
2707	-0.2	0	-0.2	399.3	400	-0.7
2712	0.3	0	0.3	397.6	400	-2.4
3569	0.1	0	0.1	398.2	400	-1.8
43C/F56056-306	0.2	0	0.2	398.1	400	-1.9

Calibration Check (After adjust)

Serial No.	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)
2707	0	0	0	400	400	0
2712	0	0	0	400	400	0
3569	0	0	0	400	400	0
43C/F56056-306	0	0	0	400	400	0



ห้างหุ้นส่วนจำกัด บลู คอนซัลแตนท์ **Blue Consultant Limited Partnership**
32/751 ถนนประชาอุทิศ แขวงทุ่งครุ เขตทุ่งครุ กรุงเทพฯ 10140
โทร.0-2873-6045-6 โทรสาร 0-2873-6046
ห้องปฏิบัติการวิเคราะห์เอกชนใบอนุญาตลงวันที่ 22 สิงหาคม 2566

CALIBRATION REPORT

Equipment : NOx Analyzer
Brand/Model: Teledyne-API/200E, Teledyne-API/T200
Serial No. : 2508, 374, 4088
Date of Calibrate : February 20, 2026

Reference Standard
Cylinder No.: EB0128767
Certification Date: October 29, 2019
Expiry Date: October 29, 2027
Component: SO2: 55.62 ppm , NO: 57.21 ppm , CO : 4,551 ppm

Calibration Check (Before adjust)

Serial No.	Zero			Span		
	Reading Value (ppb) NO/NO2/NOx	Expected Value (ppb) NO/NO2/NOx	Drift (ppb) NO/NO2/NOx	Reading Value (ppb) NO/NO2/NOx	Expected Value (ppb) NO/NO2/NOx	Drift (ppb) NO/NO2/NOx
2508	2.7/1.0/3.7	0/0/0	2.7/1.0/3.7	396.4/3.0/399.4	400/0/400	-3.6/3.0/-0.6
374	3.1/0.5/3.6	0/0/0	3.1/0.5/3.6	397.5/3.7/401.2	400/0/400	-2.5/3.7/1.2
4088	4.5/1.3/5.8	0/0/0	4.5/1.3/5.8	403.8/4.2/408.0	400/0/400	3.8/4.2/8.0

Calibration Check (After adjust)

Serial No.	Zero			Span		
	Reading Value (ppb) NO/NO2/NOx	Expected Value (ppb) NO/NO2/NOx	Drift (ppb) NO/NO2/NOx	Reading Value (ppb) NO/NO2/NOx	Expected Value (ppb) NO/NO2/NOx	Drift (ppb) NO/NO2/NOx
2508	0/0/0	0/0/0	0/0/0	400/0/400	400/0/400	0/0/0
374	0/0/0	0/0/0	0/0/0	400/0/400	400/0/400	0/0/0
4088	0/0/0	0/0/0	0/0/0	400/0/400	400/0/400	0/0/0



EES

ใบรายงานผล (Service Report)

บริษัท เอ็นไว อีควิปเม้นท์ เซอร์วิส จำกัด
เลขที่ 110/254 หมู่ที่ 3 ต.บางรักพัฒนา อ.บางบัวทอง จ.นนทบุรี 11110
โทรศัพท์ : 098-362-9152 , 089-476-7885 ; อีเมลล์ : sales@envi-ees.com
เลขประจำตัวผู้เสียภาษี : 0-1255-61021-82-5

No. SER26-050022
Date. 18/05/2026

Customer		Contact
Name	SGS (Thailand) Co.,Ltd.	Khun Weeradech
Address	238 TRR Tower, 19th - 21st Floor, Maradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120	

Description
- Meter Console Method 5 model XC-572-V ; S/N : 0509054

Requirement / Problem	Requirement / Problem
Check , Clean and Calibration	- Replace the dry gas meter

Action Taken
- ทำการตรวจเช็คเครื่องมือเบื้องต้นพบว่า เครื่องมีสิ่งสกปรก
- ทำการ Calibrate เครื่องมือ
- รายละเอียดการ Calibrate เครื่องจำหน่ายเครื่องมือ Certificate แนบ

Comment / Suggestion



1. ไม่ครอบคลุมถึงอุปกรณ์ที่ไม่ได้ระบุ
2. บริษัทฯ จะรับประกันการซ่อมเป็นเวลา 3 เดือน โดยจะรับประกันเฉพาะอุปกรณ์ที่บริษัทฯ เปลี่ยนให้ หรือ แก้ไขปัญหาจากสิ่งนั้นเท่านั้น

ดำเนินการ

EES

บริษัท เอ็นไว อีควิปเม้นท์ เซอร์วิส จำกัด
เลขที่ 110/254 หมู่ที่ 3 ต.บางรักพัฒนา อ.บางบัวทอง จ.นนทบุรี 11110
โทรศัพท์ : 098-362-9152 อีเมลล์ : sales@envi-ees.com
เลขประจำตัวผู้เสียภาษี : 0-1255-61021-82-5

No.	SER26-05022
Date	18/05/2026

เอกสารแนบ

เครื่องมือ/อุปกรณ์	Meter console
ชื่อรุ่น	XC-572-V
หมายเลขเครื่อง	0509054

รายละเอียดการปรับปรุงแก้ไข	- เปลี่ยน Dry gas meter S/N : 00007019	- เป็น Dry gas meter S/N : 00010066
		

EES

Envi Equipment Service Co., Ltd.
110/254 Moo 3, Tumbon Bang Rak Phatthana, Amphur Bang Bua Thong, Nonthaburi 11110
Tel. 098 362 9152, 089 478 7885
E-mail: sales@envi-ees.com

Certificate No.: E26-050055
Page.: 1 of 6

CERTIFICATE OF CALIBRATION

Customer	:	SGS (Thailand) Co., Ltd.
Address	:	238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120
Description of Equipment	:	Console meter
Manufacturer	:	Apex Instrument
Model Number	:	XC-572-V
Serial Number	:	0509054
ID./Control No.	:	ENSS 039
Environment Conditions	:	Temperature (25 ± 2) °C
	:	Humidity (50 ± 15) % RH
Cal. Date	:	18/05/2026
Issue Date	:	18/05/2026

Calibration Method or Calibration Procedure Used

US EPA Method (United State Environmental Protection Agency)

This certificate is traceable to national standard, which realize the units of measurement according to the International System of Units (IS).

Result of Calibration

This certificate may not be reproduced other than in full except with prior Written approval of the Technical Manager, Envi Equipment Service Company Limited.

These reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level

METHOD 5 CONSOLE CALIBRATION
USING REFERENCE WET GAS METER W-NK-2.5-B-Z No.547425
5-POINT METRIC UNIT

Meter Console Information	
Console Model Number	XC-572-V
Console Serial Number	0509054
DGM Model Number	SK25EX
DGM Serial Number	00010066

Calibration Conditions			
Date	Time	18/05/2026	10:45 AM
Calibration Reference No.		SER26-050022	
Barometric Pressure		753.89	mmHg
Calibration Meter Gamma		1.001	

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

Calibration Data

Run Time	Metering Console					Calibration Meter			
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})	(Vwi)	(Vwf)	(t_{wi})	(t_{wf})
min	mm H_2O	m^3	m^3	°C	°C	m^3	m^3	°C	°C
12.20	13.0	0.1870	0.3270	29	29	414.13078	414.27312	29	29
12.17	13.0	0.3270	0.4670	29	29	414.27312	414.41406	28	28
8.50	26.0	0.4750	0.6150	29	29	414.42694	414.56714	28	28
8.50	26.0	0.6150	0.7550	30	30	414.56714	414.70746	28	28
13.98	40.0	0.7630	1.0430	30	30	414.72976	415.01174	28	28
13.98	40.0	1.0430	1.3230	30	30	415.01174	415.29398	27	27
10.28	70.0	1.3350	1.6150	30	30	415.31906	415.59906	27	27
10.28	70.0	1.6150	1.8950	31	31	415.59906	415.87894	26	26
9.03	90.0	1.9070	2.1870	31	31	415.89708	416.17422	26	26
9.00	90.0	2.1870	2.4670	31	31	416.17422	416.45046	25	25

METHOD 5 CONSOLE CALIBRATION
USING REFERENCE WET GAS METER W-NK-2.5-B-Z No.547425
5-POINT METRIC UNIT

Meter Console Information	
Console Model Number	XC-572-V
Console Serial Number	0509054
DGM Model Number	SK25EX
DGM Serial Number	00010066

Calibration Conditions			
Date	Time	18/05/2026	10:45 AM
Calibration Reference No.		SER26-050022	
Barometric Pressure		753.89	mmHg
Calibration Meter Gamma		1.001	

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

Calibration Data

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate		
Dry Gas Meter		Calibration Meter		Value	Variation	Std & Corr	.0212 m^3_{std}/min	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vw_{(std)}$)	($Qw_{(std)}$)	(Y)	(△Y)	($Q_{m(std)(corr)}$)	(△$H_@$)	(△$H_@$)
m^3	m^3/min	m^3	m^3/min			m^3/min	mm H_2O	
0.135	0.011	0.137	0.011	1.0164	0.0183	0.011	44.769	-0.267
0.135	0.011	0.136	0.011	1.0064	0.0083	0.011	45.263	0.227
0.136	0.016	0.136	0.016	0.9999	0.0017	0.016	44.765	-0.270
0.136	0.016	0.136	0.016	1.0008	0.0026	0.016	44.689	-0.347
0.271	0.019	0.273	0.019	1.0042	0.0060	0.019	46.201	1.166
0.272	0.019	0.274	0.020	1.0051	0.0069	0.020	45.963	0.927
0.273	0.027	0.272	0.026	0.9942	-0.0040	0.026	44.457	-0.579
0.274	0.027	0.272	0.026	0.9938	-0.0044	0.026	44.347	-0.689
0.275	0.030	0.270	0.030	0.9822	-0.0160	0.030	45.047	0.011
0.275	0.031	0.270	0.030	0.9790	-0.0192	0.030	44.856	-0.180
				0.9982	Y Average		45.036	△H@ Average

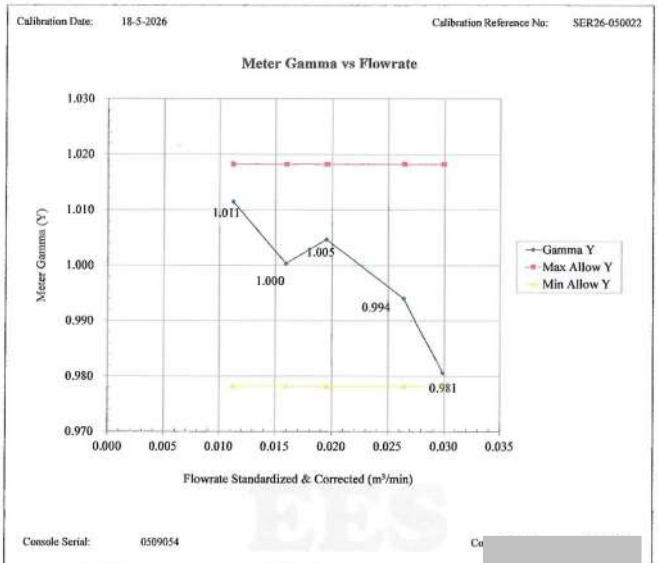
Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas m
tolerance of individual values from the average is ±0.02.
For △$H_@$, orifice pressure differential that equates to 0.75 cfm (0.0212 m^3/min) at stand
pressure, acceptable tolerance of individual values from the average is ±0.2 inches (5.1m

Meter Console Information	
Console Model Number	XC-572-V
Console Serial Number	0509054
DGM Model Number	SK25EX
DGM Serial Number	00010066

Calibration Conditions			
Date	Time	18/05/2026	10:45 AM
Calibration Reference No.		SER26-050022	
Barometric Pressure		753.89	mmHg
Calibration Meter Gamma		1.001	

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

Calibration Date: 18-5-2026 Calibration Reference No: SER26-050022



Console Serial: 0509054

EES

Certificate No. : E26-050055
Page : 5 of 6

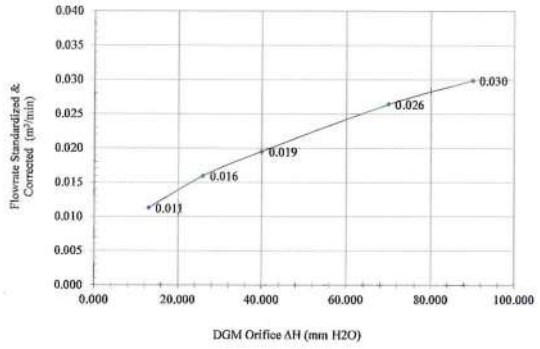
Meter Console Information	
Console Model Number	XC-572-V
Console Serial Number	0509054
DGM Model Number	SK25EX
DGM Serial Number	00010066

Calibration Conditions			
Date	Time	18/05/2026	10:45 AM
Calibration Reference No.		SER26-050022	
Barometric Pressure		753.89	mmHg
Calibration Meter Gamma		1.001	

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

Calibration Date: 18-5-2026 Calibration Reference No: SER26-050022

Meter Pressure vs Flowrate



Console Serial: 0509054

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Envi Equipment Service Co., Ltd.

EES

Certificate No. : E26-050055
Page : 6 of 6

THERMOCOUPLES SYSTEM CALIBRATION

Sampling System Equipment Information	
Console Model Number	XC-572-V
Console Serial Number	0509054
DGM Model Number	SK25EX
DGM Serial Number	00010066
Meter Box Model Number	JENCO 765 KF
Meter Box Serial Number	-

Calibration Conditions			
Date	Time	18/05/2026	01:00 PM
Calibration Reference No.		SER26-050022	
Reference Thermometer		DIGICON	
Serial Number		183169105	

Results

Console Thermocouple Simulator

Channel and test point	Meter Box Channel Temperature Reading (°C)										
	-18.0	25.0	38.0	93.0	149.0	260.0	371.0	482.0	593.0	816.0	1038.0
Stack	-17.0	24.0	37.0	93.0	150.0	260.0	372.0	383.0	595.0	817.0	1040.0
Aux	-17.0	24.0	37.0	93.0	150.0						
Probe	-17.0	24.0	37.0	93.0	150.0						
Filter	-17.0	24.0	37.0	93.0	150.0						
Oven	-17.0	24.0	37.0	93.0	150.0						
Exit	-17.0	24.0	37.0								

Tolerance Range

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

EES
Envi Equipment Service Co., Ltd.

SGS

Prob Nozzle Diameter Calibration Data Sheet

Date 05/01/2026 Personal CS

Vemier (Digital) Dial Caliper Reference MINV08

Nozzle ID ENSS 091 Stainless Steel Expire Date 05/01/2027

Nozzle No.	Nozzle Diameter (mm)			Hi-Lo	D_{avg}
	D1	D2	D3	ΔD	
1	3.10	3.14	3.16	0.06	3.13
2	4.42	4.44	4.42	0.02	4.43
3	5.12	5.12	5.12	0.00	5.12
4	6.22	6.20	6.22	0.02	6.21
5	9.06	9.10	9.10	0.04	9.09
6	9.30	9.34	9.32	0.04	9.32
7	12.52	12.56	12.50	0.06	12.53

Remark : ΔD = Maximum distance between any two diameters, must be ≤ 0.100 mm

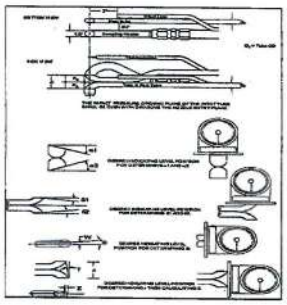
D_{avg} = (D1+D2+D3)/3

SGS

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.51/A4467

Parameter	Value	Allowable Range	Check
Assembly Level?	Y	Yes or y	PASS
Ports Damaged?	N	No or n	PASS
$\alpha 1$	-1.4	$-10° < \alpha 1 < +10°$	PASS
$\alpha 2$	-1.2	$-10° < \alpha 1 < +10°$	PASS
$\beta 1$	-0.7	$-5° < \alpha 1 < +5°$	PASS
$\beta 2$	1.9	$-5° < \alpha 1 < +5°$	PASS
γ	0.8	N/A	-
θ	0.5	N/A	-
D_t	0.375	0.188" to 0.375"	PASS
A	0.866929	$2.1D_t \le A \le 3.0D_t$	PASS
$A/2D_t$	1.155906	$1.05 \le P_d/D_t \le 1.5$	PASS
$Z = A \tan \gamma$	0.012105	$Z \le 0.125"$	PASS
$W = A \tan \theta$	0.007566	$W \le 0.031"$	PASS

I certify that pitot tube/probe No.51/A4467 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 Inclinometer	Expiration data	14-Nov-26
Manufacturer	BASELINE	ENSS No.	ENSS 22159
Model	12-1057		
ID No.	OC-1824		

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Calibration Report

1Single-Point Gas Test Report

Equipment :	All Gas Analyzer	**Customer Name :**	SGS (Thailand) Limited
Manufacturer :	ABB, Thermo Electron	**Contact Name :**	Khun Phatsakorn Soonthornwiphat

Standard gas Information

Cylinder Number : GN0029547	***Expiration Date: Mar 05, 2032***
Sulfur Dioxide (SO_2) = 89.69 ppm	Balance Nitrogen
Cylinder Number : GN0029547	***Expiration Date: Mar 05, 2032***
Carbon Monoxide (CO) = 90.24 ppm	Balance Nitrogen
Cylinder Number : GN0029547	***Expiration Date: Mar 05, 2032***
Nitrogen Oxide (NO) = 91.02 ppm	Balance Nitrogen
Cylinder Number : GN0018529	***Expiration Date: Feb 14, 2027***
Carbon Dioxide (CO_2) = 20.95 %	Balance Nitrogen
Cylinder Number : 4621265Y	***Expiration Date: Nov 27, 2031***
Oxygen (O_2) = 20.90 %	Balance Nitrogen

VALIDATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant
	Ideal	Actual	Error	Ideal	Actual	%Error	Conclusion
NO	0.00	0.421	0.42	91.02	79.40	-12.77	Not passed
NO_X	0.00	0.452	0.45	91.02	79.50	-12.66	Not passed
SO_2	0.00	0.7	0.70	89.69	76.30	-14.93	Not passed
CO	0.00	1.384	1.38	90.24	83.20	-7.80	Not passed
CO_2	0.00	-0.032	-0.03	20.95	18.35	-12.41	Not passed
O_2	0.00	-0.06	-0.06	20.90	21.00	0.10	Passed

CALIBRATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant
	Ideal	Actual	Error	Ideal	Actual	%Error	Conclusion
NO	0.00	0.001	0.00	91.02	91.02	0.00	Passed
NO_X	0.00	0.001	0.00	91.02	91.02	0.00	Passed
SO_2	0.00	0.000	0.00	89.69	89.70	0.01	Passed
CO	0.00	0.001	0.00	90.24	90.24	0.00	Passed
CO_2	0.00	0.001	0.00	20.95	20.95	0.00	Passed
O_2	0.00	0.00	0.00	20.90	20.90	0.00	Passed

Remark: Percent Error of each Parameter must be less than ± 5 % of reading.

Note :	Perform calibration to all analyzer and the result is in the control limits

DONE BY: Mr. Phuwanai Nakakul **DATE: 12-16 January 2026**

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Calibration Report

Multi-Point Gas Test Report

Equipment :	$NO-NO_2-NO_X$ Analyzer (NOx)	**Manufacturer :**	Thermo Fisher Scientific
Model :	42iHL-BZSSDCA	**Serial Number:**	1152640007

Standard gas Information

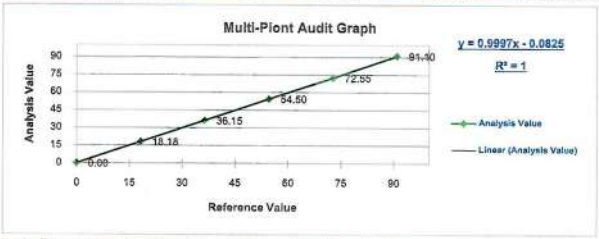
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026
Nitric Oxide (NOx) = 91.02 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS
Level		ppm	#1	#2	Avg.			(Std.<±5%)
#1	Zero	0.00	0.00	0.01	0.00	0.00	0.00	0.00
#2	20%	18.20	18.16	18.20	18.18	-0.02	-0.13	0.13
#3	40%	36.41	36.10	36.20	36.15	-0.26	-0.71	0.71
#4	60%	54.61	54.50	54.50	54.50	-0.11	-0.21	0.21
#5	80%	72.82	72.50	72.60	72.55	-0.27	-0.37	0.37
#6	100%	91.02	91.10	91.10	91.10	0.08	0.09	0.09
Measuring Range		100	ppm		Average Difference (%)			0.25

Correlation Coefficient	1.0000	Slope	0.9997	Intercept	-0.0825



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul **DATE: 12-16 January 2026**

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Calibration Report

Multi-Point Gas Test Report

Equipment :	$NO-NO_2-NO_X$ Analyzer (NO)	**Manufacturer :**	Thermo Fisher Scientific
Model :	42iHL-BZSSDCA	**Serial Number:**	1152640007

Standard gas Information

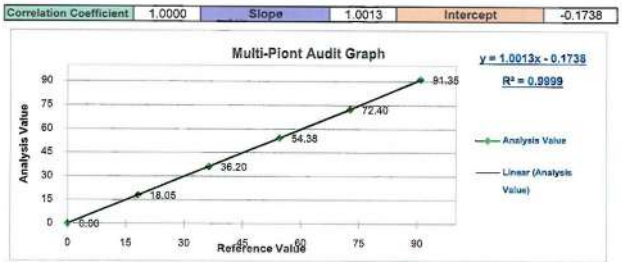
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026
Nitric Oxide (NO) = 91.0 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS
Level		ppm	#1	#2	Avg.			(Std.<±5%)
#1	Zero	0.00	0.00	0.00	0.00	0.00	0.00	0.00
#2	20%	18.20	18.10	18.00	18.05	-0.15	-0.85	0.85
#3	40%	36.41	36.10	36.30	36.20	-0.21	-0.57	0.57
#4	60%	54.61	54.40	54.35	54.38	-0.24	-0.43	0.43
#5	80%	72.82	72.40	72.40	72.40	-0.42	-0.57	0.57
#6	100%	91.02	91.30	91.40	91.35	0.33	0.36	0.36
Measuring Range		100	ppm		Average Difference (%)			0.46

Correlation Coefficient	1.0000	Slope	1.0013	Intercept	-0.1738



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul **DATE: 12-16 January 2026**

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Calibration Report

Multi-Point Gas Test Report

Equipment :	SO_2 Analyzer	**Manufacturer :**	Thermo Fisher Scientific
Model :	43iHL-DZCA	**Serial Number:**	12403232473

Standard gas Information

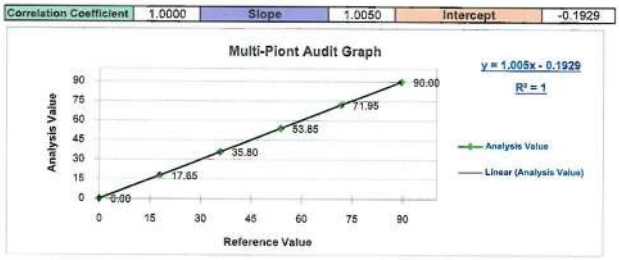
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026
Sulfur Dioxide (SO_2) = 89.69 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS
Level		ppm	#1	#2	Avg.			(Std.<±5%)
#1	Zero	0.00	0.0	0.0	0.00	0.00	0.00	0.00
#2	20%	17.94	17.6	17.7	17.65	-0.29	-1.61	1.61
#3	40%	35.88	35.8	35.8	35.80	-0.08	-0.21	0.21
#4	60%	53.81	53.7	54.0	53.85	0.04	0.07	0.07
#5	80%	71.75	71.8	72.1	71.95	0.20	0.28	0.28
#6	100%	89.69	90.0	90.0	90.00	0.31	0.35	0.35
Measuring Range		100	ppm		Average Difference (%)			0.42

Correlation Coefficient	1.0000	Slope	1.0050	Intercept	-0.1929



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul **DATE: 12-16 January 2026**

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Calibration Report

Multi-Point Gas Test Report

Equipment : CO Analyzer Manufacturer : Thermo Fisher Scientific
Model : 48i-BZSCA Serial Number: 1152640010

Standard gas Information

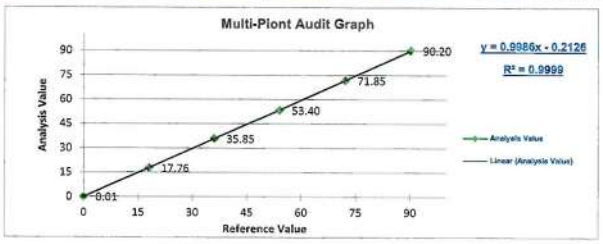
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026
Carbon Monoxide (CO) = 90.24 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value Level		ppm	Analyzer Display Value #1	#2	Avg.	Error (ppm)	% Error	%ABS (Std.<±5%)
#1	Zero	0.00	0.01	0.00	0.01	0.01	0.01	0.01
#2	20%	18.05	17.72	17.80	17.76	-0.29	-1.60	1.60
#3	40%	36.10	35.80	35.90	35.85	-0.25	-0.68	0.68
#4	60%	54.14	53.30	53.50	53.40	-0.74	-1.37	1.37
#5	80%	72.19	72.10	71.60	71.85	-0.34	-0.47	0.47
#6	100%	90.24	90.20	90.20	90.20	-0.04	-0.04	0.04
Measuring Range		100 ppm				Average Difference (%)		0.70

Correlation Coefficient	1.0000	Slope	0.9986	Intercept	-0.2126



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul DATE: 12-16 January 2026

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Calibration Report

Multi-Point Gas Test Report

Equipment : CO_2 Analyzer Manufacturer : Thermo Fisher Scientific
Model : 410i-BZPECA Serial Number: 1170530050

Standard gas Information

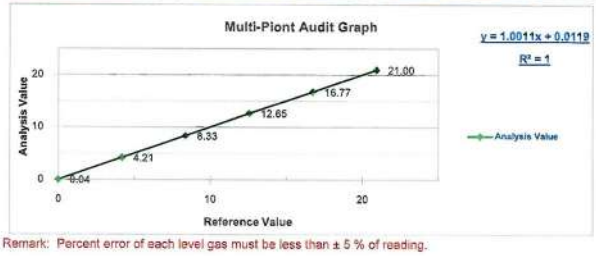
Cylinder Number : GN0018529 Expiration Date: Feb 14, 2027
Carbon Dioxide (CO_2) = 20.95 %

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value Level		%	Analyzer Display Value #1	#2	Avg.	Error (ppm)	% Error	%ABS (Std.<±5%)
#1	Zero	0.00	0.04	0.03	0.04	0.04	0.04	0.04
#2	20%	4.19	4.20	4.22	4.21	0.02	0.48	0.48
#3	40%	8.38	8.30	8.36	8.33	-0.05	-0.60	0.60
#4	60%	12.57	12.60	12.70	12.65	0.08	0.64	0.64
#5	80%	16.76	16.70	16.83	16.77	0.00	0.03	0.03
#6	100%	20.95	21.00	21.00	21.00	0.05	0.24	0.24
Measuring Range		25 %				Average Difference (%)		0.34

Correlation Coefficient	1.0000	Slope	1.0011	Intercept	0.0119



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul DATE: 12-16 January 2026

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Calibration Report

Multi-Point Gas Test Report

Equipment : O_2 Analyzer Manufacturer : ABB
Model : AO2020 Serial Number: 3.269410.5

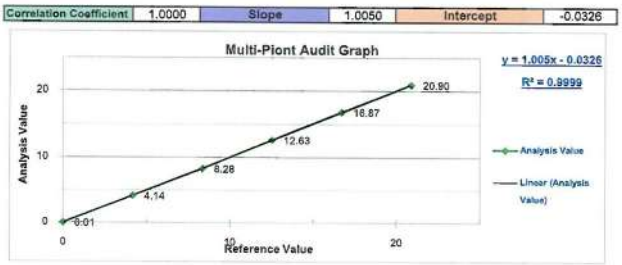
Standard gas Information

Cylinder Number : 4621265Y *Expiration Date: Nov 27, 2031*
Oxygen (O_2) = 20.90 % Balance Nitrogen

Multi-Point Gas Test Data

Reference gas value Level		%	Analyzer Display Value #1	#2	Avg.	Error (ppm)	% Error	%ABS (Std.<±5%)
#1	Zero	0.00	0.00	0.01	0.01	0.01	0.01	0.01
#2	20%	4.18	4.10	4.17	4.14	-0.04	-1.08	1.08
#3	40%	8.36	8.20	8.36	8.28	-0.08	-0.96	0.96
#4	60%	12.54	12.60	12.65	12.63	0.09	0.68	0.68
#5	80%	16.72	16.84	16.90	16.87	0.15	0.90	0.90
#6	100%	20.90	20.90	20.90	20.90	0.00	0.00	0.00
Measuring Range		25 %				Average Difference (%)		0.60

Correlation Coefficient	1.0000	Slope	1.0050	Intercept	-0.0326



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul DATE: 12-16 January 2026

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Calibration Report

Calibration Drift, LDL and Time Gas Response Test Report

ANALYZER TESTED LIST

ANALYZER NAME	BRAND	MODEL	SERIAL NUMBER
CO ANALYZER	THERMO ELECTRON	48i-BZSCA	1152640010
CO_2 ANALYZER	THERMO ELECTRON	410i-BZPECA	1170530050
O_2 ANALYZER	ABB	AO2020	3.269410.5
NO_X ANALYZER	THERMO ELECTRON	42iHL-BZSSDCA	1152640007
SO_2 ANALYZER	THERMO ELECTRON	43iHL-DZCA	12403232473

CALIBRATION DRIFT TESTING REPORT

Parameters	Zero 15-Jan-26	16-Jan-26	%DRIFT	Span 15-Jan-26	16-Jan-26	%DRIFT	Judgement
CO	0.006	-0.012	0.00	90.00	90.00	0.00	PASSED
CO_2	-0.033	-0.041	-0.03	21.00	21.00	0.00	PASSED
O_2	-0.070	-0.080	-0.04	20.95	20.95	0.04	PASSED
NO	0.041	0.042	0.00	91.10	90.90	-0.04	PASSED
NO_X	0.058	0.062	0.00	91.00	91.00	0.00	PASSED
SO_2	0.230	0.180	-0.01	90.70	90.50	-0.04	PASSED

LOWER DETECTABLE LIMIT TESTING REPORT

Parameters	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	STDEV.
CO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
CO_2	-0.032	-0.029	-0.550	-0.055	-0.018	-0.046	-0.041	-0.051	-0.033	-0.048	0.162
O_2	-0.053	-0.055	-0.057	-0.058	-0.059	-0.061	-0.062	-0.064	-0.064	-0.065	0.004
NO	0.037	0.042	0.039	0.037	0.035	0.038	0.038	0.042	0.039	0.040	0.002
NO_X	0.043	0.042	0.042	0.045	0.038	0.036	0.036	0.044	0.050	0.054	0.006
SO_2	0.244	0.234	0.216	0.224	0.232	0.189	0.204	0.221	0.215	0.212	0.016

CONCLUSION

CO Lower detectable limit (LDL) value is 0.000 PPM
CO_2 Lower detectable limit (LDL) value is 0.162 %
O_2 Lower detectable limit (LDL) value is 0.004 %VOL.
NO Lower detectable limit (LDL) value is 0.002 PPM
NO_X Lower detectable limit (LDL) value is 0.006 PPM
SO_2 Lower detectable limit (LDL) value is 0.016 PPM

GAS RESPONSE TIME TESTING REPORT

CO Response time 12 <20 Sec
CO_2 Response time 12 <20 Sec
O_2 Response time 8 <20 Sec
NO_X Response time 15 <20 Sec
SO_2 Response time 15 <20 Sec
With Sampling Line 80 meter 60 <120 Sec

DONE BY: Mr. Phuwanai Nakakul DATE: 12-16 January 2026

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Calibration Report

VALIDATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant
	Ideal	Actual	Error	Ideal	Actual	%Error	Conclusion
CO	0.00	0.014	0.01	905.9	788	-13.01	Not passed

CALIBRATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant
	Ideal	Actual	Error	Ideal	Actual	%Error	Conclusion
CO	0.00	0.017	0.02	905.9	906	0.01	Passed

Remark: Percent Error of each Parameter must be less than ± 5 % of reading.

DONE BY: Mr. Phuwanai Nakakul DATE: 12-16 January 2026

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Calibration Report

Multi-Point Gas Test Report

Equipment : CO Analyzer Manufacturer : Thermo Fisher Scientific
Model : 48I-BZSCA Serial Number: 1152640010

Standard gas Information

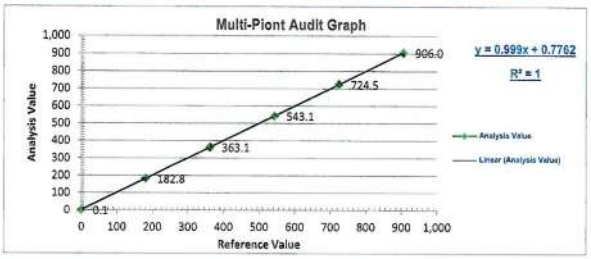
Cylinder Number : ND57460 Expiration Date: Jul 20, 2029
Carbon Monoxide (CO) = 905.9 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level		ppm	#1	#2	Avg.			
#1	Zero	0.0	0.1	0.1	0.1	0.10	0.10	0.10
#2	20%	181.2	182.7	182.8	182.8	1.57	0.87	0.87
#3	40%	362.4	363.2	363.0	363.1	0.74	0.20	0.20
#4	60%	543.5	543.0	543.2	543.1	-0.44	-0.08	0.08
#5	80%	724.7	724.0	725.0	724.5	-0.22	-0.03	0.03
#6	100%	905.9	906.0	906.0	906.0	0.10	0.01	0.01
Measuring Range		1,000 ppm			Average Difference (%)			0.22

Correlation Coefficient	1.0000	Slope	0.9990	Intercept	0.7762



Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☑ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul DATE: 12-16 January 2026

HORIBA
HORIBA (THAILAND) LIMITED

MULTI-POINT GAS TEST REPORT OF NITRIC OXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	1
Serial Number	J4D2YU7S	Coefficient	1.0389
		Room Temperature	25.4 ℃

Standard Gas Information

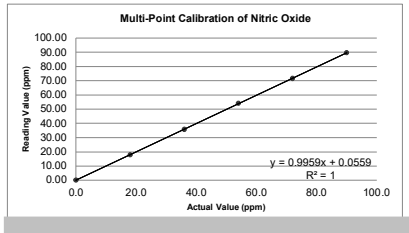
Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND58962
Component	N2	Component	NO
Concentration	99.999 %	Concentration	89.94 ppm
Expiration Date	-	Expiration Date	28-Sep-30
		Measurement Range	100
		% Measurement Range	89.94

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.1	0.2	0.2	0.17	0.17	
20%	17.99	17.80	17.80	17.90	17.83	-0.15	**0.86**
40%	35.98	35.50	35.80	35.80	35.70	-0.28	**0.77**
60%	53.96	54.20	54.09	54.12	54.14	0.17	**0.32**
80%	71.95	71.40	71.60	71.70	71.57	-0.39	**0.54**
100%	89.94	89.40	89.70	89.80	89.63	-0.31	**0.34**
						Average	**0.56**
						Result	**PASS**

Slope	0.9959	Interception	0.0559	Correlation Coefficient	1.0000
%Slope	-0.4146%	% Interception	0.0559%	% Correlation Coefficient	-0.0018%
Result	**PASS**	**Result**	**PASS**	**Result**	**PASS**

Multi-Point Gas Test Chart



HORIBA
HORIBA (THAILAND) LIMITED

MULTI-POINT GAS TEST REPORT OF SULFUR DIOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	0
Serial Number	J4D2YU7S	Coefficient	1.1295
		Room Temperature	25.4 ℃

Standard Gas Information

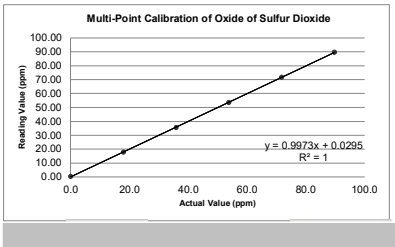
Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND58962
Component	N2	Component	SO2
Concentration	99.999 %	Concentration	89.71 ppm
Expiration Date	-	Expiration Date	28-Sep-30
		Measurement Range	200
		% Measurement Range	44.855

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.2	0.3	0.3	0.27	0.27	
20%	17.94	17.87	17.80	18.00	17.89	-0.05	**0.29**
40%	35.88	35.30	35.70	35.70	35.57	-0.32	**0.88**
60%	53.83	53.20	53.60	53.70	53.50	-0.33	**0.61**
80%	71.77	71.40	71.80	72.00	71.73	-0.03	**0.05**
100%	89.71	89.40	89.70	89.80	89.63	-0.08	**0.09**
						Average	**0.38**
						Result	**PASS**

Slope	0.9973	Interception	0.0295	Correlation Coefficient	1.0000
%Slope	-0.2665%	% Interception	0.0148%	% Correlation Coefficient	-0.0018%
Result	**PASS**	**Result**	**PASS**	**Result**	**PASS**

Multi-Point Gas Test Chart



HORIBA

HORIBA (THAILAND) LIMITED

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Website : http://www.horiba.com

MULTI-POINT GAS TEST REPORT OF CARBON MONOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	0
Serial Number	J4D2YU7S	Coefficient	1.3248
		Room Temperature	25.4 ℃

Standard Gas Information

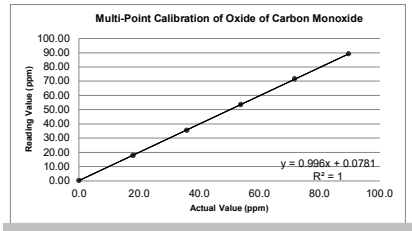
Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND58962
Component	N2	Component	CO
Concentration	99.999 %	Concentration	89.58 ppm
Expiration Date	-	Expiration Date	28-Sep-30
		Measurement Range	200
		% Measurement Range	44.79

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.2	0.3	0.3	0.27	0.27	
20%	17.92	17.92	17.87	17.70	17.83	-0.09	**0.48**
40%	35.83	35.20	35.60	35.70	35.50	-0.33	**0.93**
60%	53.75	53.30	53.70	53.90	53.63	-0.11	**0.21**
80%	71.66	71.40	71.70	71.80	71.63	-0.03	**0.04**
100%	89.58	89.00	89.40	89.40	89.27	-0.31	**0.35**
						Average	**0.40**
						Result	**PASS**

Slope	0.9960	Interception	0.0781	Correlation Coefficient	1.0000
%Slope	-0.4013%	% Interception	0.0390%	% Correlation Coefficient	-0.0013%
Result	**PASS**	**Result**	**PASS**	**Result**	**PASS**

Multi-Point Gas Test Chart



HORIBA

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Website : http://www.horiba.com

MULTI-POINT GAS TEST REPORT OF CARBON DIOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	0
Serial Number	J4D2YU7S	Coefficient	1.0042
		Room Temperature	25.4 ℃

Standard Gas Information

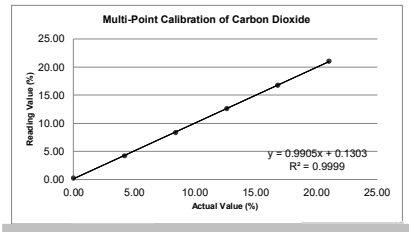
Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND11246
Component	N2	Component	CO2
Concentration	99.999 %	Concentration	21.02 %
Expiration Date	-	Expiration Date	8-Aug-30
		Measurement Range	30
		% Measurement Range	70.07

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (%)				Difference	
		1	2	3	Average	%	%
0%	0.00	0.20	0.30	0.30	0.27	0.27	
20%	4.20	4.13	4.16	4.17	4.21	0.01	**0.14**
40%	8.41	8.30	8.38	8.39	8.36	-0.05	**0.61**
60%	12.61	12.58	12.61	12.64	12.61	0.00	**0.02**
80%	16.82	16.75	16.77	16.80	16.77	-0.04	**0.25**
100%	21.02	21.00	21.03	21.05	21.03	0.01	**0.03**
						Average	**0.21**
						Result	**PASS**

Slope	0.9905	Interception	0.1303	Correlation Coefficient	0.9999
%Slope	-0.9492%	% Interception	0.4344%	% Correlation Coefficient	-0.0069%
Result	**PASS**	**Result**	**PASS**	**Result**	**PASS**

Multi-Point Gas Test Chart



HORIBA

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MULTI-POINT GAS TEST REPORT OF OXYGEN

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	16
Serial Number	J4D2YU7S	Coefficient	1.0266
		Room Temperature	25.4 ℃

Standard Gas Information

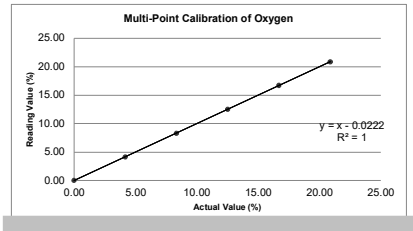
Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND60790
Component	N2	Component	O2
Concentration	99.999 %	Concentration	20.87 %
Expiration Date	-	Expiration Date	20-Jan-30
		Measurement Range	25
		% Measurement Range	83.48

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (%)				Difference	
		1	2	3	Average	%	%
0%	0.00	0.00	0.00	0.00	0.00	0.00	
20%	4.17	4.13	4.18	4.14	4.15	-0.02	**0.57**
40%	8.35	8.34	8.23	8.26	8.28	-0.07	**0.85**
60%	12.52	12.48	12.50	12.53	12.50	-0.02	**0.15**
80%	16.70	16.68	16.72	16.73	16.71	0.01	**0.08**
100%	20.87	20.82	20.84	20.85	20.84	-0.03	**0.16**
						Average	**0.36**
						Result	**PASS**

Slope	1.0000	Interception	-0.0222	Correlation Coefficient	1.0000
%Slope	0.0000%	% Interception	-0.0889%	% Correlation Coefficient	-0.0007%
Result	**PASS**	**Result**	**PASS**	**Result**	**PASS**

Multi-Point Gas Test Chart



HORIBA

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Website : http://www.horiba.com

LOWER DETECTABLE LIMIT TESTING REPORT

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Room Temperature	25.4 ℃
Serial Number	J4D2YU7S		

Standard Gas Information

Zero Gas		Component	N2
Cylinder Number	D9143166	Concentration	99.999 %

Parameters	Measruement Range	Unit	Background	Coefficient
NO	100	ppm	1	1.0389
SO_2	200	ppm	0	1.1295
CO	200	ppm	0	1.3248
CO_2	30	%	0	1.0042
O_2	25	%	16	1.0266

TESTING REPORT RESULTS

Parameters	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	STDEV.
NO	0.00	0.10	0.10	0.10	-0.10	-0.10	0.00	-0.10	0.10	0.10	0.092
SO_2	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.008
CO	0.30	0.30	0.20	0.20	0.30	0.30	0.20	0.30	0.30	0.30	0.048
CO_2	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.004
O_2	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03	0.00	0.012

Conclusion

NO Lower detectable limit (LDL) value is	0.092	ppm
SO_2 Lower detectable limit (LDL) value is	0.008	ppm
CO Lower detectable limit (LDL) value is	0.048	ppm
CO2 Lower detectable limit (LDL) value is	0.004	% Vol.
O_2 Lower detectable limit (LDL) value is	0.012	% Vol.

SGS

Prob Nozzle Diameter Calibration Data Sheet

Date	05/01/2026	Personal	CS
Vernier (Digital)	Dial Caliper	Reference	MINV08
Nozzle ID	ENSS 092 Stainless Steel	Expire Date	05/01/2027

Nozzle No.	Nozzle Diameter (mm)			Hi-Lo	D_{avg}
	D1	D2	D3	ΔD	
1	3.02	3.00	3.00	0.02	3.01
2	4.48	4.42	4.42	0.06	4.44
3	5.80	5.84	5.82	0.04	5.82
4	6.22	6.32	6.24	0.10	6.26
5	7.60	7.50	7.50	0.10	7.53
6	9.04	9.02	9.08	0.06	9.05
7	10.90	10.98	10.92	0.08	10.93

Remark : ΔD = Maximum distance between any two diameters, must be ≤ 0.100 mm

D_{avg} = (D1+D2+D3)/3

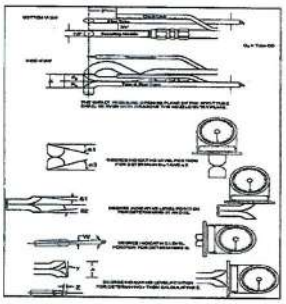
[redacted]

SGS

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.37/A8463

Parameter	Value	Allowable Range	Check
Assembly Level?	Y	Yes or y	PASS
Ports Damaged?	N	No or n	PASS
α1	1.9	$-10° < \alpha1 < +10°$	PASS
α2	0.9	$-10° < \alpha1 < +10°$	PASS
β1	-1.2	$-5° < \alpha1 < +5°$	PASS
β2	0.4	$-5° < \alpha1 < +5°$	PASS
γ	1.8	N/A	-
θ	1.2	N/A	-
D_t	0.375	0.188" to 0.375"	PASS
A	0.915748	$2.1D_t \le A \le 3.0D_t$	PASS
$A/2D_t$	1.220997	$1.05 \le P_s/D_t \le 1.5$	PASS
Z = A tan γ	0.028779	Z ≤ 0.125"	PASS
W = A tan θ	0.019182	W ≤ 0.031"	PASS

I certify that pitot tube/probe No.37/A8463 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 Inclinometer	Expiration data	14-Nov-26
Manufacturer	BASELINE	ENSS No.	ENSS 22159
Model	12-1057		
ID No.	QC-1824		

Cer

Dat

[redacted]

THC Calibration Services

THAI HEART CALIBRATION CO., LTD.

112/1 Moo 5, Phraek Sa, Muang, Samut Prakan 10280

Tel. 0-2394-2162, 0-2757-8435, 0-2757-8496 Fax. 0-2757-8507

ilac-MRA ANAB ACCREDITED CALIBRATION LABORATORY AC-2695

CERTIFICATE OF CALIBRATION

Certificate No.: L0-0505004/25 **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 High Flow
Manufacturer Bios **Model** Defender 530
Serial No. 118998 **ID No.** ENWP071
Description -

Environmental Conditions Ambient Temperature: (23 ± 3) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: -
Calibration Location Aggies 1 Laboratory (LL)
Received Date 5 May 2025
Calibration Date 7 May 2025
Date of Issue 8 May 2025

[redacted]

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

THC Calibration Services

THAI HEART CALIBRATION CO., LTD.

112/1 Moo 5, Phraek Sa, Muang, Samut Prakan 10280

Tel. 0-2394-2162, 0-2757-8435, 0-2757-8496 Fax. 0-2757-8507

ilac-MRA ANAB ACCREDITED CALIBRATION LABORATORY AC-2695

Certificate No.: L0-0505004/25 **Page** 2 **of total** 2 **pages**

Reference Method:

- The calibration method used was CP-111 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 Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Mass Flow Calibrator	185763	MW-0105-22	Dec. 26, 2026	NIMT
Mass Flow Calibrator	421040	MW-0048-23	Aug. 14, 2027	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:
- NIMT, National Institute of Metrology (Thailand).

Description of UUC

Type :	Volumetric Flow Meter	Indicator Range:	0.3 to 30 l/min
Media :	Nitrogen	Resolution :	0.00001, 0.0001, 0.001 l/min
Condition :	25 °C, 101.3 kPa	Connector Size:	6 mm.

Measurement Results: (X) Without Adjustment

Point No.	Standard Value Flow Rate (l/min)	UUC Value Flow Rate (l/min)	Error (l/min)	Error (%)	Uncertainty ± (%)
1	0.5087	0.51285	0.00415	0.82	1.1
2	1.0334	1.0232	-0.0102	-0.99	1.1
3	5.0087	5.0320	0.0233	0.47	0.80
4	10.0832	10.135	0.0518	0.51	0.80
5	20.0421	20.170	0.1279	0.64	0.80
6	29.9543	30.164	0.2097	0.70	0.80

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 [redacted]

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7/139 MOO 13, SOI SUNTINAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 10600-2116-5800-1 FAX: 10600-2116-7140

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-ACT-068
Request No : Req-2025-0995

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : Cirrus
Model : CR:515
Serial Number : 88346
ID : ENSL 19174
Class : 1
Range : 94 dB / 1000 Hz
Instrument Status : Used

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 9 May 2025
Calibration Date : 13 May 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 providoes 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 %.

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.

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7/139 MOO 13, SOI SUNTINAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 10600-2116-5800-1 FAX: 10600-2116-7140

Certificate No : 25-ACT-068
Request No : Req-2025-0995

Sound pressure level — **Calibration Results** : Without Adjustment

Calibration Range	Without Adjustment (dB)		Adjustment (dB)		Uncertainty
(dB)	Measured	Deviated value	Measured	Deviated value	(± dB)
94 dB / 1000 Hz	93.95	-0.05	-	-	0.12

Frequency of Sound pressure level

Calibration Range	Without Adjustment		Adjustment		Uncertainty
(Hz)	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	Without Adjustment	Adjustment	Uncertainty
(Hz)	Measured (%)	Measured (%)	(± %)
94 dB / 1000 Hz	0.95	-	0.17

Note :

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

End of Calibration

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-ACT-02 Rev.04 Issue date 17/2/25

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com

Cert. No. : ACL25206
Pages : 1 of 8

Calibration Certificate

ENSL 25115

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-53 / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00452076 / 26811 / 55056
ID No.: -

Condition As Found : GOOD

Customer : SGS (THAILAND) LIMITED.
238 TRR TOWER, 19th-21st FLOOR,
NARADHIWAS RAJANAGARINDRA ROAD,
CHONG NONSI, YANNAWA, BANGKOK 10120
THAILAND.

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

Received Date : 22 MAY 2025
Calibration Date : 27 MAY 2025
Date of Issue : 29 MAY 2025

Calibrated by :

Approved by :

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

SITHIPORN associates
SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : ACL25206
Job No. : VC68AC0104
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Electrical And Electronics Institute (EEI).

Cert. No. : ACL25206
Job No. : VC68AC0104
Pages : 3 of 8

Summary of Measurement Result :

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

Cert. No. : ACL25206
Job No. : VC68AC0104
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Weighting (dB)
A - weight	11.9
C - weight	17.5
Flat	24.9

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.0
1000	0.1	0.1	0.1	± 0.7
8000	-0.8	-0.7	-0.7	+ 1.5, - 2.5

Cert. No. : ACL25206
Job No. : VC68AC0104
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.0	0.1	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	-0.1	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	-0.1	-0.1	-0.1	±1.0
8000	-0.1	-0.1	-0.1	+ 1.5, - 2.5
16000	-0.1	-0.8	-0.8	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

Cert. No. : ACL25206
Job No. : VC68AC0104
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	25.0	0.0	±0.8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.4	0.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.1	-0.3	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.5	-0.1	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com

SITHIPORN associates

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NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACL25210
Pages : 1 of 8

Calibration Certificate

ENSL 75119

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-53 / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00452080 / 26815 / 55060
ID No.: -

Condition As Found : GOOD

Customer : SGS (THAILAND) LIMITED.
238 TRR TOWER, 19th-21st FLOOR,
NARADHIWAS RAJANAGARINDRA ROAD,
CHONG NONSI, YANNAWA, BANGKOK 10120
THAILAND.

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

Received Date : 22 MAY 2025
Calibration Date : 27 MAY 2025
Date of Issue : 29 MAY 2025

Calibrated by :

Approved by :

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

Calibration Procedure : CP-AC-02

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Electrical And Electronics Institute (EEI).

Cert. No. : ACL25210
Job No. : VC68AC0104
Pages : 3 of 8

Summary of Measurement Result :

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

Cert. No. : ACL25210
Job No. : VC68AC0104
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Weighting (dB)
A - weight	11.3
C - weight	15.0
Flat	20.7

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	-1.1	-1.1	-1.1	+ 1.5, - 2.5

Cert. No. : ACL25210
Job No. : VC68AC0104
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	-0.1	0.0	0.0	+ 1.5, - 2.5
16000	0.0	-0.8	-0.7	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

Cert. No. : ACL25210
Job No. : VC68AC0104
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	26.9	-0.1	±0.8
26.0	26.0	0.0	±0.8
25.0	24.9	-0.1	±0.8

Cert. No. : ACL25210
Job No. : VC68AC0104
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	116.9	-0.1	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL25210
Job No. : VC68AC0104
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.4	0.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com

SITHIPORN associates

ENSL 25120

Cert. No. : ACL25328
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-53 / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00652277 / 27598 / 55237
ID No.: -

Condition As Found : GOOD

Customer : SGS (THAILAND) CO., LIMITED.
238 TRR TOWER, 19TH-21ST FLOOR,
NARADHIWAS RAJANAGARINDRA ROAD,
CHONG NONSI YANNAWA, BANGKOK 10120 THAILAND.

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

Received Date : 08 AUGUST 2025
Calibration Date : 22 AUGUST 2025
Date of Issue : 25 AUGUST 2025

Calibrated by :

Approved by :

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

Cert. No. : ACL25328
Job No. : VC68AC0166
Pages : 2 of 8

Calibration Procedure : CP-AC-02

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

Condition of this result of calibration :
1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL.BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL.BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).
   3.3 Electrical And Electronics Institute (EEI).

Cert. No. : ACL25328
Job No. : VC68AC0166
Pages : 3 of 8

Summary of Measurement Result :

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

Cert. No. : ACL25328
Job No. : VC68AC0166
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Weighting (dB)
A - weight	12.1
C - weight	15.8
Flat	21.3

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.3	0.3	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	-0.6	-0.5	-0.5	+ 1.5, - 2.5

Cert. No. : ACL25328
Job No. : VC68AC0166
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.0	0.0	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	+ 1.5, - 2.5
16000	0.0	-0.8	-0.7	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

Cert. No. : ACL25328
Job No. : VC68AC0166
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	88.9	-0.1	±0.8
84.0	83.9	-0.1	±0.8
79.0	78.9	-0.1	±0.8
74.0	73.9	-0.1	±0.8
69.0	68.9	-0.1	±0.8
64.0	63.9	-0.1	±0.8
59.0	58.9	-0.1	±0.8
54.0	53.9	-0.1	±0.8
49.0	48.9	-0.1	±0.8
44.0	43.9	-0.1	±0.8
39.0	38.9	-0.1	±0.8
34.0	33.9	-0.1	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8
28.0	28.0	0.0	±0.8
27.0	26.9	-0.1	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

Cert. No. : ACL25328
Job No. : VC68AC0166
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL25328
Job No. : VC68AC0166
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.3	-0.1	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.5	-0.1	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-451/1 Srinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com

SITHIPORN associates
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NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACL25204
Pages : 1 of 8

Calibration Certificate

ENSL 25113

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-53 / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00452074 / 26174 / 55054
ID No.: -

Condition As Found : GOOD

Customer : SGS (THAILAND) LIMITED.
238 TRR TOWER, 19th-21st FLOOR,
NARADHIWAS RAJANAGARINDRA ROAD,
CHONG NONSI, YANNAWA, BANGKOK 10120
THAILAND.

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

Received Date : 22 MAY 2025
Calibration Date : 27 MAY 2025
Date of Issue : 29 MAY 2025

Calibrated by :

Approved by :

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

Cert. No. : ACL25204
Job No. : VC68AC0104
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Electrical And Electronics Institute (EEI).

Cert. No. : ACL25204
Job No. : VC68AC0104
Pages : 3 of 8

Summary of Measurement Result :

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

Cert. No. : ACL25204
Job No. : VC68AC0104
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Weighting (dB)
A - weight	12.1
C - weight	15.6
Flat	21.0

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.0
1000	0.1	0.1	0.1	± 0.7
8000	-0.4	-0.4	-0.4	+ 1.5, - 2.5

Cert. No. : ACL25204
Job No. : VC68AC0104
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.0	0.0	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	-0.1	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	-0.1	-0.1	-0.1	±1.0
8000	-0.1	-0.1	-0.1	+ 1.5, - 2.5
16000	-0.1	-0.8	-0.8	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

Cert. No. : ACL25204
Job No. : VC68AC0104
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	27.9	-0.1	±0.8
27.0	27.0	0.0	±0.8
26.0	25.9	-0.1	±0.8
25.0	25.0	0.0	±0.8

Cert. No. : ACL25204
Job No. : VC68AC0104
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL25204
Job No. : VC68AC0104
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.4	0.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.1	-0.3	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TIS17025 CALIBRATION 0508

Certificate of Calibration

Cert.No.: 26CH581
Page.: 1 of 3

Equipment :	pH / Conductivity Meter
Manufacturer :	Mettler Toledo
Model :	S213
Serial No. :	B902060027
ID No. :	P20190019
Condition As-Received:	Used Item
Received Date :	28 May 2026
Calibration Date :	29 May 2026
Reference :	2605-0926WSC-3
Submitted by :	SGS (Thailand) Limited 1/209, 1/211 Moo 1, T.Ban Chang, A.Ban Chang, Rayong 21130
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM) - CP-CH8 by comparison with temperature standard
Calibrated by :	Walailak Sirithean

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Cert.No.: 26CH581
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	25E2743	25 Aug 2026
2) Ref. Standard Thermometer	4982054	110RC044	25I708	03 July 2026

- This measurement result is traceable to SI throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 1.685	CPA chem	1005300	15 June 2026
pH 4.008	CPA chem	1187328	18 Jan 2028
pH 6.979	CPA chem	1187330	18 Jan 2027
pH 10.010	CPA chem	1187332	18 Jan 2027

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Document Process Calibrator at pH (1.7,4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	1.680	314.73	314.6	1.680	0.058	2.00
S/N.: B902060027	4.000	177.48	177.4	4.000	0.058	2.00
	7.000	0.00	0.0	7.000	0.058	2.00
	10.000	-177.48	-177.4	10.000	0.058	2.00

Cert.No.: 26CH581
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing four buffers standard curve by using buffer nominal pH (1.7,4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor *k*
pH Electrode	1.685	1.686	320.9	0.0044	2.00
S/N.: 8512743	4.008	4.007	183.1	0.0044	2.00
	6.979	6.979	9.2	0.0084	2.00
	10.010	10.011	-163.4	0.0070	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab Expert Pro-ISM
- Serial No. : 8512743

Dimension of probe

- Length : 120 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (±°C)	Coverage factor *k*
25.0	25.001	25.0	-0.001	0.13	2.00

Remark - UUC* = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-

การ Verify เครื่อง DO Meter โดยเปรียบเทียบระหว่างวิธีการไดเตรต กับ การวัดด้วยเครื่อง DO Meter

รายการทดสอบ : หาค่าความเข้มข้น GAGU 198±30.5 mg/L

Portion	Membrane	Azide
1	204.0	205.0
2	202.0	195.0
3	208.5	215.0
4	200.5	210.0
5	196.5	185.0
6	202.5	205.0
7	204.0	205.0
8	199.0	205.0
9	204.5	195.0
10	195.5	215.0
Mean	**201.70**	**203.50**
SD	**3.93841**	**9.44281**

F-Test Two-Sample for Variances

	Membrane	*Azide*
Mean	201.7	203.5
Variance	15.51111111	89.16666667
Observations	10	10
df	9	9
F	0.173956386	
P(F<=f) one-tail	0.007840966	
F Critical one-tail	0.314574906	

t-Test: Two-Sample Assuming Unequal Variances

	Membrane	*Azide*
Mean	201.7	203.5
Variance	15.51111111	89.16666667
Observations	10	10
Hypothesized Mean	0	
df	12	
t Stat	-0.556346369	
P(T<=t) one-tail	0.294099333	
t Critical one-tail	1.782287556	
P(T<=t) two-tail	0.588198667	
t Critical two-tail	2.17881283	

Summary

ข้อมูลทั้งสองชุดที่ได้จากการทำการทดสอบ t- test จากสองเครื่องมือไม่มีความแตกต่างกันT-stat < T (critical)
สรุปว่าข้อมูล 2 ข้อมูลไม่แตกต่างกัน

Date : 28/01/2026

Date : 29/01/2026

Membrane

Sample No.	DO0	DO5	Depletion	Seed	dilution	mg/L BOD
1	8.37	3.46	4.91	0.83	50	204.0
2	8.35	3.48	4.87	0.83	50	202.0
3	8.32	3.32	5.00	0.83	50	208.5
4	8.37	3.53	4.84	0.83	50	200.5
5	8.33	3.57	4.76	0.83	50	196.5
6	8.34	3.46	4.88	0.83	50	202.5
7	8.35	3.44	4.91	0.83	50	204.0
8	8.34	3.53	4.81	0.83	50	199.0
9	8.34	3.42	4.92	0.83	50	204.5
10	8.30	3.56	4.74	0.83	50	195.5
AVERAGE	**8.34**	**3.48**	**4.86**	**0.83**	**50**	**201.7**

Azide

Sample No.	DO0	DO5	Depletion	Seed	dilution	mg/L BOD
1	8.40	3.50	4.90	0.8	50	205.0
2	8.30	3.60	4.70	0.8	50	195.0
3	8.50	3.40	5.10	0.8	50	215.0
4	8.40	3.40	5.00	0.8	50	210.0
5	8.20	3.70	4.50	0.8	50	185.0
6	8.30	3.40	4.90	0.8	50	205.0
7	8.70	3.80	4.90	0.8	50	205.0
8	8.50	3.60	4.90	0.8	50	205.0
9	8.40	3.70	4.70	0.8	50	195.0
10	8.60	3.50	5.10	0.8	50	215.0
AVERAGE	**8.43**	**3.56**	**4.87**	**0.8**	**50**	**203.5**

BOD Report

In 28-Jan-26 Out 02-Feb-26 DO Meter No. D2017006 Incubator No. I2022007 Sample Type Water Sample No. - Test by HL

Control			6.0-8.0	20+/- 3	> 5	20+/- 1	> 1	>2	0.6>1.0	LOQ = 2 mg/L			<30%
No.	Sample No.	Range	pH	Temp	DO0	Temp	DO5	Depletion (DO5-DO0)	Vs	Result	Averange	Final Result	%RPD
	Unit	-	-	DegC	mg/L	DegC	mg/L	mg/L	-	mg/L	mg/L	mg/L	%
-	Blank 1	-	7.00		8.5		8.4	0.1	-	0.10	0.15	0.15	66.7
	Blank 2	-			8.6		8.4	0.2	-	0.20			
-	QC	20	7.01		8.5		3.9	4.6	0.8	189.00	189.0	189	QC 198±30.5 mg/L
-	Seed 1	-	7.01		8.4		4.3	4.1	-	4.10	4.0	4.0	-
	Seed 2	-			8.4		4.5	3.9	-	3.88	4.0		
1-1	Azide							0.0	0.8	#DIV/0!	-	#DIV/0!	0.0
	A							0.0	0.8	#DIV/0!	-		
1-2	QC1	20	7.02		8.4		3.5	4.9	0.8	206.00	206.0	206.00	0.0
	B							0.0	0.8	#DIV/0!	-		
										Duplicate Sample		#DIV/0!	0.0
2	QC2	20	7.02		8.3		3.6	4.7	0.8	196.00	196.0	196.0	0.0
								0.0	0.8	#DIV/0!	-		
3	QC3	20	7.02		8.5		3.4	5.1	0.8	216.00	216.0	216.0	0.0
								0.0	0.8	#DIV/0!	-		
4	QC4	20	7.02		8.4		3.4	5.0	0.8	211.00	211.0	211.0	0.0
								0.0	0.8	#DIV/0!	-		
5	QC5	20	7.02		8.2		3.7	4.5	0.8	186.00	186.0	186.0	0.0
								0.0	0.8	#DIV/0!	-		
6	QC6	20	7.02		8.3		3.4	4.9	0.8	206.00	206.0	206.0	0.0
								0.0	0.8	#DIV/0!	-		
7	QC7	20	7.02		8.7		3.8	4.9	0.8	206.00	206.0	206.0	0.0
								0.0	0.8	#DIV/0!	-		
8	QC8	20	7.02		8.5		3.6	4.9	0.8	206.00	206.0	206.0	0.0
								0.0	0.8	#DIV/0!	-		
9	QC9	20	7.02		8.4		3.7	4.7	0.8	196.00	196.0	196.0	0.0
								0.0	0.8	#DIV/0!	-		
10	QC10	20	7.02		8.6		3.5	5.1	0.8	216.00	216.0	216.0	0.0
								0.0	0.8	#DIV/0!	-		

ใส่เมื่อมีการปรับ pH สารตัวอย่างเท่านั้น (ก่อนปรับ pH 6-8 ,หลังปรับ pH 6.5-7.5)
Spike seed 3 mL ต่อ Diluted sample 1 L เมื่อใช้ V = 500 mL
เมื่อทั้ง 3 Dilution มีค่า Depletion < 2 ให้ทำการคำนวณโดยใช้ dilution ที่ V สูงสุดมาคำนวณโดยถือว่า Depletion=2

BOD (mg/L) = ((DO(0)-DO(5))-(S)Vs) x Dilution
DO(0) = ค่า O2 ที่ละลายน้ำวันแรก (mg/L)
DO(5) = ค่า O2 ที่ละลายน้ำวันที่ 5 หลังการบ่มในตู้ควบคุมอุณหภูมิ 20±1 °C (mg/L)
S = Average DO Depletion ที่เกิดจาก Seed control (mg/L) / ปริมาตรของSeedที่ใช้ในSeed control (mL)
Vs = ปริมาตรของ Seed ที่ใช้ใน Sample (mL) = 1000-V (mL) / 100

Control 0.6<(S)Vs<1.0

BOD Report

In	28-Jan-26	Out	02-Feb-26	DO Meter No.	D2017006
				Incubator No.	I2022007
				Sample Type	Water
				Sample No.	-
				Test by	HL

Control			6.0-8.0	20+/- 3	> 5	20+/- 1	> 1	>2	0.6>1.0	LOQ = 2 mg/L			<30%
No.	Sample No.	Range	pH	Temp	DO0	Temp	DO5	Depletion (DO5-DO0)	Vs	Result	Averange	Final Result	%RPD
Unit		-	-	DegC	mg/L	DegC	mg/L	mg/L	-	mg/L	mg/L	mg/L	%
-	Blank 1	-	7.00	20.0	8.37	20.1	8.19	0.18	-	0.18	0.19	0.19	10.5
	Blank 2	-		20.2	8.35	20.1	8.15	0.20	-	0.20			
-	QC	20	7.01	21.4	8.43	20.1	3.66	4.77	0.84	196.50	196.5	197	QC 198±30.5 mg/L
-	Seed 1	-	7.01	20.3	8.34	20.2	4.13	4.21	-	4.21	4.2	4.2	-
	Seed 2	-		20.3	8.38	20.0	4.15	4.23	-	4.23	4.2		
1-1	Membrane							0.00	0.84	#DIV/0!	-	#DIV/0!	0.0
	A							0.00	0.84	#DIV/0!	-		
1-2	QC1	20	7.02	21.3	8.37	20.2	3.46	4.91	0.83	204.00	204.0	204.00	0.0
	B							0.00	0.84	#DIV/0!	-		
										Duplicate Sample		#DIV/0!	0.0
2	QC2	20	7.02	21.2	8.35	20.2	3.48	4.87	0.83	202.00	202.0	202.0	0.0
								0.00	0.84	#DIV/0!	-		
3	QC3	20	7.02	21.1	8.32	20.2	3.32	5.00	0.83	208.50	208.5	208.5	0.0
								0.00	0.84	#DIV/0!	-		
4	QC4	20	7.02	21.1	8.37	20.1	3.53	4.84	0.83	200.50	200.5	200.5	0.0
								0.00	0.84	#DIV/0!	-		
5	QC5	20	7.02	21.3	8.33	20.2	3.57	4.76	0.83	196.50	196.5	196.5	0.0
								0.00	0.84	#DIV/0!	-		
6	QC6	20	7.02	21.2	8.34	20.2	3.46	4.88	0.83	202.50	202.5	202.5	0.0
								0.00	0.84	#DIV/0!	-		
7	QC7	20	7.02	21.3	8.35	20.2	3.44	4.91	0.83	204.00	204.0	204.0	0.0
								0.00	0.84	#DIV/0!	-		
8	QC8	20	7.02	21.4	8.34	20.2	3.53	4.81	0.83	199.00	199.0	199.0	0.0
								0.00	0.84	#DIV/0!	-		
9	QC9	20	7.02	21.1	8.34	20.2	3.42	4.92	0.83	204.50	204.5	204.5	0.0
								0.00	0.84	#DIV/0!	-		
10	QC10	20	7.02	21.3	8.30	20.1	3.56	4.74	0.83	195.50	195.5	195.5	0.0
								0.00	0.84	#DIV/0!	-		

ใส่เมื่อมีการปรับ pH สารตัวอย่างเท่านั้น (ก่อนปรับ pH 6-8 ,หลังปรับ pH 6.5-7.5)

Spike seed 3 mL ต่อ Diluted sample 1 L เมื่อใช้ V = 500 mL

เมื่อทั้ง 3 Dilution มีค่า Depletion < 2 ให้ทำการคำนวณโดยใช้ dilution ที่ V สูงสุดมาคำนวณโดยถือว่า Depletion=2

BOD (mg/L) = ((DO(0)-DO(5))-(S)Vs) x Dilution

DO(0) = ค่า O2 ที่ละลายน้ำวันแรก (mg/L)

DO(5) = ค่า O2 ที่ละลายน้ำวันที่ 5 หลังการบ่มในตู้ควบคุมอุณหภูมิ 20±1 ^{o}C (mg/L)

S = Average DO Depletion ที่เกิดจาก Seed control (mg/L) / ปริมาตรของSeedที่ใช้ในSeed control (mL)

Vs = ปริมาตรของ Seed ที่ใช้ใน Sample (mL) = 1000-V (mL) / 100

Control 0.6<(S)Vs<1.0

SGS Form No. ENWA-15759, Rev. 8.0, date: 30/10/25

Data Sheet

Test name	Verify DO D2017006		Azide method
By	HL		
Date	28/01/2026		

Sample No.	mL Titrate(DO1)	Factor	mL Titrate(DO5)	Factor	pH
Blank 1	9.5	1.0	9.4	1.0	7.00
2	9.6	1.0	9.4	1.0	
QC (20)	9.5	1.0	3.4	1.0	7.01
Seed 1 (5%)	9.4	1.0	4.3	1.0	7.01
2 (5%)	9.4	1.0	4.5	1.0	
QC 1 20	9.4	1.0	3.5	1.0	7.02
QC 2 20	9.3	1.0	3.6	1.0	7.02
QC 3 20	9.5	1.0	3.4	1.0	7.01
QC 4 20	9.4	1.0	3.4	1.0	7.02
QC 5 20	9.2	1.0	3.7	1.0	7.02
QC 6 20	9.3	1.0	3.4	1.0	7.01
QC 7 20	9.3	1.0	3.5	1.0	7.01
QC 8 20	9.5	1.0	3.6	1.0	7.02
QC 9 20	9.4	1.0	3.7	1.0	7.01
QC 10 20	9.6	1.0	3.5	1.0	7.01

SGS Form No. ENGL-22014, Rev. 0.0, date 02/09/2022

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Data Sheet

Test name	Verify DO	Date In	28/01/2026
By	HL	Date Out	02/02/2026
	Membrane method	Incubator	I2022007
		DO meter	D2017006

Sample No.	pH	Temp.	DO0	Temp.	DO5
Blank 1	7.00	20.0	8.37	20.1	8.19
Blank 2	7.00	20.2	8.35	20.1	8.15
QC	7.01	21.4	8.43	20.1	3.66
Seed 1	7.01	20.3	8.34	20.2	4.13
Seed 2	7.01	20.3	8.38	20.0	4.15
QC 1 20	7.02	21.3	8.37	20.2	3.46
QC 2 20	7.01	21.2	8.35	20.2	3.48
QC 3 20	7.01	21.1	8.32	20.2	3.32
QC 4 20	7.02	21.1	8.37	20.1	3.53
QC 5 20	7.02	21.3	8.33	20.2	3.57
QC 6 20	7.02	21.2	8.34	20.2	3.46
QC 7 20	7.02	21.3	8.35	20.2	3.44
QC 8 20	7.02	21.4	8.34	20.2	3.53
QC 9 20	7.02	21.1	8.34	20.2	3.42
QC 10 20	7.02	21.3	8.30	20.1	3.56

SGS Form No. ENGL-22014, Rev. 0.0, date 02/09/2022

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Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	000827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	26/1098
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2027
Calibration Date	10/04/2026	Next Cal. Date	10/04/2027

Left

Hole 1				Hole 2				Hole 3			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	148.4	-0.18	148.2	1	150.8	-0.18	150.6	1	151.0	-0.18	150.8
2	148.5	-0.18	148.3	2	150.8	-0.18	150.6	2	151.0	-0.18	150.8
3	148.4	-0.18	148.2	3	150.7	-0.18	150.5	3	151.1	-0.18	150.9
		Mean	148.25			Mean	150.59			Mean	150.85
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.039			%RSD	0.038			%RSD	0.038

Hole 4				Hole 5				Hole 6			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	150.1	-0.18	149.9	1	149.2	-0.18	149.0	1	151.0	-0.18	150.8
2	150.2	-0.18	150.0	2	149.3	-0.18	149.1	2	151.1	-0.18	150.9
3	150.1	-0.18	149.9	3	149.3	-0.18	149.1	3	151.1	-0.18	150.9
		Mean	149.95			Mean	149.09			Mean	150.89
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.039			%RSD	0.039			%RSD	0.038

Hole 7				Hole 8				Hole 9			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	148.8	-0.18	148.6	1	152.1	-0.18	151.9	1	148.2	-0.18	148.0
2	148.7	-0.18	148.5	2	152.0	-0.18	151.8	2	148.3	-0.18	148.1
3	148.8	-0.18	148.6	3	152.0	-0.18	151.8	3	148.2	-0.18	148.0
		Mean	148.59			Mean	151.85			Mean	148.05
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.039			%RSD	0.038			%RSD	0.039

Hole 10				Hole 11				Hole 12			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	150.7	-0.18	150.5	1	149.0	-0.18	148.8	1	152.0	-0.18	151.8
2	150.7	-0.18	150.5	2	149.1	-0.18	148.9	2	152.0	-0.18	151.8
3	150.7	-0.18	150.5	3	149.1	-0.18	148.9	3	151.9	-0.18	151.7
		Mean	150.52			Mean	148.89			Mean	151.79
		SD	0.000			SD	0.058			SD	0.058
		%RSD	0.000			%RSD	0.039			%RSD	0.038

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SGS Form No. ENGL 11600, Rev 4.0, Date 28/03/2024

Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	000827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	26/1098
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2027
Calibration Date	10/04/2026	Next Cal. Date	10/04/2027

Middle

Hole 1				Hole 2				Hole 3			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	151.2	-0.18	151.0	1	151.9	-0.18	151.7	1	150.9	-0.18	150.7
2	151.3	-0.18	151.1	2	152.0	-0.18	151.8	2	150.8	-0.18	150.6
3	151.2	-0.18	151.0	3	152.0	-0.18	151.8	3	150.8	-0.18	150.6
		Mean	151.05			Mean	151.79			Mean	150.65
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.038			%RSD	0.038			%RSD	0.038

Hole 4				Hole 5				Hole 6			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	151.3	-0.18	151.1	1	151.1	-0.18	150.9	1	151.9	-0.18	151.7
2	151.4	-0.18	151.2	2	151.1	-0.18	150.9	2	151.9	-0.18	151.7
3	151.3	-0.18	151.1	3	151.1	-0.18	150.9	3	151.8	-0.18	151.6
		Mean	151.15			Mean	150.92			Mean	151.69
		SD	0.058			SD	0.000			SD	0.058
		%RSD	0.038			%RSD	0.000			%RSD	0.038

Hole 7				Hole 8				Hole 9			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	151.9	-0.18	151.7	1	151.7	-0.18	151.5	1	151.7	-0.18	151.5
2	152.0	-0.18	151.8	2	151.7	-0.18	151.5	2	151.6	-0.18	151.4
3	152.0	-0.18	151.8	3	151.8	-0.18	151.6	3	151.6	-0.18	151.4
		Mean	151.79			Mean	151.55			Mean	151.45
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.038			%RSD	0.038			%RSD	0.038

Hole 10				Hole 11				Hole 12			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	152.0	-0.18	151.8	1	151.9	-0.18	151.7	1	151.9	-0.18	151.7
2	152.0	-0.18	151.8	2	151.9	-0.18	151.7	2	152.0	-0.18	151.8
3	151.9	-0.18	151.7	3	152.0	-0.18	151.8	3	151.9	-0.18	151.7
		Mean	151.79			Mean	151.75			Mean	151.75
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.038			%RSD	0.038			%RSD	0.038

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Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	000827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	26/1098
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2027
Calibration Date	10/04/2026	Next Cal. Date	10/04/2027

Right

Hole 1				Hole 2				Hole 3			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	148.6	-0.18	148.4	1	148.2	-0.18	148.0	1	148.2	-0.18	148.0
2	148.5	-0.18	148.3	2	148.2	-0.18	148.0	2	148.2	-0.18	148.0
3	148.8	-0.18	148.6	3	148.3	-0.18	148.1	3	148.2	-0.18	148.0
		Mean	148.45			Mean	148.05			Mean	148.02
		SD	0.153			SD	0.058			SD	0.000
		%RSD	0.103			%RSD	0.039			%RSD	0.000

Hole 4				Hole 5				Hole 6			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	148.2	-0.18	148.0	1	148.6	-0.18	148.4	1	148.8	-0.18	148.6
2	148.2	-0.18	148.0	2	148.5	-0.18	148.3	2	148.9	-0.18	148.7
3	148.3	-0.18	148.1	3	148.3	-0.18	148.1	3	148.7	-0.18	148.5
		Mean	148.05			Mean	148.29			Mean	148.62
		SD	0.058			SD	0.153			SD	0.100
		%RSD	0.039			%RSD	0.103			%RSD	0.067

Hole 7				Hole 8				Hole 9			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	148.4	-0.18	148.2	1	149.0	-0.18	148.8	1	149.0	-0.18	148.8
2	148.3	-0.18	148.1	2	149.0	-0.18	148.8	2	149.0	-0.18	148.8
3	148.2	-0.18	148.0	3	148.9	-0.18	148.7	3	149.0	-0.18	148.8
		Mean	148.12			Mean	148.79			Mean	148.82
		SD	0.100			SD	0.058			SD	0.000
		%RSD	0.068			%RSD	0.039			%RSD	0.000

Hole 10				Hole 11				Hole 12			
NO.	Result			NO.	Result			NO.	Result		
	temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.		temp. °C	Corr.	temp+Corr.
1	148.8	-0.18	148.6	1	148.2	-0.18	148.0	1	149.5	-0.18	149.3
2	148.8	-0.18	148.6	2	148.3	-0.18	148.1	2	149.5	-0.18	149.3
3	148.7	-0.18	148.5	3	148.2	-0.18	148.0	3	149.6	-0.18	149.4
		Mean	148.59			Mean	148.05			Mean	149.35
		SD	0.058			SD	0.058			SD	0.058
		%RSD	0.039			%RSD	0.039			%RSD	0.039

Confidential - Not to be photocopied except by permission of the Laboratory Quality Manager or nominee.

Verification COD Reactor

Equipment Name	Dri-Block Heater-Digital	Equipment No.	D2016008
Serial No.	000827-A	Model	DB 200/3
Reference Standard Instrument	Thermocouple Type K	Cert. Reference std. No.	26/1098
Temperature Verify	150 ± 2 °C	Due Date Ref. std.	24/03/2027
Calibration Date	10/04/2026	Next Cal. Date	10/04/2027

สรุปผลการ Verify COD Reactor

Set Temp. ที่ 163 องศาเซลเซียส ทำให้ Temp. อยู่ในช่วง 148 - 152 องศาเซลเซียส

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Calibration Certificate ID
TH3066-001-031626-ACC-TH

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025 CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	SGS (Thailand) Co. Ltd.		
Address:	1/209,1/211 Moo 1, Ban Chang		
City:	Ban Chang	**Contact:**	Sukanda Kerdsongsang
Zip / Postal:	21130		
State / Province:	Rayong		
Order Number:	0333851256		

Weighing Device

Manufacturer:	Mettler Toledo	**Terminal Model:**	SAT
Model:	XS205DU	**Terminal Serial No.:**	B036065880
Serial No.:	B036065880	**Terminal Asset No.:**	N/A
Instrument Type:	Weighing Instrument	**Building:**	LABORATORY
Asset Number:	N/A	**Floor:**	1
		Room:	Balance

Range	Max. Capacity	Readability (d)
1	81 g	0.00001 g
2	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found and As Left calibrations.

The sensitivity/span of the weighing instrument was adjusted before As Found and As Left calibrations with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 19.6 °C	End: 19.1 °C	Start: 46.2 %	End: 43.7 %
As Left	Start: 19.1 °C	End: 18.7 °C	Start: 43.7 %	End: 40.2 %

As Found Calibration Date:	16-Mar-2026	**Calibrator:**	
As Left Calibration Date:	16-Mar-2026		
Issue Date:	17-Mar-2026		

Approved Signatory:

Technical Manager / Head of Calibration Center

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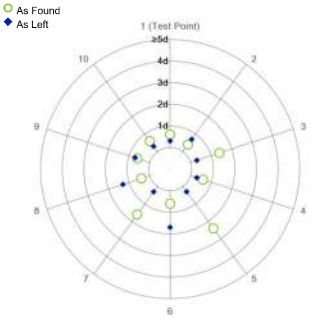
Measurement Results

Repeatability

Test Load: 70 g

	As Found	As Left
1	69.99996 g	70.00009 g
2	69.99997 g	70.00010 g
3	69.99998 g	70.00009 g
4	69.99996 g	70.00009 g
5	69.99999 g	70.00009 g
6	69.99996 g	70.00011 g
7	69.99995 g	70.00009 g
8	69.99997 g	70.00008 g
9	69.99996 g	70.00010 g
10	69.99996 g	70.00009 g

Standard Deviation	**0.000012 g**	**0.000008 g**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

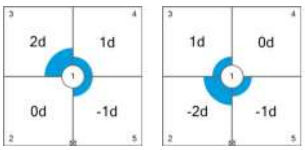
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	99.9997 g	100.0000 g
2	99.9997 g	99.9998 g
3	99.9999 g	100.0001 g
4	99.9998 g	100.0000 g
5	99.9996 g	99.9999 g

Maximum Deviation	**0.0002 g**	**0.0002 g**



As Found

As Left

The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

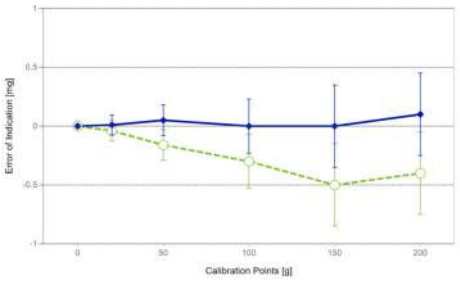
As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.024 mg	2
2	0.01000 g	0.01000 g	0.00000 g	0.026 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.029 mg	2
4	0.99999 g	0.99999 g	0.00000 g	0.036 mg	2
5	5.00001 g	5.00001 g	0.00000 g	0.051 mg	2
6	10.00000 g	9.99996 g	-0.00004 g	0.064 mg	2
7	20.00002 g	19.99998 g	-0.00004 g	0.086 mg	2
8	50.00004 g	49.99988 g	-0.00016 g	0.13 mg	2
9	100.0000 g	99.9997 g	-0.0003 g	0.23 mg	2
10	150.0000 g	149.9995 g	-0.0005 g	0.35 mg	2
11 [1]	200.0000 g	199.9996 g	-0.0004 g	0.35 mg	2

As Left

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.017 mg	2
2	0.01000 g	0.01000 g	0.00000 g	0.020 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.023 mg	2
4	0.99999 g	0.99999 g	0.00000 g	0.032 mg	2
5	5.00001 g	5.00001 g	0.00000 g	0.048 mg	2
6	10.00000 g	10.00001 g	0.00001 g	0.062 mg	2
7	20.00002 g	20.00003 g	0.00001 g	0.084 mg	2
8	50.00004 g	50.00009 g	0.00005 g	0.13 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.23 mg	2
10	150.0000 g	150.0000 g	0.0000 g	0.35 mg	2
11 [1]	200.0000 g	200.0001 g	0.0001 g	0.35 mg	2

[1]The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capabilities) value because the calculated uncertainty was smaller than the CMC value.



For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated. The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS32	Date of Issue:	14-Jan-2026
Certificate Number:	26-004835	Calibration Due Date:	13-Jul-2027

Weight Set 2: OIML E2

Weight Set No.:	WS32-5	Date of Issue:	10-Feb-2026
Certificate Number:	26-020922	Calibration Due Date:	09-Aug-2027

Thermo Hygrometer

Equipment No.:	IN324	Date of Issue:	13-Jan-2026
Certificate Number:	SG-H-00041/69	Calibration Due Date:	13-Jan-2027

Remarks

FACT adjustment functionality activated

Value of the built-in weight adjusted

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide calibration laboratory

Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.5 \cdot 10^{-5}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

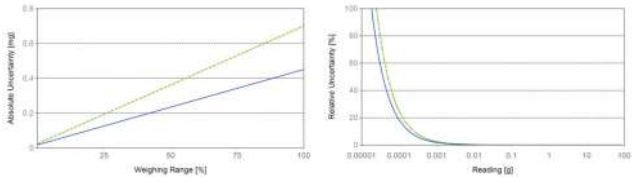
Linearization of Uncertainty Equation

	Range		As Found	As Left
	d	Max		
1	0.00001 g	81 g	U_1 = 0.025 mg + 0.00835 mg/g · R	U_1 = 0.018 mg + 0.00535 mg/g · R
2	0.0001 g	220 g	U_2 = 0.06 mg + 0.00837 mg/g · R	U_2 = 0.06 mg + 0.00530 mg/g · R

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.00220 g	0.025 mg	1.1%	0.018 mg	0.82%
0.02200 g	0.025 mg	0.11%	0.018 mg	0.082%
0.22000 g	0.027 mg	0.012%	0.019 mg	0.0087%
2.20000 g	0.043 mg	0.0020%	0.030 mg	0.0014%
220.0000 g	1.9 mg	0.00086%	1.2 mg	0.00056%



As Found **As Left**

The weighing range shown in the absolute uncertainty graph refers to the first interval/range of the device.

Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
www.mt.com/ACC-Cert-Info

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GWP™ Certificate

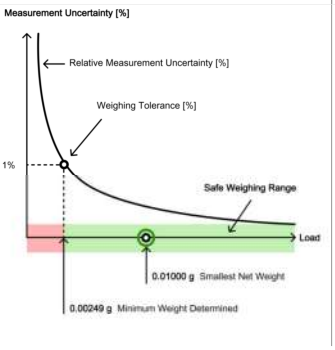
Process Requirements	
Weighing Tolerance	1%
Smallest Net Weight	0.01000 g
Safety Factor	As found = 1; As left = 2

Results As Found		
Minimum Weight Determined	0.00249 g	The instrument meets the process requirements.
Measurement Uncertainty at the Smallest Net Weight	0.25%	

Results As Left		
Minimum Weight Determined at the Safety Factor	0.00368 g	The instrument meets the process requirements.
Minimum Weight Determined	0.00184 g	
Measurement Uncertainty at the Smallest Net Weight	0.18%	

Safe Weighing Range

Results As Found



Results As Left



Are you looking for some clarifications on the terms and Safe Weighing Range graph?

More information at:
www.mt.com/GWP-Cert-Info

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Minimum Weight

As Found Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.02507 g	0.05056 g	0.07649 g	0.12969 g	0.27119 g
0.2%	0.01248 g	0.02507 g	0.03776 g	0.06347 g	0.12969 g
0.5%	0.00498 g	0.00998 g	0.01499 g	0.02507 g	0.05056 g
1%	0.00249 g	0.00498 g	0.00748 g	0.01248 g	0.02507 g
2%	0.00125 g	0.00249 g	0.00374 g	0.00623 g	0.01248 g
5%	0.00050 g	0.00100 g	0.00150 g	0.00249 g	0.00498 g

Result: **Pass**

The instrument meets the process requirements.

As Left Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.01848 g	0.03716 g	0.05604 g	0.09442 g	0.19417 g
0.2%	0.00922 g	0.01848 g	0.02780 g	0.04657 g	0.09442 g
0.5%	0.00368 g	0.00737 g	0.01107 g	0.01848 g	0.03716 g
1%	0.00184 g	0.00368 g	0.00553 g	0.00922 g	0.01848 g
2%	0.00092 g	0.00184 g	0.00276 g	0.00461 g	0.00922 g
5%	0.00037 g	0.00074 g	0.00111 g	0.00184 g	0.00368 g

Result: **Pass**

The instrument meets the process requirements.

The minimum weight values are calculated from the measurement uncertainty in use equation for various weighing tolerances and safety factors. At the minimum weight, the relative uncertainty in use equals the weighing tolerance divided by the safety factor. If "N/A" is shown in the minimum weight table, no appropriate value could be calculated.

The information and the pass-fail assessment presented in this certificate apply to the fine range.

METTLER TOLEDO is not responsible for the definition of the process requirements. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

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Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

NSC-TISI-TIS17025
CALIBRATION 0109

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1094
Order No. 26030156

Customer SGS (Thailand) Limited.
1/209, 1/211 Moo 1, T. Ban Chang, A. Ban Chang Rayong 21130 Thailand.

Place of Calibration Hot Lab

Description Oven
Model UFE400
Serial No. G410.0833
ID.No. O2010002
Date of Receipt Mar 24, 2026
Date of Calibration Mar 24, 2026
Environment

Temperature	(Min)	20.5	°C	(Max)	22.9	°C
Relative Humidity	(Min)	57.9	%rh	(Max)	89.2	%rh

Calibration Method

- This calibration was performed using work instruction No. WI-17 which based on AS2853:1986.
- The Temperature Scale in use at this laboratory is The International Temperature Scale of 1990 (ITS-90).
- The measurement is traceable to The International System of Units (SI).

Standard Equipment	Serial No.	Certificate No.	Due Date
1) Data Acquisition Switch Unit with Sensor	MY59002130	QR26-0457	09 Feb 2027

This certificate is issued in accordance with the conditions of accreditation granted by Thermology Laboratory Roo recognised national standard and the unit of measurement realised at corresponding national standard Laboratory Room. This certificate may not be reproduced other than in full except with the prior written approval of Laboratory Room.

Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

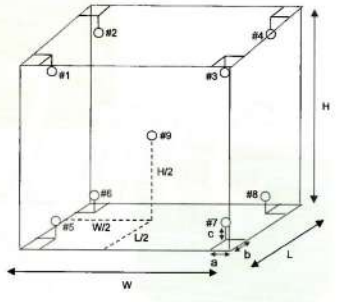
NSC-TISI-TIS17025
CALIBRATION 0109

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1094
Order No. 26030156

Results (without adjustment)



Position of reference thermometers were placed

Note.

1). Dimension (W x L x H) is 40 cm x 33 cm x 40 cm

2). Stability - greatest one half of difference between max peak and min peak of each reference probe measured temperature obtained during the calibration interval.

3). Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1094
Order No. 26030156

Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
85.0	85.0	85.0	Position 1	85.409	0.060	0.385	0.32
			Position 2	85.310			
			Position 3	84.901			
			Position 4	85.198			
			Position 5	85.006			
			Position 6	85.232			
			Position 7	84.681			
			Position 8	84.911			
			Position 9	85.046			

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
104.0	104.0	104.0	Position 1	104.350	0.059	0.479	0.43
			Position 2	104.203			
			Position 3	103.725			
			Position 4	104.035			
			Position 5	103.866			
			Position 6	104.119			
			Position 7	103.503			
			Position 8	103.740			
			Position 9	103.896			

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CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1094
Order No. 26030156

Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
150.0	150.0	150.0	Position 1	150.98	0.134	0.894	0.48
			Position 2	150.75			
			Position 3	149.46			
			Position 4	150.27			
			Position 5	150.18			
			Position 6	150.49			
			Position 7	149.49			
			Position 8	149.82			
			Position 9	150.15			

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
180.0	180.0	180.0	Position 1	180.992	0.229	1.056	0.54
			Position 2	180.752			
			Position 3	179.096			
			Position 4	180.071			
			Position 5	180.153			
			Position 6	180.393			
			Position 7	179.270			
			Position 8	179.614			
			Position 9	180.030			

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Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

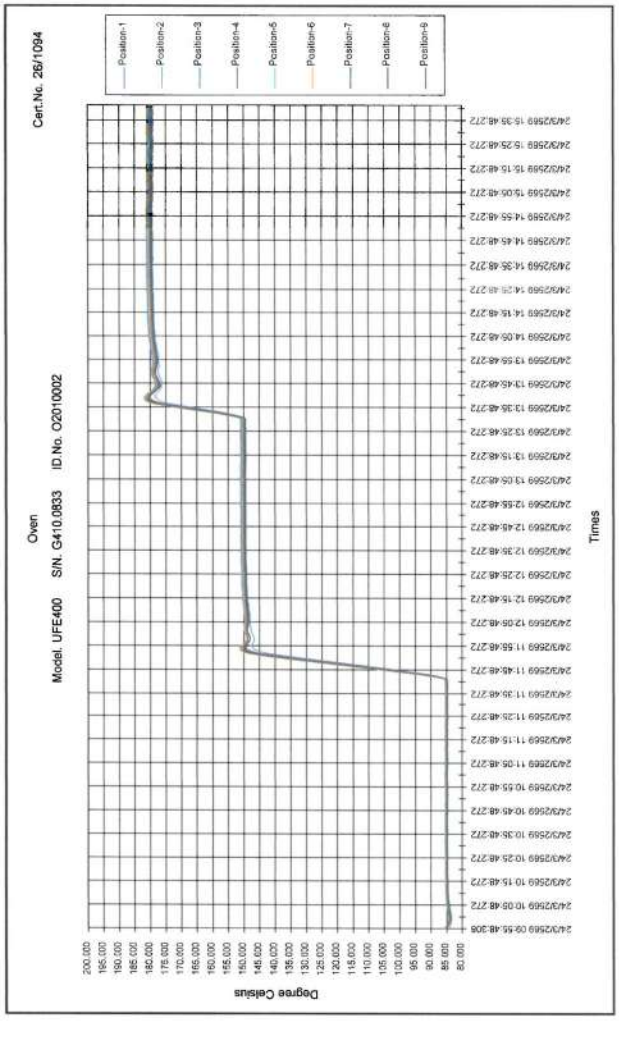
CALIBRATION CERTIFICATE

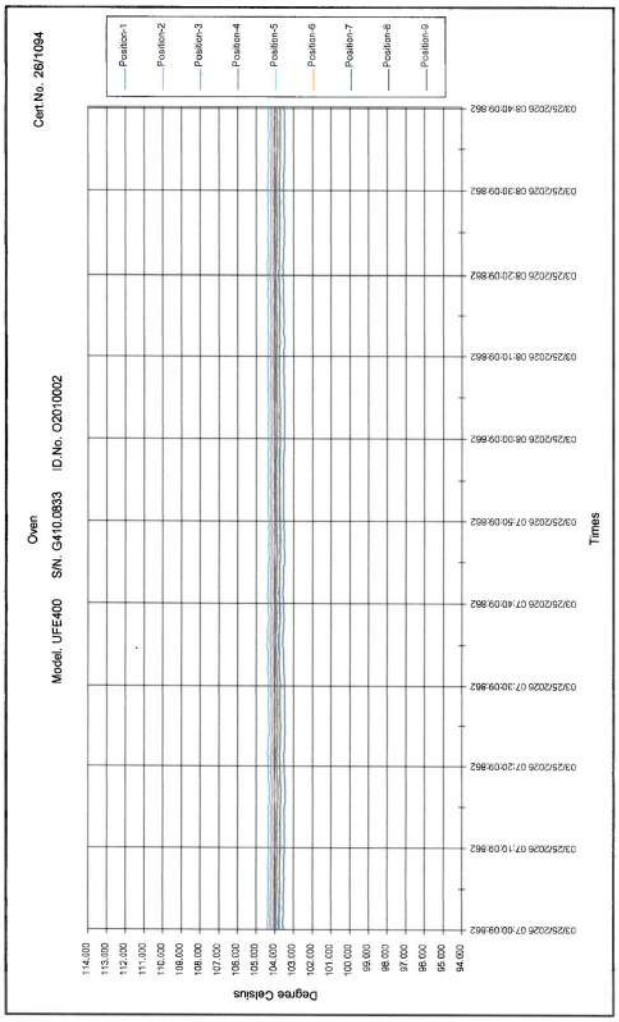
Date of Issue Mar 26, 2026

Cert No. 26/1094
Order No. 26030156

The stability and uniformity were taken into account in the measurement uncertainty stated.
The above results are valid exclusively for calibration samples as mentioned in this report.
This reported expanded uncertainty was based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with ONAC requirements.

APPROVED SIGNATORY





Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1095
Order No. 26030156

Customer SGS (THAILAND) Limited
1/209,1/211 Moo1, T.Ban Chang, A.Ban Chan, Rayong 21130 Thailand.

Place of Calibration Hot Lab

Description	Water Bath
Model	WNB29
Serial No.	L611.0546
ID.No.	W2012002
Date of Receipt	Mar 24, 2026
Date of Calibration	Mar 24, 2026

Environment

Temperature	(Min)	20.5	°C	(Max)	22.9	°C
Relative Humidity	(Min)	57.9	%rh	(Max)	89.2	%rh
Line Voltage	(Min)	230.1	Vac	(Max)	230.7	Vac

Calibration Method

- This calibration was performed using work instruction No. WI-18 which based on ASTM E 715-80 (Reapproval 2022).
- The Temperature Scale in use at this laboratory is The International Temperature Scale of 1990 (ITS-90).
- The measurement is traceable to The International System of Units (SI).

Standard Equipment	Serial No.	Certificate No.	Due Date
1) Data Acquisition Switch Unit with Sensor	MY59002130	QR26-0457	09 Feb 2027

This certificate is issued in accordance with the conditions of accreditation granted by Thermology Laboratory Room. The traceability to recognised national standard and the unit of measurement realised at corresponding national standard Laboratory Room. This certificate may not be reproduced other than in full except with the prior written approval of Laboratory Room.

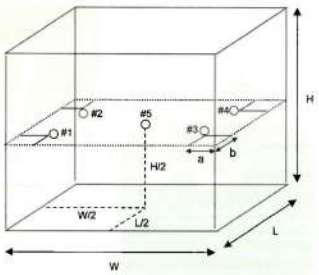
Thermology Co., Ltd.
96/177-96/178 Moo 6, T. La-harn, A. Bangbuathong, Nonthaburi 11110
Tel : 0 2191 6479 Fax : 0 2191 6480 website : www.thermology.co

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1095
Order No. 26030156

Results (without adjustment)



Position of reference thermometers were placed

Note.

1). Dimension (W x L x H) is 35 cm x 29 cm x 16 cm

2). Stability - greatest one half of difference between max peak and min peak of each reference probe measured temperature obtained during the calibration interval.

3). Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

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CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1095
Order No. 26030156

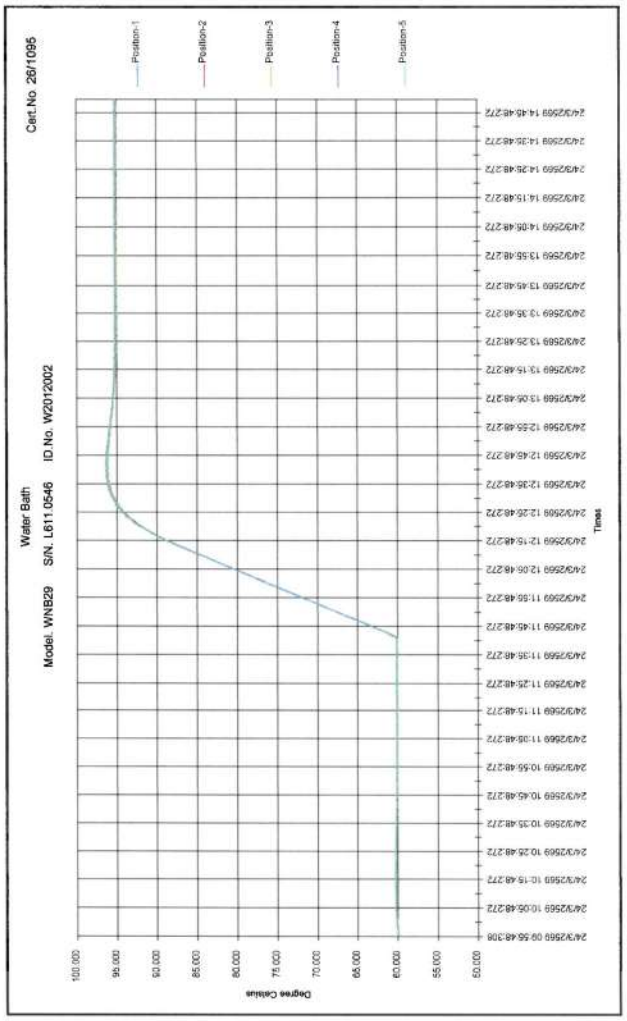
Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
60.0	60.0	60.0	Position 1	60.041	0.079	0.215	0.19
			Position 2	60.094			
			Position 3	60.043			
			Position 4	60.149			
			Position 5	60.134			

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability ±(°C)	Uniformity (°C)	Uncertainty ±(°C)
95.0	95.0	95.0	Position 1	95.032	0.127	0.365	0.24
			Position 2	95.158			
			Position 3	95.084			
			Position 4	95.243			
			Position 5	95.204			

The stability and uniformity were taken into account in the measurement uncertainty stated.
The above results are valid exclusively for calibration samples as mentioned in this report.
This reported expanded uncertainty was based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with ONAC requirements.

APPROVED SIGNATORY :



PlasmaQuant® MS (Elite)
ICP-MS



Analytik Jena AG
Konrad-Zuse-Strasse 1
07745 Jena · Germany

Phone +49 3641 77 70
Fax +49 3641 77 9279
info@analytik-jena.com
www.analytik-jena.com

Version: 01.18
ISel

1 Customer and service data

Customer data

Company	SGS
Department	Environmental Laboratory 1
Name	
Address (Street, Number, ZIP code, City)	Sukhumvit 2 Rd, Ban Chang, Ban Chang District, Rayong 21150
Telephone	
E-Mail	
Customer no.	
Order no.	

Device data

Device Type	PQMS Elite
Serial number	10-5000-030-26-AR109

Data of the authorized person for the Maintenance

Name, Company	Analytik Jena Instruments Thailand Ltd.
Date of the Maintenance	25 June 2025

	yes	no
Maintenance with following Operational Qualification OQ (requires a separate OQ protocol)	☐	☑

Analytik Jena AG
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2 Maintenance Checklist

Tick each checkbox as the steps are completed.

Parts required

☑	10-5000-220-20	Kit preventative maintenance ICP-MS
☑	13-410-540	Cooling Water Additives
	Choose one of the following oil types as it is important for rotary pump type:	
–	418-88089-0	Vacuum Pump Oil (Esther Oil LVO 200) N/A
☑	418-10-406-251	Vacuum Pump Oil (PFPE Oil LVO 420)

Initial performance tests

☑	Print out Details, Plasma Align (Time Scan mode), Res & Trim, Mass Call, Detector Setup, Mass Scan (after new scan with tuning solution), Vacuum (Gate Valve opened and closed), iCRC, Ion Optics and Stepper pages from the instrument setup
☑	Verify performance (sensitivity/oxides/double charges) of system before starting maintenance

Vacuum system

☑	Drain and replace oil in rotary pump. Inspected
☑	Clean exterior of pump.
☑	Test vacuum interlock by attempting to start vacuum with Turbo pump #1 dismounted. Verify that appropriate error message is displayed.

Mass spectrometer system

☑	Check/adjust gate valve.
☑	Clean sampler/skimmer cones/replace O-rings.
☑	Check quadrupole resolution and check Quad Controller resonance. Resonance peak voltage is 2.75 v.
☑	Clean entrance lens and entrance plate Detector voltage is: 3210 v.

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Version: 01.18
ISel

Sample introduction system

- ☑ Inspect torch.
- ☑ Inspect/replace torch gas tubing.
- ☑ Inspect/clean/adjust RF coil.
- ☑ Inspect igniter/replace ignitor cable.
- ☑ Clean sampler/skimmer cones/replace O-rings.
- ☑ Clean extraction lenses #1 and #2.
- ☑ Remove nebulizer from spray chamber. Turn on the peristaltic pump (15 rpm) and nebulizer gas flow (1.0 L/min) and aspirate de-ionized water. Check that the aerosol produced by the nebulizer is normal and uniform.
- ☑ Check spray chamber and replace all O-rings and water tubing.
- ☑ Inspect sample introduction system electrical connections.

Water cooling system

- ☑ Drain water reservoir.
- ☑ Clean air intake filters & heat exchange fins as needed.
- ☑ Inspect all water hoses for cracks/leaks.
- ☑ Disassemble inline water filter & clean cartridge.
- ☑ Fill water reservoir with additives and check the water conductivity according to instruction. Conductivity = 100 uS/cm.
- ☑ Inspect mains cable and plug.
- ☑ Turn on and re-check water level.
- ☑ Check pressure (440±40 kPa) and temperature set point (20 °C); adjust if necessary.
- ☑ Verify operation of the water solenoid.

Basic instrument

- ☑ Inspect condition of argon supply hose.
- ☑ Inspect mains power cable and plug.
- ☑ Check operation of exhaust system and inspect airflow sensor; if necessary clean according to instruction.
- ☑ Inspect USB and serial cables/connections.
- ☑ Clean all external covers and fans.
- ☑ Check argon inlet pressure if it is at recommended pressure of 700 kPa (100 psi) (allowed range is 600 to 830 kPa, 90 to 120 psi) Actual setting is 102 kPa/psi.
- ☑ Check iCRC for leakage and blockage according to service info. Check gas pressures: He ~150 kPa (22 psi), H_2 ~100 kPa (16 psi)

Interlock Tests

- ☑ Turn off argon supply and ignite plasma. Verify if low argon error message is displayed.
- ☑ Ignite plasma and press emergency stop button. Verify that plasma goes out and appropriate error message is displayed.
- ☑ Ignite plasma and unlatch plasma compartment/main RF door. Verify that plasma goes out and appropriate error message is displayed.
- ☑ Ignite plasma and turn off argon supply. Check if plasma is turned off and appropriate low argon flow message is displayed.
- ☑ Turn off water cooler and light plasma. Verify if appropriate error message is displayed.

Accessories

- ☑ Verify initialization and operation of auto sampler. Check belts and wheels etc.
- ☑ Check all other accessories.

Performance tests

- ☑ Update entries in Details page of Instrument Setup window as required.
- ☑ Print out every section of the Instrument Setup (service mode) and put it into the logbook.
- ☑ Tune up instrument and run performance test. Perform any corrective action necessary if results do not meet specifications. Add performance test results to logbook.

Instrument condition

- ☑ Assess and comment on condition of ICP-MS system
- ☑ Discuss condition, preventative maintenance results and instrument performance with the customer.
- ☑ Sign and date this checklist after obtaining customer's signature.

Instrument and environmental conditions

- ☑ Good ☐ Fair ☐ Poor

Comments and recommendations:

-

analytikjena
An Endress+Hauser Company

Analytik Jena Instruments (Thailand) Ltd.
35 Moo 5. 345 Road, Khlong Khoi, Pak Kret,
Nonthaburi. 11120 Thailand.
Phone: +66(2) 1062970-72
Fax: +66(2) 1062973
www.analytik-jena.com

Service Report

Customer's address :	Customer's Ref. No.
SGS Rayong Sukhumvit 2 Rd, Ban Chang, Ban Chang District, Rayong 21150 Sirirat.Saelim@sgs.com	DISTRIBUTOR
E-mail :	Phone : / Fax :

Job No. 2506286PB	User : คุณหยก	Service Engineer : Somchai N	Date : 24-26/06/2025	Page : 1/1
Instrument model :	Serial No. 10-5000-030-26-AR109		Software Version No. 4.3.3	

☐ Repair (RE) ☑ Maintenance (PM) ☐ Installation (IN) ☐ Warranty ☐ Application (AP) ☐ Site Prep.(SP) ☐ Visit(VI)

Fault / Claim : ☐☐☐ Error Code

PM1/2025

Action taken :
- Clean cooling system , replaces DI water, adjust conductivity to 101 uS/cm, Clean water filter
- Clean extraction lenses #1 and #2.
- Clean sample introduction system, torch,spray chamber,nebulizer, replace quick lock and clamp.
- Clean water manifold, water valve assembly
- Check spray chamber and replace all O-rings and water tubing.
- Clean sampler/skimmer cones/replace O-rings.
- Inspect/clean/adjust RF coil/ igniter/replace ignitor cable.
- Clean all external covers and fans. Interlock Tests all passed.
- Replace Activated Alumina (vacuum oil trap)
- Tune up instrument ,res and trim, mass calibration and run performance test with 1 ppb tuning standard.
- Instrument working properly.

Action Pending / Recommendation :
- ส่งของรายการอะไหล่ AutoSample
- 418-10-405-336 Sample Probe (demountable) complete 1 ea. ติดตั้งให้ ลค แล้ว
- 418-13-410-541 Set pump tubing autosampler (grey/grey) 1 set
- 10-405-102 Z-Axis drive belt 1 ea.
- 10-405-316 Nipple, polypropylene, 2,5mm nipple 2,5 mm
- fixed wash reservior *จำนวน 2 ชิ้น*

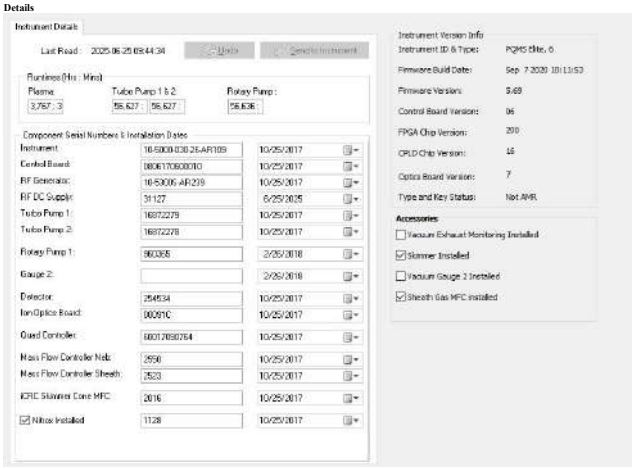
☐ Spare Part ☐ Instrument Configuration

Item No.	Name	Quantity	Unit Price
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

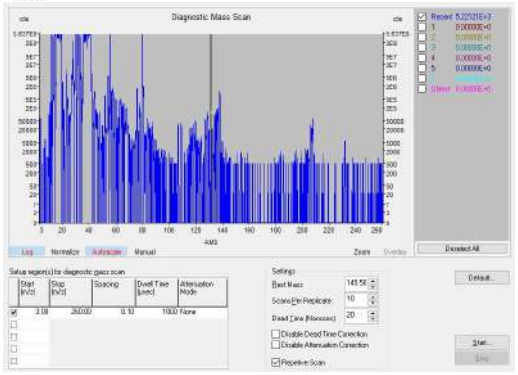
Herewith the undersigned confirm the time devoted, the work performed, the perfect function of the device, and the receipt/delivery of the specified spare parts. *Traveled hours and kilometers can only be entered after the return of the service engineer.

Services are subject to the General Terms and Conditions of Analytik Jena AG, which will be sent on request.

Details

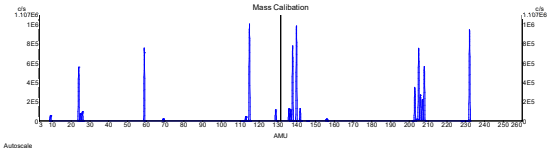


Mass Scan



Mass Calibration
Last calibration: 2025-06-25 14:43:26
[Worksheet: C:\ProgramData\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.msws]

Isotope	Exact Mass	Current Mass	Theory - Curr	Resolution	Height (c/s)	Status
Be9	9.012	9.009	0.003	0.77	56237.33	Pass
Mg25	24.986	24.984	0.002	0.75	73121.00	Pass
Co59	58.933	58.944	-0.011	0.70	785394.69	Pass
In115	114.904	114.904	0.000	0.70	1051608.38	Pass
Ce140	139.905	139.911	-0.006	0.70	1001149.00	Pass
Pb206	205.975	205.954	0.021	0.77	278202.00	Pass
Th232	232.038	232.040	-0.002	0.75	969168.00	Pass

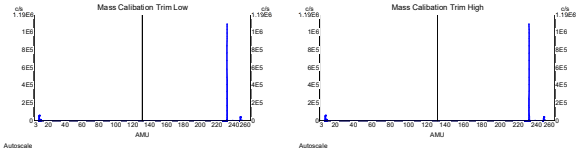


	Squared Term	Scale Factor	Offset
RF	-20.113E-6	46.458E-6	25.648E-3

Resolution and Trim
Last modified: 2025-06-25 14:43:26
[Worksheet: C:\ProgramData\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.msws]

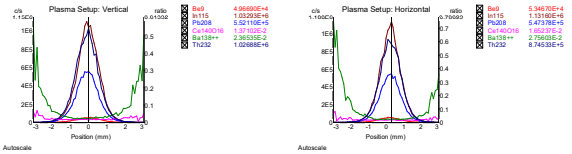
	Offset	Scale Factor
RF	-132.436	226.239
DC	-192.046	252.539

	Isotope	Observed AMU	Width
LOW Mass	Be9	8.996	0.80
HIGH Mass	Th232	232.039	0.78



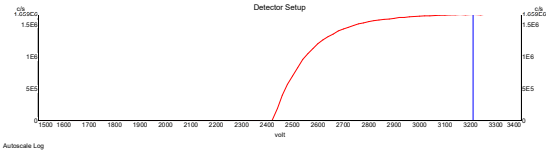
Plasma Setup
Last modified: 2025-06-25 14:48:19
[Worksheet: C:\ProgramData\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.msws]

Horizontal (x) alignment: 0.30 mm, Vertical (y) alignment: 0.00 mm



Detector Setup
Last modified: 2025-06-25 14:06:44
[Worksheet: C:\ProgramData\Analytik Jena\ASpect MS\Supplied Worksheets\System Setup 25 Jun 2025.msws]

Detector Voltage: 3210 volt, Scan Range From: 1500 - 3400 volt



Worksheet Summary
Worksheet: System Test 25 Jun 2025.msws
Created: 2020-06-03 07:36:54
Analyst:
Computer: APPLICATIONICP
Last Saved: 2025-06-25 15:10:23 GMT+07:00
Software Ver.: 4.3 r19995
Firmware Ver.: 5.69
Samples: 1
Comment:

Chemistry
Matrix:
Acids Used:
Keywords:
CRM:

Measurement Parameters

Analysis Modes Analysis Type: Quantitative, Acquisition Mode: Steady State, Scan Mode: Peak Hopping
Spacing: Coarse, Points/Peak: 1, Scans/Replicate: 50, Replicates/Sample: 10

Plasma Plasma flow: 9.00 L/min Auxiliary flow: 1.35 L/min Sheath Gas Flow: 0.00 L/min Nebulizer flow: 0.99 L/min
Sampling depth: 6.00 mm
Power: 1.20 kW Pump rate: 18 rpm Stabilization delay: 30 sec Nitrox Flow: 0.00 mL/min

Ion Optics (Volt) Skimmer Bias: 0.00
First Extraction Lens: -53.00 Second Extraction Lens: -493.00 Third Extraction Lens: -499.00
Left Mirror Lens: 61.00 Right Mirror Lens: 51.00 Bottom Mirror Lens: 54.00
Corner Lens: -446.00 Entrance Lens: 6.00
Fringe Bias: -3.00 Entrance Plate: -70.00
Detector Focus: True Pole Bias: 0.00

iCRC Skimmer Cone: Off iCRC Skimmer Gas Flow: 0 mL/min

Nitrox 0 mL/min

Sampling Aerosol generation: Nebulizer, Source: Manual
Fast pump during sample delay/rinse: On, Enable device control: Off
Spray Chamber Cooling: On Spray Chamber Temp: 3.00 °C
Sample uptake delay: 30 sec, Smart Rinse: No, Switch Delay: OFF
Scan time: 1407 msec, Replicate time: 70.35 sec

Analytes (6)
Be9, Co59, In115, Ce140, Pb208, Th232

SemiQuant Analytes (0)

Internal Standards (0)

No. of isotope ratio standards: 0

Isotope Ratios (2)
CeO/Ce(Ce140O16/Ce140), Ba++/Ba(Ba138++/Ba138)

Default exclusions (7)
Ar40, Ar40Ar40, N14, N14H1, O16, O16H1, Ar40H1

User-specified exclusions (0)

Scan Segments (11)

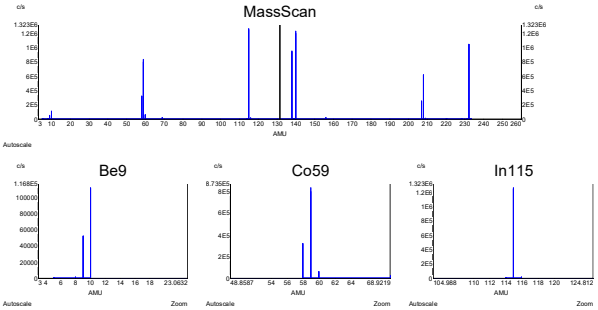
Start (m/z)	Stop (m/z)	Dwell (µsec)	Attenuation mode	Norm-Med	Med-High
5	5	60000	None		
8	10	60000	None		
58	60	60000	None		
69	69	60000	None		
114	116	60000	None		
138	140	60000	None		
156	156	60000	None		
207	209	60000	None		
220	220	60000	None		
228	228	60000	None		

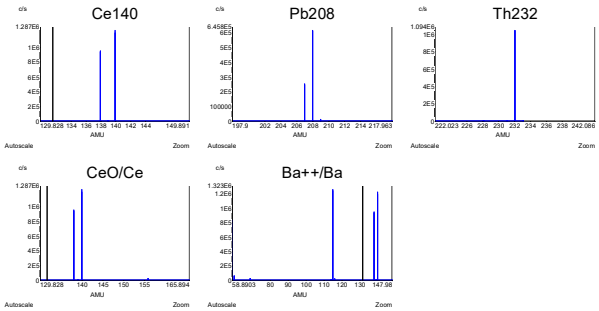
Start (m/z)	Stop (m/z)	Dwell (µsec)	Attenuation mode	Norm-Med	Med-High
231	233	60000	None		

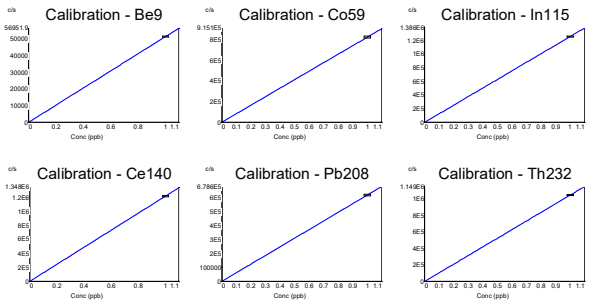
1 ppb Tuning solution [1 ppb Tuning solution]
Tube: 2, Replicates: 10, Auto Dilutions factor: -, Cal Set 1, Time measured: 2025-06-25 15:10:23
Actual weight: 1.0000 g, Actual volume: 1.00 mL, Dilution Factor: 1.00
Position Horizontal: 0.30 mm Position Vertical: 0.00 mm Detector Voltage: 3210.00 volt

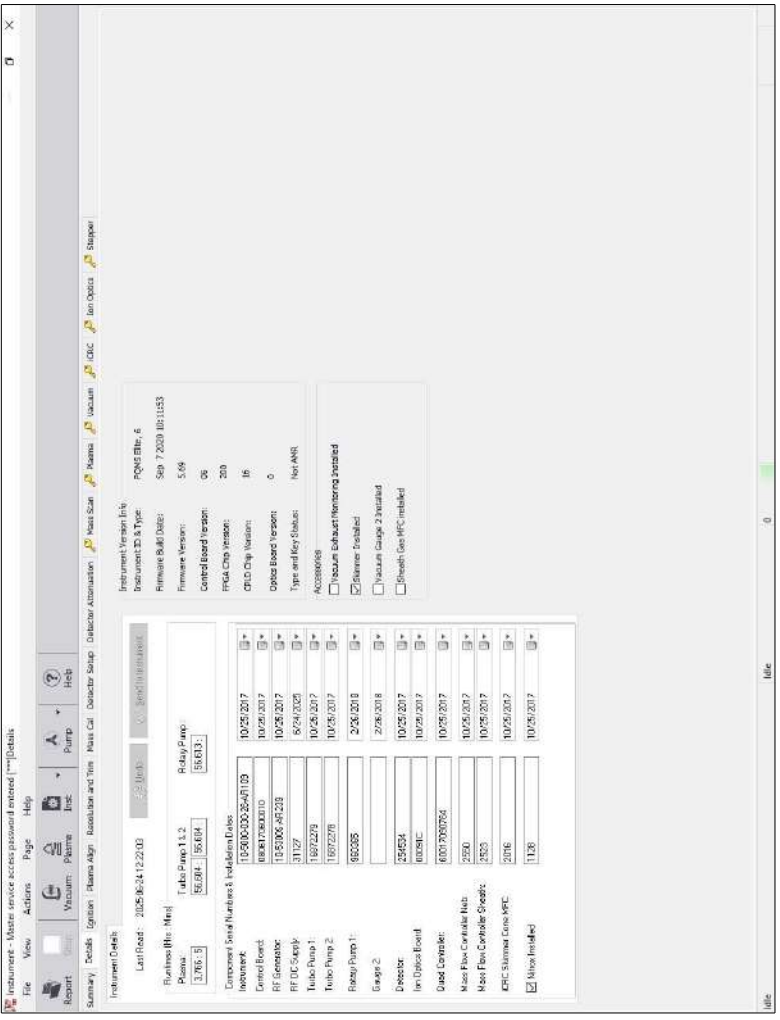
Analyte	Soln Conc	Unit	QC	Mean c/s	%RSD	SD	Replicates (c/s)				
Be9	1.0000	ppb	-	51301.60	0.72	371.8	51707	51842	51366	51270	51436
							51450	50842	51171	51346	50586
Co59	1.0000	ppb	-	820025.1	1.18	9673.2	831885	796500	824672	817928	819266
							823205	823859	824786	825083	813067
In115	1.0000	ppb	-	1249330	0.64	8001.3	1259767	1243571	1237494	1251080	1243334
							1257160	1248353	1260675	1250458	1241409
Ce140	1.0000	ppb	-	1209218	0.77	9256.5	1225517	1192488	1208656	1211723	1211688
							1215015	1213598	1211060	1197430	1205004
Pb208	1.0000	ppb	-	616915.1	0.96	5936.7	610351	615035	610190	609081	620719
							616461	615905	625686	623426	622297
Th232	1.0000	ppb	-	1042654	0.70	7316.2	1040777	1041780	1045469	1042580	1044542
							1037439	1044444	1060087	1033062	1036358

Isotope Ratio	Ratio	%RSD	SD	Replicates (ratio)							
Ce140O16/Ce140	0.017	1.95	0.000	0.017	0.017	0.016	0.016	0.016	0.017	0.017	0.017
				0.016	0.017						
Ba138++/Ba138	0.023	1.09	0.000	0.023	0.023	0.024	0.023	0.023	0.023	0.023	0.023
				0.023	0.023						









SGS (Thailand) Limited

Automatic Mercury Analyzer

Model : RA-4500

Preventive Maintenance Report

SERIAL No. RA-4500	:	14780131
Soft version	:	Ver 2.0.4
ROM version	:	Ver 2.0.0
DATE	:	27 FEBRUARY 2026
DUE DATE	:	27 FEBRUARY 2027

INSPECTED BY :

APPROVED BY :

Kinetic Solutions Company Limited.
2, Soi Lat Krabang 1, Lat Krabang Subdistrict,
Lat Krabang District, Bangkok 10520
Tel. (+66) 062-789-5221

Inspection

ITEMS		SPECIFICATIONS	RESULT	JUDGE
1. Quantity	-	Accessories are completed.	GOOD	OK
2. Appearance	2.1 Overall Appearance	No visible damage.	GOOD	OK
	2.2 Parts / Cables	Correctly placed and connected.	GOOD	
3. Indication	Nameplate / Label	Plate and Label are indicated.	GOOD	OK
4. Self check				
4.1 GLP Counter	Mercury Lamp	5000 hours	3,757 hr	OK
	Membrane Filter	2000 hours or 1 year after replace	9 hr	OK
	Main Pump Tube	750 hours or 1 year after replace	9 hr	OK
	Absorbed Hg	1500 mg	1 mg	OK
	P1 Tube	2000 hours or 1 year after replace	< 1 hr	OK
	P2 Tube	2000 hours or 1 year after replace	< 6 hr	OK
	P3 Tube	2000 hours or 1 year after replace	< 1 hr	OK
	P4 Tube	2000 hours or 1 year after replace	< 8 hr	OK
	P5 Tube	2000 hours or 1 year after replace	< 4 hr	OK
	P6 Tube	2000 hours or 1 year after replace	< 1 hr	OK
	P7 Tube	2000 hours or 1 year after replace	< 12 hr	OK
	Heater	2000 hours	27 hr	OK
4.2 Check/Test	Flow rate Adjustment	Flow rate 0.14 - 0.20 L/min	0.14 L/min	OK
	Signals Detector	V.SIG is 3.5 - 4.5 V.	3.74 V.	OK
		V.REF is 3.5 - 4.5 V.	3.87 V.	OK
	Cooling Fan	Check the operation of cooling fan	PASS	OK
	Color Sensor	signals (R,G,B) at least one nonzero	PASS	OK
	Radiation Thermometer	a positive valve form thermometer	PASS	OK
	Heater	heater temp rises 4 °C within 5 min.	PASS	OK
5. Heater	Temperature	At 95°C ± 2°C with 30 min.	94.8°C	OK
6. Calibration Curve	no pretreatment	0-10 ng : Max.Dev. ≤ 5.0%	3.90%	OK
7. Repeatability	100 ug/L, 50ul, 5ng (n=5)	Average: 100ug/L ± 10 µg/L	103.118 µg/L	OK
		C.V. ≤ 5.0%	1.01%	OK
8. Blank	no pretreatment	Less than 0.001 (PEAK)	0.0000378 PEAK	OK

Apparatus

NAME	Date Certified	Expiration
Mercury ICP Standard (1000 µg/mL) AccuStandard, Inc. Lot 223035027	March 10, 2023	March 10, 2028

Inspection details

Remark

Preventive Maintenance and Calibrate ประจำปี 2026

วันที่ 06/02/2026 เข้าทำ PM แล้วพบว่า เครื่องมีอาการเสียหายหลายชุด สายไฟและขั้วต่อถูกกัดกร่อน สาย color sensor หลุด ทำให้ไม่สามารถใช้งานได้

จึงได้ทำการนัดหมายเพื่อยกเครื่องกลับมาซ่อมบำรุงทั้งหมด

วันที่ 25/02/2026 ได้ทำการยกเครื่องจากSGS ระยอง มาที่ office kinetic และเริ่มทำการตรวจเช็คสภาพและประเมินความเสียหาย

พบความเสียหายดังนี้

- สีตัวเครื่องถูกกัดกร่อนทำให้หลุดร่อนออกมาทั้งภายในและนอกเครื่อง
- สายไฟและขั้วต่อถูกกัดกร่อน ทำให้สายไฟบางจุดไม่สามารถทำงานได้
- คราบของสารเคมีที่ปนเปื้อนภายใน
- Color sensor กระจกด้านหน้า sensor แตก

ดำเนินการดังนี้

- ทำ Preventive Maintenance
- ถอดชิ้นส่วน ทำความสะอาด ครบสารเคมี ฝุ่นละออง เศษของสีที่หลุดร่อน สิ่งสกปรกภายในและภายนอก
- Wiring สายไฟที่เสียหายใหม่ทั้งหมด
- ประกอบกลับคืน และทดสอบการทำงานโดยรวม
- ทำ Calibration curve and repeatability

รายการบำรุงรักษาและสอบเทียบ:

Cleaning : Bodycase, Tray, Cell Detector, Grease Reagent Pump and Air Pump.

Signal Optical Adjust : ปรับสัญญาณหลังจากทำความสะอาด

Test Electricparts : ทดสอบการทำงานของอุปกรณ์หรือชิ้นส่วนอิเล็กทรอนิกส์ (วาล์ว, ฮีทเตอร์, กลไก)

Auto Sampler (BC) Alignment : ตรวจสอบและปรับตำแหน่งการทำงานของ auto sampler ให้เหมาะสมเพื่อการวัดตัวอย่างที่แม่นยำ

System Equipment Check : ตรวจสอบการทำงานของระบบทั้งหมด , ตรวจสอบ Calibration Curve, ตรวจสอบความสามารถในการทำซ้ำ

GLP Counter Check : ค่า GLP ทั้งหมดอยู่ในเกณฑ์ปกติ

Recommend : รายการอะไหล่ที่ควรเปลี่ยนมีดังนี้

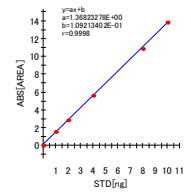
1. Color sensor unit เนื่องจากส่วนกระจกด้านหน้ารูรับแสงแตกอาจมีผลให้ sensor รับค่าได้ไม่แม่นยำ
2. Valve V2 เนื่องจากมีสภาพผุกร่อนตามอายุการใช้งาน อาจส่งผลให้การวัดได้ค่าที่ไม่ถูกต้องและทำให้เกิด PEAK SHAPE X

สรุป: โดยรวมหลังจากแก้ไขและทำ PM เครื่องสามารถทำงานได้ปกติ ค่าสัญญาณอยู่ในเกณฑ์ดี ค่าที่ได้จากการทำ Calibration curve และ Repeatability อยู่ในเกณฑ์ดี

SGS Thailand Limited

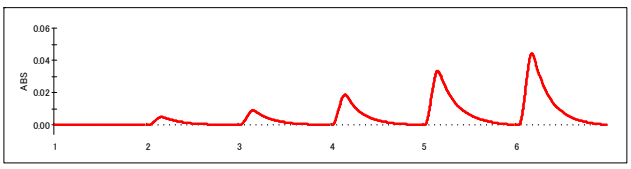
Title : Preventive Maintenance RA-4500 SN14780131
Date : 2026-02-26
Name : Kinetic solutions
Memo : Calibration Curve 0 - 10 ng

Calib



STD

No.	STD [ppb]	SVOL [mL]	CVOL [mL]	DVOL [mL]	STD [ng]	AREA [ON]	MEAS [ng]	Dev [%]	Note
1	0.000	0.000	5.000	5.000	0.000	0.0427	-0.0486	-	
2	100.000	0.010	5.000	5.000	1.000	1.5314	1.0394	3.9	
3	100.000	0.020	5.000	5.000	2.000	2.8507	2.0037	0.2	
4	100.000	0.040	5.000	5.000	4.000	5.6592	4.0563	1.4	
5	100.000	0.080	5.000	5.000	8.000	10.8936	7.8820	1.5	
6	100.000	0.100	5.000	5.000	10.000	13.8835	10.0672	0.7	



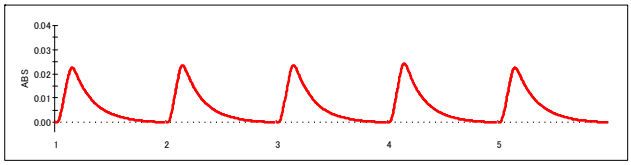
SMP

No.	NAME	SVOL [mL]	CVOL [mL]	DVOL [mL]	AREA [ON]	MEAS [ng]	CONC [ug/L]	Note
1	100ppb	0.050	5.000	5.000	7.0499	5.0727	101.454	
2	100ppb	0.050	5.000	5.000	7.1823	5.1695	103.390	
3	100ppb	0.050	5.000	5.000	7.1701	5.1606	103.212	
4	100ppb	0.050	5.000	5.000	7.2463	5.2163	104.326	
5	100ppb	0.050	5.000	5.000	7.1698	5.1604	103.208	

SGS Thailand Limited

Statistics

No.	NAME	TRY	AV [ug/L]	SD [ug/L]	Cv [%]
1	100ppb	5	103.1180	1.039120	1.01



Self Check

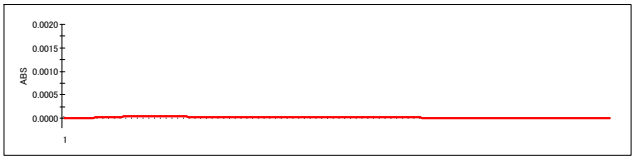
```
Heat check:PASS!! ( 27.7degC[05:00] ->  31.7degC[02:49])
Sensor check:PASS!! ( 409- 213= 196)
Leak check:PASS!! (0.14L/min)
Sig/Ref check:PASS!! (Sig:3.74V, Ref:3.87V)
Drift check:PASS!! (-0.0012139 - -0.0017119 =  0.0004980)
```

SGS Thailand Limited

Title : Preventive Maintenance RA-4500 SN14780131
Date : 2026-02-26
Name : Kinetic solutions
Memo : Blank

SMP

No.	NAME	SVOL [mL]	CVOL [mL]	DVOL [mL]	PEAK [ON]	MEAS [ng]	CONC [ug/L]	Note
1	blank	0.000	5.000	5.000	0.0000378	-0.0746	0.000	



NIPPON INSTRUMENTS CORPORATION

125 Market Street
New Haven, CT 06513
USA

Tel (203)786-5290
Fax (203)786-5287
www.AccuStandard.com

AccuStandard, Inc.

CERTIFICATE OF ANALYSIS

AccuTrace™ Reference Standard

Catalog No: ICP-34N-1
Description: Mercury ICP Standard
Element: Mercury (Hg)
SRM: 3133
Lot: 223035027
Matrix: 10% Nitric acid
Hazards: *Refer to SDS for complete safety information*

Signal Word: Danger

Date Certified: Mar 10, 2023
Expiration: Mar 10, 2028
Density: 1.052 g/mL
Sample Size: 100 mL
Components: 1
Storage Condition: Ambient (>5 °C)

Certified Reference Material

ANAB AR-1463 ilac-MRA

Certified Concentration: 1000 µg/mL

Trace Elements in µg/mL

Ag	nd<0.02	Ce	nd<0.2	Gd	nd<0.02	Lu	nd<0.02	Pb	nd<0.2	Sc	nd<0.02	Ti	nd<0.02
Al	nd<0.02	Co	nd<0.02	Ge	nd<0.2	Mg	nd<0.02	Pd	nd<0.2	Se	nd<0.2	Tl	nd<0.2
As	nd<0.2	Cr	nd<0.02	Hf	nd<0.02	Mn	nd<0.02	Pr	nd<0.2	Si	N/A	Tm	nd<0.02
Au	nd<0.02	Cs	N/A	Hg	*	Mo	nd<0.02	Pt	nd<0.2	Sm	nd<0.2	U	nd<0.2
B	nd<0.2	Cu	nd<0.02	Ho	nd<0.02	Na	nd<0.02	Rb	N/A	Sn	nd<0.02	V	nd<0.02
Ba	nd<0.02	Dy	nd<0.02	In	nd<0.2	Nb	nd<0.2	Re	nd<0.2	Sr	nd<0.02	W	nd<0.2
Be	nd<0.02	Er	nd<0.02	Ir	nd<0.2	Nd	nd<0.02	Rh	nd<0.2	Ta	nd<0.2	Y	nd<0.02
Bi	nd<0.2	Eu	nd<0.02	K	nd<0.2	Ni	nd<0.02	Ru	nd<0.02	Tb	nd<0.02	Yb	nd<0.02
Ca	nd<0.02	Fe	nd<0.02	La	nd<0.02	Os	N/A	S	N/A	Te	nd<0.2	Zn	nd<0.02
Cd	nd<0.02	Ga	nd<0.02	Li	nd<0.02	P	N/A	Sb	nd<0.2	Th	nd<0.02	Zr	nd<0.02

This Certified Reference Material was verified in accordance with ISO/IEC 17025 (AT-1339) and ISO 17034 (AR-1463)
This solution was assayed gravimetrically, using a balance calibrated against weight sets, ID #88270, traceable to NIST
A product with a suffix (-1A, -2B, etc. or -01, -02, etc.) on its lot number has had its expiration date extended and is identical to the same lot number without the suffix.
This product contains mercury and MUST be disposed of in accordance with all federal, state and local regulations.
The gravimetric uncertainty for this product is ±0.24%. The CRM uncertainty is ±2.4%.
In order to verify the concentration(s), the final solution was checked by plasma emission spectroscopy (ICP) against material traceable to the above listed NIST SRM(s).
We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as high purity acids and ASTM Type I 18 megohm deionized water.
All trace level elemental impurities were determined via plasma emission spectroscopy on the concentrate.
All weights are traceable through NIST, Test No. 684/291344-18 & 684/292805-19
All glassware used in preparation is Class A.
All bottles are acid leached and triple rinsed with deionized water prior to use.
Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware. Keep bottle tightly capped.

Page 1 of 1

For use in routine laboratory analysis.

AccuStandard is accredited to ISO 17034, ISO/IEC 17025 and certified to ISO 9001:2015

1. **Quality Standards:**
   ISO 17034:2016 – General Requirements for the Competence of Reference Material Producers
   ISO/IEC 17025:2017 – General Requirements for the Competence of Testing And Calibration Laboratories
   ISO 9001:2015 – Quality Management System – Requirements Eagle Registrations
2. **Intended Use:** The product covered by this certificate is designed for calibration or for use in quality control procedures for the specified chemical compounds listed on the reverse side. This product can be used for quantification and/or identification. This product can also be used as a reference material to validate analytical procedures, subject to the conditions under Section 7.
3. **Manufacturing:** All balances are calibrated daily using an in-house procedure with weights that are compared annually to master weights and traceable to NIST. The balances are also calibrated annually by an ISO/IEC 17025 accredited calibration laboratory. Please refer to the NIST test number listed on the front of this certificate. Class A glassware is used in the manufacture and quality control of all standards. Good Laboratory Practices have been used throughout the preparation of this Standard.
4. **Homogeneity:** This product is sufficiently homogeneous and any sample size would be within the uncertainty budget.
5. **Stability:** The manufacturer guarantees the stability of this solution through the expiration date stated on the label, when handled and stored according to the conditions stated on the label
6. **Uncertainty:** The uncertainty values as stated on the face of this certificate have been determined using the EURACHEM/CITAC Guide. We report a combined expanded uncertainty equal to the positive square root of the total variance of the uncertainty of the components using the following formula: $u_c = \sqrt{(u(V))^2 + (u(m))^2 + (u(V))^2 + (u(RO))^2}$ This formula represents uncertainty components from the mass, volume, short-term stability, long-term stability and homogeneity factors associated with the production of this product. The expanded uncertainty, assumes a normal distribution and a coverage factor of $k=2$ is chosen using approximately a 95% confidence level.
7. **Legal Notice and Limit of Liability:** This product is for routine laboratory analysis and research purposes only. The company's liability will be limited to replacement of product or refund of purchase price. Notice of claims must be made within thirty (30) days from date of delivery.

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

ilac-MRA
NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Cert.No.: 26CH580
Page.: 1 of 3

Equipment :	pH / Conductivity Meter
Manufacturer :	Mettler Toledo
Model :	S213
Serial No. :	B902060027
ID No. :	P20190019
Condition As-Received:	Used Item
Received Date :	28 May 2026
Calibration Date :	29 May 2026
Reference :	2605-0926WSC-1
Submitted by :	SGS (Thailand) Limited 1/209, 1/211 Moo 1, T.Ban Chang, A.Ban Chang, Rayong 21130
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure:	In -house method : - CP-CH6 by direct measurement with certified reference material (CRM) - CP-CH8 by comparison with temperature standard
Calibrated by :	Walalak Sirithean
Issue Date :	01 June 2026

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	9549224	130RC003	26I428	23 Apr 2027
2) Ref. Std.Thermometer	4982054	110RC044	25I708	03 July 2026

- This measurement result is traceable to SI throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :-
   - Conductivity calibration solution, CPA chem Ltd., The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Conductivity Solution	Manufacturer	Lot No.	Exp. date
25.010 µS/cm	CPA Chem	1187334	18 Jan 2027
1413.3 µS/cm	CPA Chem	1187337	18 Jan 2027
12.882 mS/cm	CPA Chem	1135362	16 Aug 2026

   - Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) °C

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 1413.3 µS/cm

Conductivity Electrode Serial No.: 5818450992

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor *k*
25.010 µS/cm	27.90 µS/cm	25.55 µS/cm	0.20 µS/cm	2.00
1413.3 µS/cm	1514 µS/cm	1413 µS/cm	9.3 µS/cm	2.00
12.882 mS/cm	13.81 mS/cm	12.88 mS/cm	0.086 mS/cm	2.00

Remark : **- UUC* = Unit Under Calibration**

- Cell constant = 0.558382 cm^{-1}

Calibration Results

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab 731-ISM
- Serial No. : 5818450992

Dimension of probe;

- Length : 120 mm
- Diameter : 12 mm
- Immersion Depth : 100 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (± °C)	Coverage factor *k*
25.0	25.001	25.1	0.099	0.13	2.00

Remark : - UUC* = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

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NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Cert.No.: 25CHO502
Page.: 1 of 3

Equipment :	Spectrophotometer
Manufacturer :	PerKin Elmer
Model :	Lambda 25
Serial No. :	501S14022112
ID No. :	S2014004
Condition As-Received:	Used Item
Received Date :	19 September 2025
Calibration Date :	19 September 2025
Reference :	2509-0503OC-1
Submitted by :	SGS (Thailand) Limited 1/209, 1/211 Moo 1, T.Ban Chang, A.Ban Chang, Rayong 21130
Calibration Place :	Spectrophotometry Lab
Ambient Temperature :	(18.6 to 17.1) °C (On-Site)
Relative Humidity :	(69.2 to 57.4) % (On-Site)
Calibration Procedure :	In - house method : CP-OCH4 based on ASTM E 275-08
Calibrated by :	Uthen Kankawi
Approved by :	Approved Signatory
Issue Date :	25 September 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Condition of calibration result

1. Reference Standard Material :

Material	Serial No.	Certificate No.	Due date
1. Absorbance Standard set	43533	119611	22 Feb 2026
2. Wavelength Standard set	36730	118120	15 Jan 2026
3. Wavelength Standard set	36730	118121	15 Jan 2026
4. Stray Light Standard set	8419	129607	02 Mar 2027

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certificate is traceable to the International System of Unit maintained through :
   - Starna Scientific Ltd.
4. Spectral BandWidth : 1 nm
   Scan Speed : 60 nm/min

Calibration Results : without adjustment

Wavelength Accuracy

Certified Values of Reference Material (nm)	UUC Reading (nm)	Uncertainty of Measurement (± nm)	Coverage Factor *k*
241.70	241.96	0.12	2.00
418.53	418.55	0.12	2.00
459.99	459.97	0.12	2.00
585.19	585.31	0.12	2.00
879.41	879.17	0.12	2.00

Calibration Results : without adjustment

Photometric Accuracy

Wavelength (nm)	Certified Values of Reference Material (Abs)	UUC Reading (Abs)	Uncertainty of Measurement (±Abs)	Coverage Factor *k*
235.0	Zero	0.0000	0.0046	2.00
	0.4897	0.4991	0.0046	2.00
	0.7354	0.7456	0.0050	2.00
465.0	Zero	0.0000	0.0028	2.00
	0.5207	0.5207	0.0028	2.00
	0.9443	0.9475	0.0028	2.00
	1.9255	1.9277	0.0060	2.00
635.0	Zero	0.0000	0.0028	2.00
	0.5629	0.5626	0.0028	2.00
	1.0956	1.0953	0.0028	2.00
	1.9924	1.9918	0.0060	2.00

Stray Light

* Straylight at 260.72 ± 0.11 nm	Reading at 260.72 ± 0.11 nm
Abs	1.7000
%T	1.9467

Remark

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer
- The Potassium Dichromate filled cells are measured against a Perchloric acid blank.
- Cut-off wavelength of stray light reference material (Potassium Iodide) at Wavelength 260.72 ± 0.11 nm
- Result = Pass, If Absorbance > 2.00 Abs and Transmission < 1.0 %T at Wavelength 260.72 ± 0.11 nm
- * : Not NSC-ONSC Accredited
- UUC = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k* , providing a level of confidence of approximately 95 %.

-o0o-

SITHIPORN associates

Preventive Maintenance and Performance Verification

Milestone Ethos UP /Ethos EASY Microwave System



SITHIPORN ASSOCIATES CO.,LTD.
451-451/1 Sirinthorn Road, Bangbumru,Bangplud, Bangkok 10700 Thailand
Tel. (662) 433-8331, 434-9191 fax: (662) 433-1679,434-9510

SERVICE PROTOCOL REPORT

Customer information:

Company:	บ.เอสจีเอส(ประเทศไทย) จำกัด
Department:	LAB
Person in charge:	
Address:	300/109 หมู่ 1 ตำบลตาสิทธ์ อำเภอปลวกแดง จังหวัดระยอง
Tel.:	
E-mail:	

Technical data:

MW Unit, type and Serial Number:	ETHOS UP	SN **17052168**
Terminal, type and Serial Number:	Terminal 660	SN 17063393
Software, type and revision:	Easy Control	Rev. 02-C-SP1
Accessories (rotor, reactor…) types:	Rotor	Maxi-44 , Fast-X
VAC unit, type and serial number (if present):	-	SN -
Cooling chiller, type and Serial Number (if present):	-	SN -
Dosing station, type and Serial Number (if present):	-	SN -
Installation and last maintenance dates:	Inst. on:	Maint. on: 05-08-2025

NOTE: once concluded the following protocol, a filled in and signed copy of this report should be sent to Milestone srl at: service@milestonesrl.com

1. VISUAL INSPECTION

	OK	Not OK	Corrosion
External chassis – check general conditions	√		
Internal cavity – check general conditions and integrity Teflon coating	√		
Door – check general conditions and correct functionality	√		
Screws – check condition and availability	√		
Feet – check condition and solidity	√		
Exhaust hose – check cleaning and proper connection to a suitable exhaust line	√		
Power supply cord – check integrity, firm plugging and ground connection	√		
Working site – check clearances, bench and environmental conditions	√		

2. ELECTRICAL SAFETY TEST

Using a suitable testing device (e.g. SECUTEST SIII), check the below reported parameters and take note of the results.

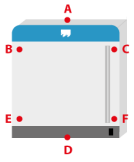
Parameter	Result	OK	Not OK
Voltage : 230 VAC	Actual value: 226 VAC	√	
Ground : ≤ 2 VAC	Actual value: 0.9 VAC	√	

3. MW LEAKAGE TEST

Insert into the cavity a vessel filled in with 275±15ml of water.

Using a MW leak tester, check the MW leakage radiation all around the unit and in particular around the critical points shown in the picture.

Report the measured value in the chart.



POSITION	RESULT (mW/cm²)
A	0.00 mW
B	0.00 mW
C	0.00 mW
D	0.00 mW
E	0.00 mW
F	0.00 mW

Maximum allowed leakage: 1mW/cm² max *(ref. standard: IEC/EN 61010-2-010, IEC/EN 60335-2-90)*

4. MW OUTPUT POWER TEST

Open the "1000" panel on the terminal *Panel Administration* program.

Load a suitable borosilicate glass container (19cm diameter, 9cm height) with 1000ml of water and place it in the cavity.

According to normative IEC 60705 the water temperature must be 10°C ±1°C

With an external thermometer measure the *Start temperature* of water and report it on the related field.

Start the test, by heating the water for 1 minute at 100% power (1800W)

With the external thermometer, measure the *End temperature* and report it on the related field.

Take note of the obtained result from the *Calculated Energy* field



MEASURED MAX POWER	1,722	W

Start T1 = 28.8°C , Start T2 = 53.4°C
Power=(T2-T1)70

Acceptable result, brand new unit(1):	≥ 90 of nominal power
Acceptable result, old unit(1):	≥ 80% of measured power when unit was new

(1)Recommended tolerance based on normal power supply testing conditions (230VAC)

5. MW HOMOGENEITY DISTRIBUTION TEST

Fill in with 100ml water n°5 vessels (PN 70625) [2] and place them on the rotating holding plate (PN 70405) [2]. With an external thermometer measure the water starting temperature of each vessel and report into the table.

Run an heating program at 50% of Max nominal power for 1 minute.

With an external thermometer measure the water final temperature of each vessel and report into the table. Calculate and report the difference of temperature (ΔT) for each vessel.



Position	T start	T final	ΔT
1	28	48	**20**(**Tmin**)
2	28	49	**21**(**Tmax**)
3	28	48	20
4	28	48	20
5	28	48	20

Recommended acceptable result: Maximum ΔT < 7°C **ΔT 1°C ,Tmax-Tmin <7°C**

[2] Included in the Microwave cavity performance kit (PN 70630).

6. TEST OF FUNCTION

	OK	Not OK	N.A.
Main switch - check if the unit turns on/off	√		
Cavity illumination – check if the led boards work properly	√		
Turntable motor - check the regular rotation of carousel motor, adapter, 360° twist and position calibration.	√		
Diffuser motor - check the regular rotation without abnormal friction	√		
Exhaust motor – check if the fan is sucking air from the cavity	√		
Magnetron cooling fan/s – check if the fan/s is cooling down the magnetron/s	√		
Safety switches – check if the door safety switches are properly activated when the door is closed/opened	√		
Cavity camera – check the correct functionality of camera on terminal display	√		
Door locking electropiston – check correct activation according to T1 temperature	√		
Magnetic Stirrer - check that the stirrer is rotating properly at 100%, and max current	√		

7. TERMINAL

	OK	Not OK	N.A.	Readjusted
Display – check/adjust the brightness and correct functionality	√			
Touch screen – check functionality and calibration	√			
Interface cable – check condition and firm connection	√			
Free memory – check size, in case erasing files	√			
Actual Date and time – check correctness	√			
Mouse (optional)			√	
Keyboard (optional)			√	

8. SENSORS TEST

Condition, calibration and functionality to be checked according to the related service manual

Type of sensor	Re-calibrated	OK	Not OK	N.A.
ATC-400 (thermocouple temperature sensor)				√
ATC-FO (fiber optic temperature sensor)				√
IRTC (infrared temperature sensor)		√		
APC55 (pressure sensor)				√
AVC (vacuum sensor)				√
QP (acid / solvent gas sensor) Type: **QPA , QPS**		√		
CCS (cavity control system sensor):				√

9. ACCESSORIES CHECK

The condition of each component has to be visually checked and tested according to the related User and Tips & Techniques manuals. Particular attention should be paid to marks of crack, deformation, discoloration, corrosion.

Specify quantity:	OK	Not OK	N.A.
Rotor body	1 pcs	pcs	
Segment body	pcs	pcs	
Pressure screw	pcs	pcs	√
Indicator ring	pcs	pcs	√
Covers	44 pcs	pcs	
Adapter plate	pcs	pcs	√
Pressure release spring/valve	44 pcs	pcs	
Vessels	44 pcs	pcs	
Protection shield	pcs	pcs	
Thermowell / sealing screw (*only for reference vessel*)	pcs	pcs	
Pressure sensor tubing	pcs	pcs	
Torque wrench			

10. REPLACED SPARE PARTS

PN	DESCRIPTION	Q.ty

11. FINAL REPORT

	OK	Not OK
All screws inserted and tightened	√	
Safety devices fully checked	√	
All exhaust and cooling fans are functioning	√	
Necessary tools available at customer's site	√	
Last revision of User Manual and required tools available at customer's site	√	
Advised customer about care and maintenance instructions	√	

12. VERIFY TEMPERATURE

 setting page.

Setting point Temperature (°C)	Temperature of Instrument (°C)	Temperature of the Black body (°C)	Tolerance	OK	Not OK
Testing conditions ____30____ °C Room temperature at ± 3 °C					
50	50	50.5	± 3 °C	√	
100	100	100.4		√	
200	200	200.5		√	

The measure reading is in the setting page only. Acceptance range considers the different emissivity factor and accuracy of the black body device and Easy TEMP sensor.

* Temperature of Instrument (°C) ค่าในวงเล็บคือค่าที่เครื่องต้องอ่านได้ ค่าที่อยู่นอกวงเล็บคือค่าที่เครื่องอ่านอุณหภูมิได้จริง

Instrument/Measurement Device :

Instrument/Measurement	Model	Serial	Cert. No.	Due Date
The Blackbody Device	BB500	190100004	SPR24060226-1	08-06-2026
True RMS Multimeter with TC Sensor	179	15450132	TEI25012	23-01-2026

Remarks:

	Working hours:

Date	Service Engineer Name	Service Engineer Signature
05-08-2025		
Laboratory Manager / Person in charge acceptance signature:		

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TEL.: 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

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NSC-TEST-TSE 17025 CALIBRATION 0292

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 : 26-TPM-025
Request No : Req-2026-0075
Page : 1/2

Unit Under Calibration Details

Calibration Parameter	: Temperature		
Instrument Name	: Area Heat Stress Monitor	Range Calibration :	25 °C - 45 °C
Manufacturer	: 3M	Type of Sensor :	RTD
Model	: QT-34	Sensor Diameter (mm) :	4.5
Serial Number	: TEM030023	Immersion Depth (mm) :	67.5
ID Number	: ENHS 17001	Instrument Condition :	Used
Resolution	: 0.1 °C		

Calibration Environment and Details

Temperature	: 23 °C ± 3 °C
Humidity	: 55 %RH ± 15 %RH
Received Date	: 9 January 2026
Calibrated Date	: 20 January 2026
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: 12000077, ID: AR-TPM Which was calibrated on 10 October 2025, Calibration Certificate No. : QR25-2938
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 %.

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.

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NSC-ONSC-TIS17025 CALIBRATION 0292

Calibration Note

UUC Adjustment : Without Adjusument

Certificate No : 26-TPM-025

Request No : Req-2026-0075

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.003	25.0	0.0	0.14
	35.004	35.0	0.0	0.14
	45.002	45.0	0.0	0.14
DRY	25.003	24.9	+ 0.1	0.14
	35.003	34.9	+ 0.1	0.14
	45.005	44.9	+ 0.1	0.14
GLOBE	25.003	25.0	0.0	0.14
	35.002	35.0	0.0	0.14
	45.003	45.0	0.0	0.14

End of Certificate

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.

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NSC-ONSC-TIS17025 CALIBRATION0292

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.

Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok 10120

Certificate No : 25-TPM-443

Request No : Req-2025-2088

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 : ENHS 17005

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 : 12 September 2025

Calibrated Date : 15 September 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: 12000077, ID: AR-TPM Which was calibrated on 15 October 2024, Calibration Certificate No. : QR24-2836

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 %.

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.

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NSC-ONSC-TIS17025 CALIBRATION0292

Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 25-TPM-443

Request No : Req-2025-2088

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.003	25.1	- 0.1	0.14
	35.005	35.1	- 0.1	0.14
	45.003	45.1	- 0.1	0.14
DRY	25.004	24.9	+ 0.1	0.14
	35.002	34.9	+ 0.1	0.14
	45.004	44.9	+ 0.1	0.14
GLOBE	25.001	24.9	+ 0.1	0.14
	35.004	35.0	0.0	0.14
	45.002	45.0	0.0	0.14

End of Certific

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NSC-ONSC-TIS17025 CALIBRATION0292

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited.

Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok 10120

Certificate No : 25-TPM-444

Request No : Req-2025-2088

Unit Under Calibration Details

Calibration Parameter : Temperature

Instrument Name : Area Heat Stress Monitor

Manufacturer : 3M

Model : QT-36

Serial Number : TKR030002

Resolution : 0.1 °C

ID Number : ENHS 17007

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 : 12 September 2025

Calibrated Date : 15 September 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: 12000077, ID: AR-TPM Which was calibrated on 15 October 2024, Calibration Certificate No. : QR24-2836

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 %.

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Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 25-TPM-444
Request No : Req-2025-2088
Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.003	25.1	- 0.1	0.14
	35.005	34.9	+ 0.1	0.14
	45.003	44.9	+ 0.1	0.14
DRY	25.004	25.1	- 0.1	0.14
	35.002	34.9	+ 0.1	0.14
	45.004	44.9	+ 0.1	0.14
GLOBE	25.001	25.0	0.0	0.14
	35.001	34.9	+ 0.1	0.14
	45.002	44.9	+ 0.1	0.14

End of Certificate

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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-310
Request No : Req-2025-1539
Page : 1/2

Unit Under Calibration Details

Calibration Parameter : Temperature
Instrument Name : Area Heat Stress Monitor
Manufacturer : 3M
Model : QT-34
Serial Number : TEM030026
Resolution : 0.1 °C
ID Number : ENWP 090
Range Calibration : 30°C to 40°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 : 7 July 2025
Calibrated Date : 14 July 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: 12000077, ID: AR-TPM Which was calibrated on 15 October 2024, Calibration Certificate No. : QR24-2836

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 %.

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Calibration Note

UUC Adjustment : Not Adjust

Certificate No : 25-TPM-310
Request No : Req-2025-1539
Page : 2/2

Result of Calibration :

UUC Sensor	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
WET	25.002	24.9	+ 0.1	0.14
	35.004	34.9	+ 0.1	0.14
	45.003	44.9	+ 0.1	0.14
DRY	25.003	24.8	+ 0.2	0.14
	35.003	34.8	+ 0.2	0.14
	45.002	44.9	+ 0.1	0.14
GLOBE	25.001	24.8	+ 0.2	0.14
	35.002	34.8	+ 0.2	0.14
	45.003	44.9	+ 0.1	0.14

End of Certific

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.

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Certificate No. : CAL00228-26 Page : 1 of : 3

Certificate of Calibration

Equipment : DIGITAL LIGHT METER
Manufacturer : TENMARS
Model / Type : TM-201L
Serial No. : 210101092
ID No. : ENLM 21003
Customer : SGS (Thailand) Limited (Head Office)
238 TRR Tower, 19th – 21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120
C.S.R. No. : L0000158-26
Received Date : 05 February 2026
Calibration Date : 09 March 2026

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

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

Calibration Report

Condition of this calibration result :

1. Location : Photometry Calibration Laboratory

2. Environment : Temperature : (23 ± 3) °C

Relative Humidity : (50 ± 15) %

3. Reference / Procedure Used :

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

4. Reference Standard Instrument :

Instrument	Model	Serial No	Certificate No	Due Dated
Illuminance meter	PMA2200 / PMA2130	17323 / 26664	TP-1011-25	12 Jun 26

5. This Certification is traceable to the SI unit through :

- The National Institute of Metrology (Thailand) .

6. Uncertainty :

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

GIIC Calibration Laboratory

Calibration Report

All data shown below were as received value : After adjustment

Calibration result :

Function: Illuminance measurement

[1]UUC Range (lux)	Standard Setting (lux)	[1]UUC Reading Before (lux)	[1]UUC Reading After (lux)	Error After (lux)	Uncertainty ± (lux)
2000	0	0	0	0	0.82
	50	47	50	0	1.6
	250	238	252	2	6.0
	500	475	506	6	12
	1000	948	1009	9	24
	1950	1851	1967	17	47
20000	2000	1910	2030	30	48
	3000	2860	3040	40	72
	4000	3810	4050	50	96
	5000	4760	5060	60	0.12 klux

[1]UUC = Unit Under Calibration

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

- END -

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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-ACT-092

Request No : Req-2025-1224

Unit Under Calibration Details

Measurement item : Acoustic Calibrator

Manufacturer : Cirrus

Model : CR:515

Serial Number : 88336

ID : ENSL 19173

Class : 1

Range : 94 dB / 1000 Hz

Instrument Status : Used

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 providoes 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 %.

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TEL : 0660-2116-5860-1 FAX: 0660-2116-7140

Certificate No : 25-ACT-092

Request No : Req-2025-1224

Calibration Results : Without Adjustment

Sound pressure level

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

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment Measured (Hz)	Without Adjustment Deviated value	Adjustment Measured (Hz)	Adjustment Deviated value	Uncertainty (± %)
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 Measured (%)	Adjustment Measured (%)	Uncertainty (± %)
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

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.

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TEL.: 06640-2116-5860-1 FAX: 06640-2116-7140

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. **Certificate No :** 25-SLM-176

Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120 **Request No :** Req-2025-1164

Unit Under Calibration Details

Measurement item	: Sound Level Meter	Microphone Class	: 2
Manufacturer	: SCARLET	Microphone Model	: AWA14421
Model	: ST-21D	Microphone S/N	: A-000273
Serial Number	: 820705	Preamplifier Model	: -
ID	: ENSL 22177	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 %.

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

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TEL.: 06640-2116-5860-1 FAX: 06640-2116-7140

Certificate No : 25-SLM-176

Request No : Req-2025-1164

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)	(± 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
FAST / 31-141		
UUC Weighting	(dB)	(± dB)
A	25.5	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	24.6	0.10
C	24.6	0.10
Z	28.8	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 31-141	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.2	0.1	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.0	0.0	-0.1	0.60
8000 Hz	0.4	0.5	0.7	0.70

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

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL.: 06640-2116-5860-1 FAX: 06640-2116-7140

Certificate No : 25-SLM-176

Request No : Req-2025-1164

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 31-141				
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	-0.3	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 31-141	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
31-141 / A	REF	UUC	ERR	
UUC Time Respone	(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	

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Certificate No : 25-SLM-176

Request No : Req-2025-1164

7. Long Term Stability

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

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 31-141	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
140.00	140	140.0	0.0	0.30
139.00	139	138.9	-0.1	
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	
39.00	39	38.7	-0.3	
38.00	38	37.5	-0.5	

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Certificate No : 25-SLM-176
Request No : Req-2025-1164

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
31-141	44.00	43.9	-0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 31-141	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	137.0	137.1	+0.1	0.20
	2	120.0	120.0	0.0	
	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
FAST / C / 31-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	136.4	136.0	-0.40	0.20
Positive half cycle	135.4	135.3	-0.10	
Negative half cycle	135.4	135.3	-0.10	

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Request No : Req-2025-1164

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 31-141	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.4	
Negative one-half cycle	141.6	
Deviated	-0.2	0.20

13. High Level Stability

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

End of Certificate

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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-175
Request No : Req-2025-1165

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : SCARLET
Model : ST-21D
Serial Number : 820706
ID : ENSL 22178
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : AWA14421
Microphone S/N : A-000225
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	Tracebility
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 %.

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TEL.: 06640-2116-5860-1 FAX: 06640-2116-7140

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
FAST / A / 28-138	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(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
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
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 Respone curve			UNCERTAINTY
FAST / 28-138	A	C	Z	
STD Setting	(dB)	(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

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

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 28-138				
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
FAST / 28-138	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
28-138 / A	REF	UUC	ERR	
UUC Time Respone	(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	

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

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 28-138	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 / 28-138	REF	UUC	ERR	
STD dB	(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	

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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 Respone	(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	

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TEL: 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

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

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TEL: 1660-2116-5860-1 FAX: 0600-2116-7140

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 %.

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TEL: 1660-2116-5860-1 FAX: 0600-2116-7140

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
FAST / A / 32-142	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(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
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
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 Respone curve			UNCERTAINTY
FAST / 32-142	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	-0.1	0.0	-0.2	0.60
8000 Hz	0.1	0.3	0.4	0.70

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

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 32-142				
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
FAST / 32-142	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
32-142 / A	REF	UUC	ERR	
UUC Time Respone	(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	

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

7. Long Term Stability

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

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 32-142	REF	UUC	ERR	
STD dB	(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	

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 6660-2116-5860-1 FAX: 6660-2116-7140

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 Respone	(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	

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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	[redacted]
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	[redacted]
Final	141.0	
Deviated	0.0	0.10

End of Certificate

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TEL : 6660-2116-5860-1 FAX: 6660-2116-7140

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 %.

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TEL : 6660-2116-5860-1 FAX: 6660-2116-7140

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
FAST / A / 34-144	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(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
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
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 Respone curve			UNCERTAINTY
FAST / 34-144	A	C	Z	
STD Setting	(dB)	(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

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TEL : 0660-2116-5860-1 FAX : 0660-2116-7140

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

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 34-144				
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
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 Respone	(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	

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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	[redacted]
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	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	

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TEL : 0660-2116-5860-1 FAX : 0660-2116-7140

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 Respone	(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	

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TEL : 0660-2116-5860-1 FAX : 0660-2116-7140

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	[redacted]
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	[redacted]
Final	143.0	
Deviated	0.0	0.10

End of Certificate

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

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0660-2116-5860-1 FAX: 0660-2116-7140

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-ACT-092
Request No : Req-2025-1224

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : Cirrus
Model : CR:515
Serial Number : 88336
ID : ENSL 19173
Class : 1
Range : 94 dB / 1000 Hz
Instrument Status : Used

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 providoes 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 %.

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TEL : 0660-2116-5860-1 FAX: 0660-2116-7140

Certificate No : 25-ACT-092
Request No : Req-2025-1224

Sound pressure level — **Calibration Results :** Without Adjustment

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

Frequency of Sound pressure level

Calibration Range	Without Adjustment		Adjustment		Uncertainty
(Hz)	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	Without Adjustment	Adjustment	Uncertainty
(Hz)	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

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-ACT-02 Rev.04 Issue date 17/2/25

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 0660-2116-5860-1 FAX: 0660-2116-7140

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-196
Request No : Req-2025-1222

Unit Under Calibration Details

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

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TEL : 0660-2116-5860-1 FAX: 0660-2116-7140

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
FAST / A / 29-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(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		
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 / 29-139		
UUC Weighting	(dB)	(± dB)
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 Respone curve			UNCERTAINTY
FAST / 29-139	A	C	Z	
STD Setting	(dB)	(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

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

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 29-139				
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)	(± 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 Respone	(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	

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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)	(± dB)
Initial	114.0	[redacted]
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)	(± 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	

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TEL: 06640-2116-5860-1 FAX: 06640-2116-7140

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

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	41.90	41.8	-0.1	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 Respone	(ms)	(dB)	(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
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	

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

12. Overload indication

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

13. High Level Stability

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

End of Certificate

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Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. **Certificate No :** 25-SLM-229

Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa, Bangkok 10120 **Request No :** Req-2025-1550

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	Tracebility
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 Facter $k = 2$, providing a level of confidence approximately 95 %.

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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)	(± 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 Respone curve			UNCERTAINTY
FAST / 31-141	A	C	Z	
STD Setting	(dB)	(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

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

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Certificate No : 25-SLM-229

Request No : Req-2025-1550

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 31-141				
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
FAST / 31-141	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
31-141 / A	REF	UUC	ERR	
UUC Time Respone	(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	

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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	[redacted]
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 31-141	REF	UUC	ERR	
STD dB	(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	109.1	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	

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

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(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
A / 31-141	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	137.0	137.1	+0.1	0.30
	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
FAST / C / 31-141	REF	UUC	ERR	
STD Setting	(dB)	(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	

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

12. Overload indication

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

13. High Level Stability

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

End of Certificate

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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-179
Request No : Req-2025-1168

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : SCARLET
Model : ST-21D
Serial Number : 820716
ID : ENSL 22187
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : AWA14421
Microphone S/N : A-000303
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	Tracebility
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 %.

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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
FAST / A / 34-144	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(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
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	27.7	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
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 Respone curve			UNCERTAINTY
FAST / 34-144	A	C	Z	
STD Setting	(dB)	(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

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

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 34-144				
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 Respone	(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	

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TEL: 06640-2116-5860-1 FAX: 06640-2116-7140

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	

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TEL: 06640-2116-5860-1 FAX: 06640-2116-7140

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

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	46.10	46.1	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 Respone	(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	113.7	-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
FAST / C / 34-144	REF	UUC	ERR	
STD Setting	(dB)	(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	

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TEL: 06640-2116-5860-1 FAX: 06640-2116-7140

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

12. Overload indication

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

End of Certificate

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TEL : 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

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-195

Request No : Req-2025-1221

Unit Under Calibration Details

Measurement Item : Sound Level Meter
Manufacturer : SCARLET
Model : ST-21D
Serial Number : 820718
ID : ENSL 22189
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : AWA14421
Microphone S/N : A-000419
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 %.

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

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7 139 MOO 13, SOI SUNTINAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 66(0)-2116-5860-1 FAX: 66(0)-2116-7140

Certificate No : 25-SLM-195
Request No : Req-2025-1221

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)	(± dB)
1000 Hz 94 dB	94.00	93.6	-0.40	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	24.8	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	24.2	0.10
C	25.7	0.10
Z	30.2	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 31-141	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	-0.2	-0.1	-0.3	0.60
8000 Hz	-0.2	-0.1	0.0	0.70

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

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Certificate No : 25-SLM-195
Request No : Req-2025-1221

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 31-141				
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	-0.3	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 31-141	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
31-141 / A	REF	UUC	ERR	
UUC Time Respone	(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	

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Certificate No : 25-SLM-195
Request No : Req-2025-1221

7. Long Term Stability

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

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 31-141	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
138.00	138	137.9	-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	43.9	-0.1	
39.00	39	38.8	-0.2	
38.00	38	37.7	-0.3	

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Certificate No : 25-SLM-195
Request No : Req-2025-1221

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
31-141	43.10	43.1	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 31-141	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	137.0	137.1	+0.1	0.20
	2	120.0	120.0	0.0	
	0.25	111.0	110.7	-0.3	
Slow	200	130.6	130.6	0.0	
	2	111.0	111.0	0.0	
SEL	200	131.0	131.1	+0.1	
	2	111.0	111.1	+0.1	
	0.25	102.0	101.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 31-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	136.4	136.2	-0.20	0.20
Positive half cycle	135.4	135.3	-0.10	
Negative half cycle	135.4	135.3	-0.10	

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Certificate No : 25-SLM-195
Request No : Req-2025-1221

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 31-141	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	140.5	
Negative one-half cycle	140.7	
Deviated	-0.2	0.20

13. High Level Stability

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

End of Certificate

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CASELLA
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Certificate of Conformity and Calibration

Instrument Model:- dBadge2/IS
Serial Number 5150070
Firmware revision V12.03

Microphone Type:- CEL-252
Serial Number 113519

END
28033



Instrument Class/Type:- 2

Test Conditions:- 18 °C, 54 %RH, 1013 mBar

Test Engineer:- Nicola Cartwright
Date of Issue:- January 30, 2026

Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications, which is designed to meet the requirements of IEC 61252 Ed 1.1 2002-03 and ANSI S1.25:1991. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2015 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

Test Summary:-

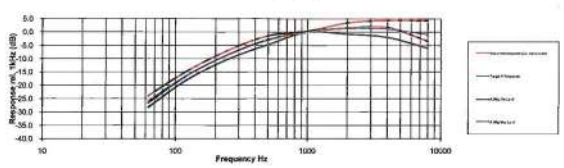
Self generated Noise test	All Tests Pass
Frequency weightings A/C/Z	All Tests Pass
Level Linearity tests	All Tests Pass
Response to short duration signals	All Tests Pass
Response to unipolar pulses	All Tests Pass
Overload indicator	All Tests Pass
Time weightings tests	All Tests Pass
C-weighting peak response	All Tests Pass
Acoustic Tests (Please see below)	All Tests Pass

Combined Electro-Acoustic Frequency Response - A Weighted

IEC 61252 Section 7.2, - Frequency Weighting.

The following A-Weighted frequency response graph shows this instruments overall frequency response based upon the application of multi-frequency pressure field calibrations. The microphones Pressure to Free field correction coefficients are applied to pressure response. Reference level taken at 1kHz.

Overall Electro-Acoustic Frequency response - 'A' Weighted.



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Tested to dBadge2 test sheet TP502 revision 12-00

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TEL: 16680-2116-5860-1 FAX: 16680-2116-7140

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-ACT-112
Request No : Req-2025-1542

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : CRIFFER
Model : CR2 PLUS
Serial Number : 37001157
ID : ENSL 22193

Class : 1
Range : 94 , 114 dB 1000 Hz
Instrument Status : Used

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 7 July 2025
Calibration Date : 15 July 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	20 June 2026
THD Multimeter	2015	1047765	NIMT	4 February 2026

Traceability : This certificate providoes 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 %.

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.

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 0660-2116-5800-1 FAX: 0660-2116-7140

Certificate No : 25-ACT-112

Request No : Req-2025-1542

Sound pressure level **Calibration Results** : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty
	Measured	Deviated value	Measured	Deviated value	(± dB)
94 dB / 1000 Hz	93.86	-0.14	-	-	0.12
114 dB / 1000 Hz	113.85	-0.15	-	-	0.11

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	(± %)
94 dB / 1000 Hz	1000.00	0.00	-	-	0.01
114 dB / 1000 Hz	1000.00	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	1.89	-	0.17
114 dB / 1000 Hz	2.10	-	0.17

Note :

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

End of Calibration

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.

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TEL: 0660-2116-5800-1 FAX: 0660-2116-7140

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-ACT-112

Request No : Req-2025-1542

Unit Under Calibration Details

Measurement item : Acoustic Calibrator

Manufacturer : CRIFFER

Model : CR2 PLUS

Serial Number : 37001157

ID : ENSL 22193

Class : 1

Range : 94 , 114 dB 1000 Hz

Instrument Status : Used

Calibration Environment and Details

Temperature : (23 ±2 °C)

Humidity : (50 ± 20 %RH)

Barometric Pressure : (1013 ±10.0 hPa)

Received Date : 7 July 2025

Calibration Date : 15 July 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	20 June 2026
THD Multimeter	2015	1047765	NIMT	4 February 2026

Traceability : This certificate providoes 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 %.

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.

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TEL: 0660-2116-5800-1 FAX: 0660-2116-7140

Certificate No : 25-ACT-112

Request No : Req-2025-1542

Sound pressure level **Calibration Results** : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty
	Measured	Deviated value	Measured	Deviated value	(± dB)
94 dB / 1000 Hz	93.86	-0.14	-	-	0.12
114 dB / 1000 Hz	113.85	-0.15	-	-	0.11

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	(± %)
94 dB / 1000 Hz	1000.00	0.00	-	-	0.01
114 dB / 1000 Hz	1000.00	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	1.89	-	0.17
114 dB / 1000 Hz	2.10	-	0.17

Note :

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

End of Calibration

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.

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Certificate of Calibration

Customer

Name : SGS (Thailaad) Limited.

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

Certificate No : 25-NDM-140

Request No : Req-2025-1381

Unit Under Calibration Details

Measurement item : Noise Dosimeter

Manufacturer : CASELLA

Model : dBadge2

Serial Number : 5037541

ID : ENSL 24216

Resolution : 0.1 dB

Microphone Class : 2

Microphone Model : -

Microphone S/N : 105369

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 : 17 June 2025

Calibrated Date : 19 June 2025

Calibration Procedure : In-house method CP-NDM-01 based on IEC 61252 : 2017

Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Tracebility
Standard Microphone	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	Svantek	SVAN 401	131	9 October 2025	WK Electric
Timer	EXTECH	-	05-ACT	11 March 2026	TPA

Note

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

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TEL: 06600-2116-5860-1 FAX: 06600-2116-7140

Certificate No : 25-NDM-140
Request No : Req-2025-1381

1. Absolute acoustical sensitivity

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
1000 Hz 114 dB	120	120	3.53	3.55	+0.6	3.1

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand CASELLA, Model CEL-120/2, SN. 3865016

2. Frequency weightings

UUC Setting	Deviation from various Frequency Weighting		UNCERTAINTY
FAST / 54-140	A	C	(± dB)
STD Setting	(dB)	(dB)	
*63 Hz	0.2	0.4	0.40
125 Hz	0.0	-0.1	0.40
250 Hz	-0.2	-0.4	0.40
500 Hz	-0.1	-0.2	0.40
1000 Hz	0.0	0.0	0.40
2000 Hz	0.4	0.1	0.40
4000 Hz	1.1	0.9	0.40
8000 Hz	0.3	0.3	0.40

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TEL: 06600-2116-5860-1 FAX: 06600-2116-7140

Certificate No : 25-NDM-140
Request No : Req-2025-1381

3. Linearity of response to steady signals

a. Sound exposure meter, linearity of response for changes of input sinusoidal signal level

UUC Setting			FAST / A / High							
1000 Hz	Ref	(dB)	54.0	80.0	90.0	100.0	110.0	114.0	120.0	130.0	140.0
	Level A	(dB)	54.6	80.1	90.1	100.0	110.0	114.0	120.0	130.0	140.0
	Error	(dB)	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
8000 Hz	Ref	(dB)			88.9	98.9	108.9	112.9	118.9	128.9	138.9
	Level A	(dB)			89.0	99.0	108.9	112.9	118.9	128.8	138.8
	Error	(dB)			0.1	0.1	0.0	0.0	0.0	-0.1	-0.1
63 Hz	Ref	(dB)						87.8	93.8	103.8	113.8
	Level A	(dB)						87.8	93.8	103.8	113.8
	Error	(dB)						0.0	0.0	0.0	0.0
UNCERTAINTY		(±dB)	0.3								

b. Sound exposure meter linearity of error

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
1000 Hz 110 dB	27	27	0.30	0.30	0.00	
1000 Hz 110 dB	45	45	0.50	0.50	0.00	
1000 Hz 110 dB	90	90	1.00	0.99	-1.00	5.6
1000 Hz 110 dB	180	180	2.00	1.98	-1.00	
1000 Hz 120 dB	36	36	4.00	3.96	-1.00	
1000 Hz 120 dB	72	72	8.00	7.92	-1.00	
1000 Hz 120 dB	90	90	10.00	9.90	-1.00	
1000 Hz 120 dB	180	180	20.00	19.80	-1.00	5.6
1000 Hz 120 dB	360	360	40.00	39.60	-1.00	
1000 Hz 120 dB	720	720	80.00	79.20	-1.00	

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

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INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
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TEL: 06600-2116-5860-1 FAX: 06600-2116-7140

Certificate No : 25-NDM-140
Request No : Req-2025-1381

4. Response to short duration

a. Response for sinusoidal signals - reference level

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(Pa^2h)	(Pa^2h)
4000 Hz 95 dB	2846	2846	1.00	1.00	0.00	0.052

b. Sound exposure meter response for series of toneburst impulses

UUC Setting	Time		Exposure Measurement			UNCERTAINTY
FAST / A / 54-140	Ref	UUC	Ref	UUC	Error	
Calibrator Setting	(s)	(s)	(Pa^2h)	(Pa^2h)	(%)	(%)
Burst 1 ms, 95 dB	2846	2846	1.00	1.00	0.00	
Burst 1 ms, 100 dB	900	900	1.00	1.00	0.00	5.6
Burst 1 ms, 108 dB	143	143	1.00	1.01	+1.00	

5. Response to unipolar pulse

UUC Setting	Time	Exposure Measurement		UNCERTAINTY
FAST / A / 54-140	UUC	UUC	Different	
Calibrator Setting	(s)	(Pa^2h)	(%)	(%)
Continuous Rectangle +	28	10.12	+0.59	3.7
Continuous Rectangle -		10.18		

End of Certificate

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

ภาคผนวก ค

สำเนาหนังสือรับรองการขึ้นทะเบียน

ห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอสจีเอส (ประเทศไทย) จำกัด

[redacted]

ค. ขอบข่ายชนิดสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๔ รายการ น้ำใต้ดิน จำนวน ๑๒๓ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๗ รายการ ดิน จำนวน ๑๒๓ รายการ และอากาศ จำนวน ๒๘ รายการ รวมทั้งสิ้น ๓๕๕ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้ ...

ที่ อก ๐๓๑๐(๓)/ ๙๒๓๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๓ พฤศจิกายน ๒๕๖๘

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง)

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๑ สิงหาคม ๒๕๖๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) จำนวน ๒๕ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๙๗ สถานที่ตั้งเลขที่ ๑/๒๐๙ และ ๑/๒๑๑ หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

[redacted]

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) เลขทะเบียน ว-๑๙๗
ที่ อก ๐๓๑๐(๓)/ ๙๒๓๐ ลงวันที่ ๑๓ พฤศจิกายน ๒๕๖๘

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๕ รายการ

น้ำ/น้ำเสีย จำนวน 44 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
2	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
3	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
5	Arsenic	Digestion, Inductively Coupled Plasma Method[4]
6	Barium	Digestion, Inductively Coupled Plasma Method[4]
7	Biochemical Oxygen Demand	5-Day BOD Test, Membrane-Electrode Method[4]
8	Cadmium	Digestion, Inductively Coupled Plasma Method[4]
9	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method[4]
10	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
11	Chromium	Digestion, Inductively Coupled Plasma Method[4]
12	Color	ADMI Weighted-Ordinate Spectrophotometric Method[4]
13	Copper	Digestion, Inductively Coupled Plasma Method[4]
14	Cyanide	Total Cyanide after Distillation, Colorimetric Method[4]
15	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
16	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
17	Endosulfan II	Liquid-Liquid Extraction, Gas Chr[illegible] Method[4]

18 Endosulfan Sulfate...

หนังสือฉบับนี้จะสิ้นอายุในวันที่ ๑๒ ตุลาคม ๒๕๗๒ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๖๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[redacted]

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
41	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
42	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
43	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
44	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]

น้ำใต้ดิน จำนวน 123 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
2	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
3	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
4	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
5	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
6	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
7	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
8	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
9	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]
10	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[6]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
19	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
20	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
21	Formaldehyde	Distillation, Colorimetric Method[4]
22	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
23	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
24	Hexavalent Chromium	Colorimetric Method[4]
25	Lead	Digestion, Inductively Coupled Plasma Method[4]
26	Manganese	Digestion, Inductively Coupled Plasma Method[4]
27	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]
28	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
29	Nickel	Digestion, Inductively Coupled Plasma Method[4]
30	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
31	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method[4]
32	pH	Electrometric Method[4]
33	Phenols	Distillation, Direct Photometric Method[4]
34	Selenium	Digestion, Inductively Coupled Plasma Method[4]
35	Temperature	Laboratory and Field Methods[4]
36	Total Dissolved Solids	Dried at 180 °C[4]
37	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method[4]
38	Total Suspended Solids	Dried from 103 to 105 °C[4]
39	Trivalent Chromium	Calculation[4]
40	Zinc	Digestion, Inductively Coupled Plasma Method

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
12	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
13	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
14	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
15	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
16	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
17	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
18	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
19	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
20	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
21	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
22	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
23	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
24	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
25	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
26	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]

27 Acenaphthene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
28	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
29	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
30	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
31	Antimony	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
32	Arsenic	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
33	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
34	Barium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
35	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
36	Benzo(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
37	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
38	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
39	Benzo(ghi)perylene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
40	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]

41 Benzoic acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
41	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
42	Beryllium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
43	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
44	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
45	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
46	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
47	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
48	Cadmium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
49	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
50	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
51	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
52	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
53	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
54	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
55	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]

56 Chromium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	Chromium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
57	Chromium (II)	Calculation[4]
58	Chromium (VI)	Colorimetric Method[4]
59	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
60	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
61	Cyanide	Total Cyanide after Distillation, Colorimetric Method[4]
62	DDD	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
63	DDE	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
64	DDT	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
65	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
66	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
67	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
68	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
69	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
70	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
71	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]

72 Ethylbenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
72	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
73	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
74	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
75	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
76	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
77	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
78	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
79	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
80	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
81	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
82	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
83	Lead	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
84	Manganese	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
85	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
86	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
87	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
88	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
89	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
90	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
92	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
93	Nickel	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
94	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
96	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
97	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
98	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
99	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
100	pH	Electrometric Method[4]
101	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
116	Vanadium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
117	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
118	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
119	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
120	Zinc	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
121	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
122	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
123	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
4	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
5	Carbon Monoxide	Instrumental Analyzer Method[5]
6	Chlorine	Isokinetic Sampling, Ion Chromatographic Method[5]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
102	Phenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
103	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
104	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
105	Selenium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
106	Silver	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
107	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
108	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
109	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
110	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4]
111	TPH (C5-C8)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
112	TPH (C>8-C16)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[4]
113	TPH (C>16-C35)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[4]
114	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[4]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
26	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method[5]
27	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
28	Xylene	Adsorption Sampling, Gas Chromatographic Method[5]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๗ รายการ

ดับที่	สารมลพิษ	วิธีวิเคราะห์
1	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method[6]
2	Aldrin	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
3	Antimony	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,10]
4	Arsenic	1) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[9,11] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,11]
5	Barium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
6	Beryllium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
7	Cadmium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
8	Chlordane	Ultrasonic Extraction, Gas Chromatographic Method[7,8]

9 Chromium...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
7	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
9	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method[5]
11	Dioxins/Furans	Isokinetic Sampling[5]
12	Hydrogen Chloride	Isokinetic Sampling, Ion Chromatographic Method[5]
13	Hydrogen Fluoride	Isokinetic Sampling, Ion Chromatographic Method[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
15	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
16	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5]
18	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
19	Opacity	Ringelmann's Method[1]
20	Oxides of Nitrogen	1) Instrumental Analyzer Method[5] 2) Absorption Sampling, Alkaline Permanganate/ Colorimetric Method[5]
21	Selenium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
22	Sulfur Dioxide	1) Absorption Sampling Barium-Thorin Titrimetric Method[5] 2) Instrumental Analyzer Method[5]
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[5]
24	Tellurium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]

25 Tin...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chromium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
10	Chromium (III)	Calculation[1,9,10,12]
11	Chromium (VI)	1) Alkaline Digestion, Colorimetric Method[12] 2) Waste Extraction, Colorimetric Method[1,12]
12	Cobalt	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
13	Copper	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
14	DDD	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
15	DDE	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
16	DDT	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
17	Dieldrin	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
18	Endrin	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
19	Heptachlor	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
20	Kepone	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
21	Lead	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
22	Lindane	Ultrasonic Extraction, Gas Chromatographic Method[7,8]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[15] 2) Waste Extraction, Digestion, Thermal Decomposition Atomic Absorption Spectrometric Method[1,15]
24	Methoxychlor	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
25	Mirex	Ultrasonic Extraction, Gas Chromatographic Method[7,8]
26	Molybdenum	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
27	Nickel	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
28	PCBs	Ultrasonic Extraction, Gas Chromatographic Method[8,16]
29	Pentachlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
30	Selenium	1) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[9,11] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,11]
31	Silver	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
32	Silvex	Ultrasonic Extraction, Gas Chromatographic Method[6]
33	Thallium	1) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[9,11] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,9,11]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
34	Toxaphene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
35	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
36	Vanadium	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]
37	Zinc	1) Digestion, Inductively Coupled Plasma Method[9,10] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,9,10]

<u>ดิน จำนวน ๑๒๓ รายการ</u>

ดับที่	สารมลพิษ	วิธีวิเคราะห์
1	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
2	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
3	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
4	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
5	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
6	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
7	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
8	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
9	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]

10 1,3,5-Trimethylbenzene...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
10	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
11	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
12	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
13	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
14	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
15	2,4,5-Trichlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
16	2,4,6-Trichlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
17	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method[6]
18	2,4-Dichlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
19	2,4-Dimethylphenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
20	2,4-Dinitrophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
21	2,4-Dinitrotoluene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
22	2,6-Dinitrotoluene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
23	2-Chlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
24	2-Methylnaphthalene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
25	2-Methylphenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

26 3,3'-Dichlorobenzidine...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
26	3,3'-Dichlorobenzidine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
27	Acenaphthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
28	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
29	Aldrin	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
30	Anthracene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
31	Antimony	Digestion, Inductively Coupled Plasma Method[10,19]
32	Arsenic	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[11,19]
33	Atrazine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
34	Barium	Digestion, Inductively Coupled Plasma Method[10,19]
35	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
36	Benzo(a)anthracene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
37	Benzo(a)pyrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
38	Benzo(b)fluoranthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
39	Benzo(ghi)perylene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
40	Benzo(k)fluoranthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
41	Benzoic acid	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
42	Beryllium	Digestion, Inductively Coupled Plasma Method[10,19]
43	Bis(2-chloroethyl)ether	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
44	Bis(2-ethylhexyl)phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
45	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
46	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
47	Butyl benzyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
48	Cadmium	Digestion, Inductively Coupled Plasma Method[10,19]
49	Carbazole	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
50	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
51	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
52	Chlordane	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
53	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
54	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
55	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
56	Chromium	Digestion, Inductively Coupled Plasma Method[10,19]
57	Chromium (III)	Calculation[9,10,12]
58	Chromium (VI)	Alkaline Digestion, Colorimetric Method[12]
59	Chrysene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
60	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
61	Cyanide	Extraction, Distillation, Colorimetric Method[20,21,22]
62	DDD	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
63	DDE	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
64	DDT	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
65	Dibenz(a,h)anthracene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
66	Dieldrin	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
67	Diethyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
68	Di-n-butyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
69	Di-n-Octyl phthalate	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
70	Endosulfan	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
71	Endrin	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
72	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
73	Fluoranthene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
74	Fluorene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
75	Heptachlor	Microwave Extraction, Gas Chromat... Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
76	Heptachlor Epoxide	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
77	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
78	Hexachlorobenzene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
79	Hexachlorocyclopentadiene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
80	Hexachloroethane	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
81	Indeno(1,2,3-cd)pyrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
82	Isophorone	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
83	Lead	Digestion, Inductively Coupled Plasma Method[10,19]
84	Manganese	Digestion, Inductively Coupled Plasma Method[10,19]
85	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[15]
86	Methoxychlor	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
87	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
88	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
89	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
90	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
91	Naphthalene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

ดับที่	สารมลพิษ	วิธีวิเคราะห์
92	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
93	Nickel	Digestion, Inductively Coupled Plasma Method[10,19]
94	Nitrobenzene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
95	N-Nitrosodi-n-propylamine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
96	N-Nitrosodiphenylamine	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
97	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
98	PCBs	Ultrasonic Extraction, Gas Chromatographic Method[8,16]
99	p-Chloroaniline	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
100	Pentachlorophenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
101	Phenanthrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
102	Phenol	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
103	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
104	Pyrene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
105	Selenium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[11,19]
106	Silver	Digestion, Inductively Coupled Plasma Method[10,19]
107	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
108	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]

109 Toluene...

ดับที่	สารมลพิษ	วิธีวิเคราะห์
109	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
110	Toxaphene	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
111	TPH (C5-C8)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17]
112	TPH (C>8-C16)	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[8]
113	TPH (C>16-C35)	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[8]
114	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
116	Vanadium	Digestion, Inductively Coupled Plasma Method[10,19]
117	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
118	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
119	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[17,18]
120	Zinc	Digestion, Inductively Coupled Plasma Method[10,19]
121	α-HCH	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
122	β-HCH	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]
123	γ-HCH	Microwave Extraction, Gas Chromatographic/Mass Spectrometric Method[13,14]

เอกสารอ้างอิง...

เอกสารอ้างอิง

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13 United States...

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18. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.

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20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oils. SW-846 Method 9013A, 2014.

21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014, 2014.

22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide : Distillation. SW-846 Method 9010C, 2004.

Ref No. : 0303/17005

CERTIFICATE OF TESTING LABORATORY ACCREDITATION

This is to certify that

SGS (Thailand) Limited, Laboratory Services
10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

has successfully undergone assessment according to ISO/IEC 17025 : 2017
and under the Bureau of Laboratory Accreditation, Department of Science Service
for the requirements, regulations and criteria for the competence of testing laboratories

LABORATORY ACCREDITATION
BLA-DSS

Accreditation Number TESTING - 0017

The scope of accreditation is as annexed hereto

Issue date : *7th November 2022*
Expired date : *6th November 2026*
Sign

Bureau of Laboratory Accreditation, Department of Science Service,
Ministry of Higher Education, Science, Research and Innovation

ที่ อก ๐๓๑๐(๓)/ ๒๑๐๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๙ มีนาคม ๒๕๖๙

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง)

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๖ มีนาคม ๒๕๖๙

ตามคำขอที่อ้างถึง บริษัท เอสจีเอส (ประเทศไทย) จำกัด (สาขาระยอง) ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๙๗ สถานที่ตั้งเลขที่ ๑/๒๐๙ และ ๑/๒๑๑ หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๕ ราย ได้แก่

อนึ่ง หนังสือฉบับนี้จะสิ้นอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๑๒ ตุลาคม ๒๕๗๒

จึงเรียนมาเพื่อทราบ

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

Green Industry
"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Antimony 0.63 µg/L to 12.5 µg/L - Arsenic 0.63 µg/L to 6.25 µg/L - Cadmium 0.63 µg/L to 6.25 µg/L - Chromium 0.63 µg/L to 12.5 µg/L - Cobalt 1.25 µg/L to 62.5 µg/L - Copper 0.63 µg/L to 6.25 µg/L - Lead 0.63 µg/L to 6.25 µg/L - Manganese 0.63 µg/L to 6.25 µg/L	In - house method : LBEN–14004 based on United States Environmental Protection Agency, 2014, EPA Method 6020B, Revision 2

Reference No. : 0303/17005

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1	Water	- Cadmium 0.002 mg/L to 0.1 mg/L - Copper 0.01 mg/L to 1.0 mg/L - Lead 0.01 mg/L to 1.0 mg/L - Manganese 0.1 mg/L to 4.0 mg/L - Nickel 0.01 mg/L to 1.0 mg/L - Zinc 0.01 mg/L to 1.0 mg/L	In - house method : LBEN–05119 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3120 B, 3030 F
		- Arsenic 0.002 mg/L to 0.008 mg/L	In - house method : LBEN–05119 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3114 C

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- pH 6.0 to 10.0	In - house method : LBEN–09152 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H^+ B
		- Ammonia - Nitrogen 0.10 mg/L to 10.0 mg/L	In-house method : LBEN-19003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - NH_3-F
		- Total phosphorus 0.10 mg/L to 10.0 mg/L	In - house method : LBEN-19002 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P J

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Accreditation Number : Testing - 0017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Nickel 0.63 µg/L to 6.25 µg/L - Silver 2.5 µg/L to 62.5 µg/L - Zinc 2.5 µg/L to 62.5 µg/L	In - house method : LBEN–14004 based on United States Environmental Protection Agency, 2014, EPA Method 6020B, Revision 2
		- Mercury 0.5 µg/L to 8.0 µg/L	In - house method : LBEN–08145 based on United States Environmental Protection Agency, 1994, EPA Method 245.1, Revision 3.0
		- Hexavalent chromium 1.0 µg/L to 6.25 µg/L	ISO 18412 : 2005

Initial Issue Date 22nd June 2007 Issue Number 13

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Higher Education, Science, Research and Innovation

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Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Navy Blue 1.0 mg/L to 7.5 mg/L	In - house method : LBLC-19004 based on United States Environmental Protection Agency, 2007, EPA Method 8321 B
		Azo colorants - Aniline - n-Methylaniline - p-Toluidine - o-Toluidine - m-Toluidine - n-Ethylaniline - 2-Chloroaniline - 2,4-Xylidine - 2,6-Xylidine 0.10 µg/L to 3.00 µg/L	In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017

Initial Issue Date 22nd June 2007 Issue Number 13

Reference No. : 0303/17005

Scope of Laboratory Accreditation

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Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Oil and Gresce 0.50 mg/L to 100.0 mg/L	In - house method : LBEN-18005 based on United States Environmental Protection Agency, 2010, EPA, Method 1664, Revision B
		- Color 0.10 m^{-1} to 10.00 m^{-1}	ISO 7887 : 2011, method B
		- Phenol 0.001 mg/L to 0.10 mg/L	In - house method : LBEN-15007 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5530 B, C
		- Cyanide 0.01 mg/L to 0.50 mg/L	In - house method : LBEN-97018 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-CN^- C, E

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Scope of Laboratory Accreditation

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Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Azo colorants - Benzidine - 4,4'-Thiodianiline - o-Aminoazotoluene - 3,3'-Dimethyl-4,4'-diaminodiphenylmethane - 3,3'-Dimethylbenzidine - 4,4'-Thiodianiline - 3,3'-Dichlorobenzidine - 4,4'-Methylene-bis- (2-chloro aniline) - 3,3'-Dimethoxybenzidine 0.10 µg/L to 3.00 µg/L	In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Azo colorants - o-Anisidine - 4-Chloroaniline - n,n-diethylanaline - p-Cresidine - 2,4,5-Trimethylaniline - 4-Chloro-o-toluidine - 2,4-Toluenediamine - 2,4-Diaminoanisole - 2-Naphtylamine - 5-Nitro-o-toluidine - 5-Nitro-o-anisidine - 4-Aminobiphenyl - 4-Aminoazobenzene - 4,4'-Oxydianiline 0.10 µg/L to 3.00 µg/L	In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama II S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Polycyclic Aromatic Hydrocarbons (PAHs) - Naphthalene - 2-Methylphtalene - 1-Methylphtalene - Acenaphthylene - Acenaphthene - Fluorene - Phenanthrene - Anthracene - Fluoranthene - Pyrene - Cyclopenta (c,d) pyrene - Benzo(a) Anthracene - Chrysene 0.01 µg/L to 2.0 µg/L	In - house method : SOP LBGC-18008 based on DIN 38407-39 : 2011

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Organotin Compounds - Trimethyltin(TMT) - Dimethyltin(DMT) - Dipropytin-dichloride(DProT) - Monobutytin(MBT) - Tripropyltin(TPrT) - Dibutytin(DBT) - Tributyltin(TBT) - Monooctyltin(MOT) - Tetrabutyltin(TeBT) - Diphenyltin(DPhT) - Dioctyltin(DOT) - Triphenyltin(TPhT) - Tri-cyclohexyltin(TCyT) - Tri-n-octyltin(TOT) 0.05 µg/L to 2.0 µg/L	In - house method : SOP LBGC-18006 based on ISO 17353 : 2004

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Accreditation Number : Testing - 0017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Chlorophenol - 4-Chloro-3-methylphenol - 2-Chlorophenol - 3-Chlorophenol - 4-Chlorophenol - 2,4-Dichlorophenol - 2,5-Dichlorophenol - 2,6-Dichlorophenol - 3,5-Dichlorophenol - 2,3-Dichlorophenol - 3,4-Dichlorophenol - Pentachlorophenol - 2,3,4,6-Tetrachlorophenol 0.5 µg/L to 20.0 µg/L	In - house method : SOP LBGC-18003 based on ISO 17070 : 2015

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Polycyclic Aromatic Hydrocarbons (PAHs) - Benzo (b) Fluoranthene - Benzo (j) Fluoranthene - Benzo (k) Fluoranthene - Benzo (e) pyrene - Benzo (a) pyrene - Indenol (1,2,3-cd) pyrene - Dibenzo (ah) anthracene - Benzo (ghi) perylene 0.01 µg/L to 2.0 µg/L	In - house method : SOP LBGC-18008 based on DIN 38407-39 : 2011

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Phthalates - Di-butyl phthalate - Di-2-ethyl hexyl phthalate - Di-isononyl phthalate - Bis-methylglycol ester phthalate - Di-isoheptyl phthalate - Bis cyclohexyl phthalate - Di-n-octyl phthalate - Bis-(2-propylheptyl) phthalate - Bis-nonyl phthalate - Bis-propyl phthalate - Bis-iso-pentyl phthalate - n-pentyl-iso-pentyl phthalate - Bis-n-pentyl phthalate - Di-n-hexyl phthalate - Bis-iso-octhyl phthalate - Di-isodecyl phthalate 5 µg/L to 30 µg/L	In - house method : SOP LBGC-18007 based on ISO 18856 : 2004

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Chlorophenol - 2,4,5-Trichlorophenol - 2,4,6-Trichlorophenol - 2,3,4-Trichlorophenol - 2,3,5-Trichlorophenol - 3,4,5-Trichlorophenol - 2,3,4,5-Tetrachlorophenol - 2,3,5,6-Tetrachlorophenol - 2,3,6-Trichlorophenol 0.5 µg/L to 20.0 µg/L	In - house method : SOP LBGC-18003 based on ISO 17070 : 2015
		Phthalates - Dimethyl phthalate - Diethyl phthalate - Di-iso-buthyl phthalate - Benzyl buthyl phthalate 5 µg/L to 30 µg/L	In - house method : SOP LBGC-18007 based on ISO 18856 : 2004

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Perfluorocarbons (PFCs) : - 6:2 FTOH - 8:2 FTOH - 10:2 FTOH - 6:2 FTA - 8:2 FTA - 10:2 FTA 5 µg/L to 25 µg/L	In - house method : LBEGC-18011 based on GB/T 29493.2 : 2013
		Flame retardants - 2,2-bis(bromomethyl)-1,3-propane-diol - Tris (2-chloroethyl) phosphate - Tris (1,3-dichloro-isopropyl) phosphate - Hexabromocyclododecane 5.0 µg/L to 25.0 µg/L	In - house method : LBGC-18005 based on United States Environmental Protection Agency, 2005, EPA, Method 527, Revision 1.0

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Volatile Organic Compound - Methylene Chloride - Benzene - 1,2-Dichloroethane - Trichloroethylene - Tetrachloroethylene - Total Xylene 5 µg/L to 20 µg/L	In - house method : SOP LBGC-18009 based on United States Environmental Protection Agency, 1996, EPA, Method 8260B, Revision 2.0
		- p- Cresol - o- Cresol - m- Cresol 5 µg/L to 25 µg/L	In - house method : SOP LBGC-18010 based on United States Environmental Protection Agency, 1996, EPA, Method 8260 B, Revision 2.0

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Disperse dyes - Disperse Violet 1 - Disperse Yellow 1 - Disperse Yellow 9 - Disperse Yellow 39 - Disperse Yellow 54 - Solvent Yellow 1 - Solvent Yellow 2 - Solvent Yellow 3 - Solvent Yellow 14 10.0 µg/L to 50.0 µg/L	In - house method : LBLC-18002 based on Journal of Chromatographic Science 2015, 53 : page 1257-1264

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Flame retardants - Polybrominated biphenyls ethers - Polybrominated diphenyl ethers 0.25 µg/L to 1.5 µg/L Disperse dyes - Basic violet 1 - Basic violet 3 - Disperse Blue 1 - Disperse Blue 7 - Disperse Brown 1 - Disperse Orange 1 - Disperse Orange 3 - Disperse Orange 11 - Disperse Orange 37/76 - Disperse Red 1 10.0 µg/L to 50.0 µg/L	In - house method : LBGC-18005 based on United States Environmental Protection Agency, 2005, EPA, Method 527, Revision 1.0 In - house method : LBLC-18002 based on Journal of Chromatographic Science 2015, 53 : page 1257-1264

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Conductivity 147 µS/cm to 12 880 µS/cm	In - house method : LBEN–02110 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B
		- Total solids dried at 103 °C to 105 °C 50 mg/L to 20 000 mg/L	In - house method : LBEN–09150 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 B
		- Total suspended solids dried at 103 °C to 105 °C 5 mg/L to 10 000 mg/L	In - house method : LBEN–97042 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Flame retardant - Tris (2,3-dibromopropyl) phosphate - Bis (2,3-dibromopropyl) phosphate 1.00 µg/L to 4.00 µg/L	In - house method : LBLC-18001 based on ISO 18857-2 : 2009
		- Glycol 20 µg/L to 100 µg/L	In - house method : LBGC–18012 based on United States Environmental Protection Agency, 2014, EPA, Method 600/R-14/008

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- COD 10 mg/L to 300 mg/L	In - house method : LBEN–97010 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 C
		- COD 10 mg/L to 400 mg/L	In - house method : LBEN–12161 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D
		- pH 4.0 to 9.2	In - house method : LBEN–21001 based on United States Environmental Protection Agency, Editorial Revision 1978, 1982, EPA Method 150.1

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Total dissolved solids dried at 180 °C 50 mg/L to 20 000 mg/L	In - house method : LBEN–00106 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C
		- Total hardness (calculates as $CaCO_3$) 1 mg/L to 300 mg/L	In - house method : LBEN–00098 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C
		- BOD 2 mg/L to 2 100 mg/L	In - house method : LBEN–97006 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Total organic carbon 0.5 mg/L to 10.0 mg/L	In - house method : LBEN–09149 based on United States Environmental Protection Agency, 2004, EPA Method 9060 A, Revision 1.0
		Perfluorocarbons (PFCs) : - PFPeA - PFBS - PFHxS - PFHpS - PF-3,7-DMOA - PFDA - PFOS - PFUnA - PFDoA - PFDS 0.05 µg/L to 0.3 µg/L	In – house method : LBLC-17014 based on DIN 38407-42 : 2011-03 and analysis with HPLC-MS

Scope of Laboratory Accreditation

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	- Nitrate 0.02 mg/L to 6.0 mg/L	In - house method : LBEN–97029 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - NO_3^- E
		- Nitrite 0.02 mg/L to 1.0 mg/L	In - house method : LBEN–97049 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - NO_2^- B
		- Sulfate 2.0 mg/L to 100.0 mg/L	In - house method : LBEN–14003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - SO_4^{2-} E

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Chlorobenzenes and Chlorotoluenes (COCs) : - 1,3-Dichlorobenzene - 1,4-Dichlorobenzene - 1,2-Dichlorobenzene - 3,5-Dichlorotoluene - 2,4-Dichlorotoluene - 2,5 Dichlorotoluene - 2,6-Dichlorotoluene - 1,3,5-Trichlorobenzene - 2,3-Dichlorotoluene - 3,4-Dichlorotoluene - 1,2,4-Trichlorobenzene - 1,2,3-Trichlorobenzene 0.20 µg/L to 5.00 µg/L	In – house method : LBGC-21010 based on United States Environmental Protection Agency, 2014, EPA Method 8270

Reference No. : 0303/17005

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Perfluorocarbons (PFCs) : - PFTrA - PFTeA - PFOSA 0.05 µg/L to 0.3 µg/L	In – house method : LBLC-17014 based on DIN 38407-42 : 2011-03 and analysis with HPLC-MS
		Alkyl phenol ethoxylate : - OPEO - NPEO 1 µg/L to 10 µg/L	In – house method : LBLC-17013 based on ISO 18857-2 : 2009 and analysis with HPLC-MS
		Chlorobenzenes and Chlorotoluenes (COCs) : - Chlorobenzene - 2-Chlorotoluene - 3-Chlorotoluene - 4-Chlorotoluene 0.20 µg/L to 5.00 µg/L	In – house method : LBGC-21010 based on United States Environmental Protection Agency, 2014, EPA Method 8270

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Alkylphenol (AP) : - Nonylphenol (NP) - 4-n-Nonyl phenol (4-n-NP) - 4-n-Octylphenol (4-n-OP) - Octylphenol (4-tert-OP) 1.0 µg/L to 10.0 µg/L	In – house method : LBLC-17013 based on ISO 18857-2: 2009
		- Carbon disulfide 0.05 mg/L to 1 mg/L	In – house method : LBGC-2007 based on United States Environmental Protection Agency, 2017, EPA Method 8260D

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
1 (cont.)	Water	Chlorobenzenes and Chlorotoluenes (COCs) : - 2,4,6-Trichlorotoluene - 2,4,5 -Trichlorotoluene - 2,3,6-Trichlorotoluene - 1,2,3,5-Tetrachlorobenzene - 3,4,5-Trichlorotoluene - 1,2,4,5-Tetrachlorobenzene - 2,3,4-Trichlorotoluene - 1,2,3,4-Tetrachlorobenzene - 2,3,4,6-Tetrachlorotoluene - 2,3,5,6-Tetrachlorotoluene - 2,3,4,5-Tetrachlorotoluene - Pentachlorobenzene - 2,3,4,5,6-Pentachlorotoluene - Hexachlorobenzene 0.20 µg/L to 5.00 µg/L	In – house method : LBGC-21010 based on United States Environmental Protection Agency, 2014, EPA Method 8270

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Total suspended solids dried at 103 °C to 105 °C 5 mg/L to 10 000 mg/L	In - house method : LBEN–97042 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D
		- Total dissolved solids dried at 180 °C 50 mg/L to 20 000 mg/L	In - house method : LBEN–00106 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C
		- Conductivity 147 µS/cm to 12 880 µS/cm	In - house method : LBEN–02110 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2	Wastewater	- Mercury 0.5 µg/L to 8.0 µg/L	In - house method : LBEN–08145 based on United States Environmental Protection Agency, 1994, EPA Method 245.1, Revision 3.0
		- pH 4.0 to 10.0	In - house method : LBEN–09152 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H^+ B
		- Total solids dried at 103 °C to 105 °C 50 mg/L to 20 000 mg/L	In - house method : LBEN–09150 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 B

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- COD 10 mg/L to 500 mg/L	In - house method : LBEN–12161 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D
		- pH 4.0 to 9.2	In - house method : LBEN–21001 based on United States Environmental Protection Agency, Editorial Revision 1978, 1982, EPA Method 150.1
		- Nitrate 0.02 mg/L to 15.0 mg/L	In - house method : LBEN–97029 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - NO_3^- E

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Total hardness (calculates as $CaCO_3$) 2 mg/L to 500 mg/L	In - house method : LBEN–00098 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C
		- BOD 2 mg/L to 2 100 mg/L	In - house method : LBEN–97006 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B
		- COD 10 mg/L to 3 000 mg/L	In - house method : LBEN–97010 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 C

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Ammonia-Nitrogen 0.02 mg/L to 20 mg/L	In - house method : LBEN–11158 based on ASTM D1426-08
		- Total phosphorus 0.01 mg/L to 40 mg/L	In - house method : LBEN–97037 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - P B4, E
		- Dissolved phosphorus 0.005 mg/L to 20 mg/L	In - house method : LBEN–97037 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - P B1, E

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Nitrite 0.02 mg/L to 1.0 mg/L	In - house method : LBEN–97049 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - NO_2^- B
		- Sulfate 2.0 mg/L to 100.0 mg/L	In - house method : LBEN–14003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - SO_4^{2-} E
		- Total organic carbon 0.5 mg/L to 10.0 mg/L	In - house method : LBEN–09149 based on United States Environmental Protection Agency, 2004, EPA Method 9060 A, Revision 1.0

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Chloride 1.0 mg/L to 20 000 mg/L	In - house method : LBEN-11157 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl^- D
		- Navy Blue 1.0 mg/L to 7.5 mg/L	In - house method : LBLC–19004 based on United States Environmental Protection Agency, 2007, EPA, Method 8321B

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Glycol 20 µg/L to 200 µg/L	In - house method : LBGC–18012 based on United States Environmental Protection Agency, 2014, EPA, Method 600/R-14/008
		- Ammonia-Nitrogen 0.10 mg/L to 10.0 mg/L	In - house method : LBEN-19003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - NH_3-F
		- Total phosphorus 0.10 mg/L to 10.0 mg/L	In - house method : LBEN -19002 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P J

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Alkyl phenol ethoxylate : - OPEO - NPEO 1 µg/L to 10 µg/L	In – house method : LBLC-17013 based on ISO 18857-2 : 2009 and analysis with HPLC-MS
		- Phenol 0.001 mg/L to 0.1 mg/L	In – house method : LBEN-15007 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed.,2017, part 5530 B, C
		- Cyanide 0.05 mg/L to 0.2 mg/L	In – house method : LBEN-97018 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed.,2017, part 4500 - CN^- C, E

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Perfluorocarbons (PFCs) : - PFPeA - PFBS - PFHxS - PFHpS - PF-3,7-DMOA - PFDA - PFOS - PFUnA - PFDoA - PFDS - PFTrA - PFTeA - PFOSA 0.05 µg/L to 0.3 µg/L	In – house method : LBLC-17014 based on DIN 38407-42 : 2011-03 and analysis with HPLC-MS

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Sulfite 0.75 mg/L to 3.0 mg/L	In - house method : LBEN-18006 based on United States Environmental Protection Agency, 1978, EPA, Method 377.1
		- Total kjeldahl nitrogen 2 mg/L to 200 mg/L	In - house method : LBAG-18002 based on ISO 5663 : 1984
		- Color 0.10 m^{-1} to 10.00 m^{-1}	ISO 7887 : 2011, Method B

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Oil and Grease 1 mg/L to 100 mg/L	In – house method : LBEN-97031 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed.,2017, part 5520 B
		- Oil and Grease 0.5 mg/L to 100 mg/L	In - house method : LBEN-18005 based on United States Environmental Protection Agency, 2010, EPA, Method 1664, Revision B
		- Sulfide 0.01 mg/L to 1.0 mg/L	In – house method : LBEN-97045 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed.,2017, part 4500-S^{2-}-D

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Chromium 0.63 µg/L to 12.5 µg/L - Antimony 0.63 µg/L to 12.5 µg/L - Cobalt 1.25 µg/L to 62.5 µg/L - Hexavalent chromium 1.0 µg/L to 5.0 µg/L Flame retardant - Tris (2,3-dibromopropyl) phosphate - Bis (2,3-dibromopropyl) phosphate - 2,2 Bis (bromomethyl)-1,3-propanediol 1.00 µg/L to 4.00 µg/L	In – house method : LBEN-14004 based on United States Environmental Protection Agency, 2014, EPA, Method 6020B, Revision 2 ISO 18412 : 2005 In - house method : LBLC-18001 based on ISO 18857-2 : 2009

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Arsenic 0.63 µg/L to 6.25 µg/L - Lead 0.63 µg/L to 6.25 µg/L - Cadmium 0.63 µg/L to 6.25 µg/L - Copper 0.63 µg/L to 6.25 µg/L - Manganese 0.63 µg/L to 6.25 µg/L - Nickel 0.63 µg/L to 6.25 µg/L - Zinc 2.5 µg/L to 62.5 µg/L - Silver 2.5 µg/L to 62.5 µg/L	In – house method : LBEN-14004 based on United States Environmental Protection Agency, 2014, EPA, Method 6020B, Revision 2

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Disperse dyes - Basic violet 1 - Solvent Yellow 14 - Disperse Yellow 54 - Disperse Violet 1 10.0 µg/L to 50.0 µg/L	In - house method : LBLC-18002 based on Journal of Chromatographic Science 2015,53 : page 1257-1264
		Azo colorants - Aniline - n-Methylaniline - p-Toluidine - o-Toluidine - m-Toluidine - n-Ethylaniline - 2-Chloroaniline - 2,4-Xylidine 2,6-Xylidine 0.5 µg/L to 3.0 µg/L	In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Disperse dyes - Disperse Blue 1 - Disperse Blue 7 - Disperse Brown 1 - Disperse Orange 1 - Disperse Orange 3 - Disperse Orange 11 - Disperse Orange 37/76 - Disperse Red 1 - Disperse Yellow 1 - Disperse Yellow 9 - Disperse Yellow 39 - Basic violet 3 - Solvent Yellow 1 - Solvent Yellow 2 - Solvent Yellow 3 10.0 µg/L to 50.0 µg/L	In - house method : LBLC-18002 based on Journal of Chromatographic Science 2015,53 : page 1257-1264

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Azo colorants - 4,4'-Thiodianiline - o-Aminoazotoluene - 3,3'-Dimethyl-4,4'-diaminodiphenylmethane - 3,3'-Dimethylbenzidine - 4,4'-Thiodianiline - 3,3'-Dichlorobenzidine - 4,4'-Methylenebis (2-Chlorcaniline) - 3,3'-Dimethoxybenzidine 0.5 µg/L to 3.0 µg/L	In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Azo colorants - o-Anisidine - 4-Chloroaniline - n,n-diethylanaline - p-Cresidine - 2,4,5-Trimethylaniline - 4-Chloro-o-toluidine - 2,4-Toluenediamine - 2,4-Diaminoanisole - 2-Naphtylamine - 5-Nitro-o-toluidine - 5-Nitro-o-anisidine - 4-Aminobiphenyl - 4-Aminoazobenzene - 4,4'-Oxydianiline - Benzidine 0.5 µg/L to 3.0 µg/L	In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Organotin compounds - Trimethyltin(TMT) - Dimethyltin(DMT) - Dipropytin-dichloride(DProT) - Monobutytin(MBT) - Tripropyltin(TPrT) - Dibutytin(DBT) - Tributyltin(TBT) - Monooctyltin(MOT) - Tetrabutyltin(TeBT) - Diphenyltin(DPhT) - Dioctyltin(DOT) - Triphenyltin(TPhT) - Tri-cyclohexyltin(TCyT) - Tri-n-octyltin(TOT) 0.05 µg/L to 1.0 µg/L	In - house method : SOP LBGC-18006 based on ISO 17353 : 2004

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Flame retarndants - 2,2-bis(bromomethyl)-1,3-propane-diol - Tris (2-chloroethyl) phosphate - Tris (1,3-dichloro-isopropyl) phosphate - Hexabromocyclododecane 5 µg/L to 25 µg/L - Polybrominated biphenyls ether - polybrominated diphenyl ethers 0.25 µg/L to 1.5 µg/L	In - house method : LBGC-18005 based on United States Environmental Protection Agency, 2005, EPA, Method 527, Revision 1.0

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Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Polycyclic Aromatic Hydrocarbons (PAH) - Benzo(b) Fluoranthene - Benzo(j) Fluoranthene - Benzo(k) Fluoranthene - Benzo(e) Pyrene - Benzo(a) Pyrene - Indenol(1,2,3-cd) Pyrene - Dibenzo (ah) Anthracene - Benzo (ghi) perylene 1.0 µg/L to 20.0 µg/L	In - house method : LBGC-18008 based on DIN 38407-39 : 2011

Reference No. : 0303/17005

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Laboratory Name : SGS (Thailand) Limited, Laboratory Services

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Chong Nonsi, Yan Nawa, Bangkok 10120

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Polycyclic Aromatic Hydrocarbons (PAH) - Naphthalene - 2-Methylphtalene - 1-Methylphtalene - Acenaphthylene - Acenaphthene - Fluorene - Phenanthrene - Anthracene - Fluoranthene - Pyrene - Cyclopenta (c,d) pyrene - Benzo(a) Anthracene - Chrysene 1.0 µg/L to 20.0 µg/L	In - house method : LBGC-18008 based on DIN 38407-39 : 2011

Scope of Laboratory Accreditation

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Chlorophenol - 2,3,4,5-Tetrachlorophenol - 2,3,5-Trichlorophenol - 2,3,5,6-Tetrachlorophenol - 2,3,6-Trichlorophenol - 3,4,5-Trichlorophenol 0.5 µg/L to 20.0 µg/L	In - house method : SOP LBGC-18003 based on ISO 17070 : 2015
		Phthalates - Dimethyl phthalate - Diethyl phthalate - Bis-iso-buthyl ester phthalate - Benzyl buthyl phthalate - Di-n-octyl phthalate - Di-2-ethyl hexyl phthalate - Di-isononyl phthalate - Bis methylglycol ester phthalate 5 µg/L to 30 µg/L	In - house method : LBGC-18007 based on ISO 18856 : 2004

Reference No. : 0303/17005

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Chlorophenol - 4-Chloro-3-methylphenol - 2-Chlorophenol - 3-Chlorophenol - 4-Chlorophenol - 2,4-Dichlorophenol - 2,5-Dichlorophenol - 2,6-Dichlorophenol - 3,5-Dichlorophenol - 2,3-Dichlorophenol - 3,4-Dichlorophenol - Pentachlorophenol - 2,3,4,6-Tetrachlorophenol - 2,4,5-Trichlorophenol - 2,4,6-Trichlorophenol - 2,3,4-Trichlorophenol 0.5 µg/L to 20.0 µg/L	In - house method : SOP LBGC-18003 based on ISO 17070 : 2015

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Volatile organic compounds - Methylene Chloride - Benzene - 1,2-Dichloroethane - Trichloroethylene - Tetrachloroethylene - Total Xylene 5 µg/L to 20 µg/L	In - house method : SOP LBGC-18009 based on United States Environmental Protection Agency, 1996, EPA, Method 8260B, Revision 2.0
		- p- Cresol - o- Cresol - m- Cresol 5 µg/L to 25 µg/L	In - house method : LBGC-18010 based on United States Environmental Protection Agency, 1996, EPA, Method 8260B, Revision 2.0

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Phthalates - Di-isoheptyl phthalate - Bis cyclohexyl phthalate - Di-n–octyl phthalate - Bis-(2-propylheptyl) phthalate - Bis-nonyl phthalate - Bis-propyl phthalate - Bis-iso-pentyl phthalate - n-pentyl-iso-pentyl phthalate - Bis-n-pentyl phthalate - Di-n-hexyl phthalate - Bis-iso-octhyl phthalate - Di-isodecyl phthalate 5 µg/L to 30 µg/L	In - house method : LBGC-18007 based on ISO 18856 : 2004

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Chlorobenzenes and Chlorotoluenes (COCs) : - 1,3-Dichlorobenzene - 1,4-Dichlorobenzene - 1,2-Dichlorobenzene - 3,5-Dichlorotoluene - 2,4-Dichlorotoluene - 2,5 Dichlorotoluene - 2,6-Dichlorotoluene - 1,3,5-Trichlorobenzene - 2,3-Dichlorotoluene - 3,4-Dichlorotoluene - 1,2,4-Trichlorobenzene - 1,2,3-Trichlorobenzene - 2,4,6-Trichlorotoluene - 2,4,5 -Trichlorotoluene 0.20 µg/L to 5.00 µg/L	In – house method : LBGC-21010 based on United States Environmental Protection Agency, 2014, EPA Method 8270

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Perfluorocarbons (PFCs) : - 6:2 FTOH - 8:2 FTOH - 10:2 FTOH - 6:2 FTA - 8:2 FTA - 10:2 FTA 5 µg/L to 25 µg/L	In - house method : LBGC-18011 based on DIN 38407-42 : 2011
		Chlorobenzenes and Chlorotoluenes (COCs) : - Chlorobenzene - 2-Chlorotoluene - 3-Chlorotoluene - 4-Chlorotoluene 0.20 µg/L to 5.00 µg/L	In – house method : LBGC-21010 based on United States Environmental Protection Agency, 2014, EPA Method 8270

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Alkylphenol (AP) : - Nonylphenol (NP) - 4-n-Nonyl phenol (4-n-NP) - 4-n-Octylphenol (4-n-OP) - Octylphenol (4-tert-OP) 1.0 µg/L to 10.0 µg/L	In – house method : LBLC-17013 based on ISO 18857-2: 2009
		- Carbon disulfide 0.05 mg/L to 1 mg/L	In – house method : LBGC-20007 based on United States Environmental Protection Agency, 2017, EPA Method 8260D
		- Hydrocarbon 1.0 mg/L to 50 mg/L	In - house method : LBEN 21002 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220B, 5520F

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	Chlorobenzenes and Chlorotoluenes (COCs) : - 1,2,3,5-Tetrachlorobenzene - 3,4,5-Trichlorotoluene - 1,2,4,5-Tetrachlorobenzene - 2,3,4-Trichlorotoluene - 1,2,3,4-Tetrachlorobenzene - 2,3,4,6-Tetrachlorotoluene - 2,3,5,6-Tetrachlorotoluene - 2,3,4,5-Tetrachlorotoluene - Pentachlorobenzene - 2,3,4,5,6-Pentachlorotoluene - Hexachlorobenzene 0.20 µg/L to 5.00 µg/L	In – house method : LBGC-21010 based on United States Environmental Protection Agency, 2014, EPA Method 8270

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
3	Surface water	- Ammonia-Nitrogen 0.02 mg/L to 20 mg/L	In - house method : LBEN–11158 based on ASTM D1426-08
		- Chloride 1 mg/L to 20 000 mg/L	In - house method : LBEN–11157 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - Cl^- D
		- Total phosphorus 0.01 mg/L to 40 mg/L	In - house method : LBEN–97037 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - P B4, E

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
2 (cont.)	Wastewater	- Coliforms MPN/100 mL Detected or Not detected/ 100 mL	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed, 2017, part 9221 B
		- Coliforms cfu/100 mL	ISO 9308 -1: 2014 / Amd.1: 2016
		- *E.coli* MPN/100 mL Detected or Not detected/100 mL	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed, 2017, part 9221B, 9221C, 9221F and FDA BAM Online, 2020 (Chapter 4)

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
4 (cont.)	Sludge	- Arsenic 0.50 mg/kg to 5.00 mg/kg - Cadmium 0.50 mg/kg to 5.00 mg/kg - Lead 0.50 mg/kg to 5.00 mg/kg - Zinc 1.00 mg/kg to 5.00 mg/kg - Nickel 1.00 mg/kg to 5.00 mg/kg - Copper 1.00 mg/kg to 5.00 mg/kg	In - house method : LBEN 18007 based on United States Environmental Protection Agency, 2014, EPA, Method 6020B, Revision 2

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
3 (cont.)	Surface water	- Dissolved phosphorus 0.005 mg/L to 20 mg/L	In - house method : LBEN-97037 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - P B1, E
4	Sludge	- Mercury 0.1 mg/kg to 4.0 mg/kg	In - house method : LBEN-18008 based on United States Environmental Protection Agency, 2007, EPA, Method 7473, Revision 0
		- Hexavalent chromium 1.0 mg/kg to 40.0 mg/kg	In - house method : LBEN 18003 based on United States Environmental Protection Agency, 1992, EPA, Method 7196A, Revision 1

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Chong Nonsi, Yan Nawa, Bangkok 10120

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
4 (cont.)	Sludge	- Cadmium 10 mg/kg to 1 000 mg/kg	In - house method : LBEN 18007 based on United States Environmental Protection Agency, 2007, EPA Method 6010C, Revision 3
		- Lead 10 mg/kg to 1 000 mg/kg	
		- Cyanide 0.50 mg/kg to 10.0 mg/kg	In - house method : SOP LBEN-19001 based on ISO 11262 : 2011
5	Sludge Waste	Chlorophenol : - 4-Chloro-3-methylphenol - 2-Chlorophenol - 3-Chlorophenol - 4-Chlorophenol 0.05 mg/kg to 1.00 mg/kg	In - house method SOP LBGC-20004 based on ISO 14154 : 2005

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Chlorophenol : - 2,3-Dichlorophenol - 2,4-Dichlorophenol - 2,5-Dichlorophenol - 2,6-Dichlorophenol - 3,4-Dichlorophenol - 3,5-Dichlorophenol - Pentachlorophenol - 2,3,4-Trichlorophenol - 2,3,5-Trichlorophenol - 2,3,6-Trichlorophenol - 2,4,5-Trichlorophenol - 2,4,6-Trichlorophenol - 3,4,5-Trichlorophenol 0.05 mg/kg to 1.00 mg/kg	In - house method SOP LBGC-20004 based on ISO 14154 : 2005

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Polycyclic Aromatic Hydrocarbons (PAHs) : - Anthracene - Fluoranthene - Pyrene - Cyclopenta (c,d) pyrene - Benzo(a) anthracene - Chrysene - Benzo(k) fluoranthene - Benzo(b) fluoranthene - Benzo(j) fluoranthene - Benzo(e) pyrene - Benzo(a) pyrene - Indenol(1,2,3-cd) pyrene - Dibenzo (ah) anthracene - Benzo (ghi) perylene 0.0025 mg/kg to 0.1 mg/kg	In - house method : SOP LBGC-20005 based on DIN 38407-39:2011

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Chlorophenol : - 2,3,4,5-Tetrachlorophenol - 2,3,4,6-Tetrachlorophenol - 2,3,5,6-Tetrachlorophenol 0.05 mg/kg to 1.00 mg/kg Polycyclic Aromatic Hydrocarbons (PAHs) : - Naphthalene - 2-Methylphtalene - 1-Methylphtalene - Acenaphthylene - Acenaphthene - Fluorene - Phenanthrene 0.0025 mg/kg to 0.1 mg/kg	In - house method SOP LBGC-20004 based on ISO 14154 : 2005 In - house method : SOP LBGC-20005 based on DIN 38407-39 : 2011

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Glycol : - 2-Methoxyethanol - 2-Ethoxyethyl acetate - Bis(2-methoxyethyl)ether - 2-Ethoxyethanol - 2-Methoxypropylacetate - 2-Methoxyethylacetate - Triethylene glycol dimethyl ether - Ethylene glycol dimethyl ether 0.50 mg/kg to 5.00 mg/kg	In - house method : SOP LBGC-20006 based on ISO 22892:2006
		Organotin Compounds : - Trimethyltin (TMT) - Dimethyltin (DMT) - Monomethyltin(MMT) - Dipropytin-dichloride (DProT) 0.50 mg/kg to 2.00 mg/kg	In - house method : SOP LBGC-21011 based on ISO 23161:2018

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Organotin Compounds : - Monobutytin (MBT) - Tripropyltin (TPrT) - Dibutytin (DBT) - Monophenyltin (MPhT) - Tributyltin (TBT) - Monooctyltin (MOT) - Tetrabutyltin (TeBT) - Diphenyltin (DPhT) - Dioctyltin (DOT) - Tri-cyclohexyltin (TCyT) - Triphenyltin (TPhT) - Tri-n-octyltin (TOT) 0.50 mg/kg to 2.00 mg/kg	In - house method : SOP LBGC-21011 based on ISO 23161:2018

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Chlorobenzenes and Chlorotoluenes (COCs) : - Chlorobenzene - 2-Chlorotoluene - 3-Chlorotoluene - 4-Chlorotoluene - 1,3-Dichlorobenzene - 1,4-Dichlorobenzene - 1,2-Dichlorobenzene - 2,4-Dichlorotoluene - 2,5-Dichlorotoluene - 2,6-Dichlorotoluene - 1,3,5-Trichlorobenzene - 2,3-Dichlorotoluene - 3,4-Dichlorotoluene 0.025 mg/kg to 0.50 mg/kg	In - house method : LBGC–21014 based on United States Environmental Protection Agency, 2014, EPA Method 8270D

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Disperse dyes : - Acid Violet 49 - Basic Blue 26 - Basic Green 4 - Basic Red 9 - Basic Violet 1 - Basic Violet 3 - Disperse Blue 1 - Disperse Blue 3 - Disperse Blue 7 - Disperse Blue 106 - Disperse Yellow 1 - Disperse Yellow 3 - Disperse Yellow 9 - Disperse Red 17 - Solvent Yellow 1 - Solvent Yellow 3 1.00 mg/kg to 4.00 mg/kg	In - house method : SOP LBGC-21006 based on ISO 16373-3: 2014

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Chlorobenzenes and Chlorotoluenes (COCs) : - Pentachlorobenzene - 2,3,4,5,6-Pentachlorotoluene - Hexachlorobenzene 0.025 mg/kg to 0.50 mg/kg	In - house method : LBGC–21014 based on United States Environmental Protection Agency, 2014, EPA Method 8270D
		Azo dyes : - Aniline (62-53-3) - n-methylaniline (100-61-8) - p-Toluidine (106-49-0) - o-Toluidine (95-53-4) - m-Toluidine (108-44-1) - n-ethylaniline (103-69-5) - 2-Chloroaniline (95-51-2) 0.20 mg/kg to 1.50 mg/kg	In - house method : LBGC–21019 based on ISO 14362-1 and 3: 2017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Chlorobenzenes and Chlorotoluenes (COCs) : - 1,2,4-Trichlorobenzene - 1,2,3-Trichlorobenzene - 2,4,6-Trichlorotoluene - 2,4,5 -Trichlorotoluene - 2,3,6-Trichlorotoluene - 1,2,3,5-Tetrachlorobenzene - 3,4,5-Trichlorotoluene - 1,2,4,5-Tetrachlorobenzene - 2,3,4-Tetrachlorotoluene - 1,2,3,4-Tetrachlorobenzene - 2,3,4,6-Tetrachlorotoluene - 2,3,5,6-Tetrachlorotoluene - 2,3,4,5-Tetrachlorotoluene 0.025 mg/kg to 0.50 mg/kg	In - house method : LBGC–21014 based on United States Environmental Protection Agency, 2014, EPA Method 8270D

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Azo dyes : - 4,4'-Thiodianiline (139-65-1) - 3,3'-Dichlorobenzidine (91-94-1) - 4,4'-Methylene bis(2-chloroaniline) (101-14-4) - 4-Aminobipheny (92-67-1) - 4,4'-Oxydianiline (101-80-4) - Benzindine (92-87-5) - 4,4'-Thiodianiline (101-77-9) - 3,3'-Dimethy- 4,4'-diaminodiphenymethane (838-88-0) 0.20 mg/kg to 1.50 mg/kg	In - house method : LBGC–21019 based on ISO 14362-1 and 3: 2017

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Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Azo dyes : - 2,4-Xylidine (95-68-1) - 2,6-Xylidine (87-62-7) - o-Anisidine (90-04-0) - 4-Chloroaniline (106-47-8) - n,n-Diethylaniline (91-66-7) - p-Cresidine (120-71-8) - 2,4,5 -Trimethylaniline (137-17-7) - 4-Chloro-o-toluidine (95-69-2) - 2,4-Toluenediamine (95-80-7) - 2,4 -Diaminoanisole (615-05-4) - 2-Naphtylamine (91-59-8) - 3,3'-dimethybenzidine (119-90-4) - 3,3'-dimethybenzidine (119-93-7) 0.20 mg/kg to 1.50 mg/kg	In - house method : LBGC–21019 based on ISO 14362-1 and 3: 2017

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Perfluorinated/Polyfluorinated (PFCs) : - PFOA - PFOS - PFBS - PFHXA 0.025 mg/kg to 0.15 mg/kg	In – house method : LBLC-17014 based on DIN 38407-42: 2011
		Flame retardant : - Tris(2-chloroethyl) phosphate (TCEP) - Tris(1,3-dichloro-isopropyl) phosphate (TDCP) - Hexabromocyclododecane (HBCDD) - Tri-o-cresyl phosphate(TOCP) - Tris-(aziridinyl)phosphine oxide (TEPA) - Polybromobiphenyls (PBB) - Polybromobiphenyls ether (PBDE) 0.25 mg/kg to 0.75 mg/kg	In - house method : LBGC–21020 based on ISO 22032: 2006

Reference No. : 0303/17005

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Perfluorinated/Polyfluorinated (PFCs) : - 1H,1H,2H,2H-Tridecafluoro-1-n-octanol (6:2 FTOH) - 1H,1H,2H,2H-Heptadecafluoro-1-decanol (8:2 FTOH) - 1H,1H,2H,2H-Perfluoro-1-dodecanol (10:2 FTOH) - 1H,1H,2H,2H-Perfluorooctyl acrylate (6:2 FTA) - 1H,1H,2H,2H-Heptadecafluorodecyl Acrylate (8:2 FTA) - 1H,1H,2H,2H-Perfluorododecyl acrylate (10:2 FTA) 0.25 mg/kg to 1.5 mg/kg	In - house method : LBGC–21023 based on DIN 38407-42: 2011

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Volatile Organic compound (Halogenated solvent) : - Methylene chloride - Benzene - 1,2-Dichloroethane - Trichloroethylene - tetrachloroethylene - p,m Xylene - o-xylene 0.02 mg/kg to 0.20 mg/kg	In - house method : LBGC–21024 based on United States Environmental Protection Agency, 2014, EPA Method 5021

Reference No. : 0303/17005

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Flame retardant : - Tris(2,3-dibromopropyl) phosphate - Bis(2,3-dibromopropyl) phosphate - 2,2,-Bis(bromomethyl)-1,3-propanediol 0.5 mg/kg to 2 mg/kg	In - house method : LBLC–18001 based on ISO 22032: 2006
		Alkylphenol (AP) : - Nonylphenol (NP) - 4-n-Nonyl phenol (4-n-NP) - 4-n-Octylphenol (4-n-OP) - Octylphenol (4-tert-OP) 0.5 mg/kg to 5 mg/kg	In – house method : LBLC-17013 based on ISO 18857-2: 2009
		Alkylphenol Ethoxylates (APEOs) : - Nonylphenol ethoxylates (NPEO) - Octhylphenol ethoxylates (OPEO) 0.1 mg/kg to 2 mg/kg	In – house method : LBLC-17013 based on ISO 18857-2: 2009

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Phthalates : - Bis-propyl phthalate (DPrP) - Bis-n-heptyl phthalate (DHpP/DnHpP) - Bis-phenylphthalate(DIPHENYL/ DPhP) - Bis-benzyl phthalate (DBzP) - Bis-nonyl phthalate (DNP) - Didecyl Phthalate (DDP) - Diundecyl phthalate(DUDP) 0.05 mg/kg to 1.5 mg/kg - Diisononyl Phthalate (DINP) - Diisodecyl Phthalate (DIDP) - Dihexyl Phthalate (DHP) - Bis-iso-octyl phthalate (DIOP) - Diisoheptyl phthalate (DIHP/DIHpP) 0.20 mg/kg to 6.0 mg/kg	In – house method : LBGC-21021 based on ISO 18856: 2004

Reference No. : 0303/17005

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Phthalates : - Dimethyl phthalate (DMP) - Bis-iso-butyl ester Phthalate (DIBP) - Di-butyl Phthalate (DBP) - Benzyl Butyl Phthalate (BBP) - Di-2-Ethyl Hexyl Phthalate (DEHP) - Di-n-octyl Phthalate (DNOP) - Bis-ethyl phthalate (DEP) - Bis-methylglycol ester Phthalate (DMEP) - Bis-iso-pentyl ester Phthalate (DiPP) - n-Pentyl-iso-Pentyl phthalate (iPnPP) - Bis-n-pentyl ester Phthalate (DnPP) - Di-n-hexyl Phthalate (DnHP/DnHxP) - Bis-cyclohexyl phthalate (DCHP) - Bis-(2-Propylheptyl) phthalate (DPHP) 0.05 mg/kg to 1.5 mg/kg	In – house method : LBGC-21021 based on ISO 18856: 2004

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
6 (cont.)	Chemical fertilizer	- Total phosphorus (Calculated P_2O_5) 2.00 g/100 g to 61.68 g/100 g	In - house method : SOP LBAG-00106 based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.09.01
		- Calcium oxide (Calculated from total calcium) 0.02 g/100 g to 51.8 g/100 g	In - house method : SOP LBCH-16010 based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.13.01
		- Magnesium oxide (Calculated from total magnesium) 0.02 g/100 g to 81.04 g/100 g	In - house method : SOP LBCH-16010 based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.14.01

Reference No. : 0303/17005

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
5 (cont.)	Sludge Waste	Volatile Organic compound (Cresol) : - o-cresol - m-cresol - p-cresol 0.25 mg/kg to 1.5 mg/kg	In - house method : LBGC–21022 based on United States Environmental Protection Agency, 2017, EPA Method 8260D
6	Chemical fertilizer	- Water soluble potassium (Calculated as K_2O) 1.0 g/100 g to 60.4 g/100 g	In - house method : SOP LBCH-99246 based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.12.02
		- Total Nitrogen 1.0 g/100 g to 46.5 g/100 g	In - house method : SOP LBAG-12276 based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.05.01

แบบ กมช./สมอ.๒
Form NSC/TISI 2

ใบรับรองเลขที่ 23-LB0119
(Certificate No.)

ใบรับรองระบบงาน
(Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท เอสจีเอส (ประเทศไทย) จำกัด ห้องปฏิบัติการทดสอบสิ่งแวดล้อม (สาขาระยอง)
(SGS (Thailand) Limited, Environmental Laboratory (Rayong Branch))

ตั้งอยู่เลขที่
(Address)

๑/๒๐๙ และ ๑/๒๑๑ หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง
1/209 and 1/211 Moo 1, Ban Chang, Ban Chang, Rayong

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๑๗๐๒๕ - ๒๕๖๑
(Standard No. TIS 17025-2561 (2018) (ISO/IEC 17025: 2017))

ข้อกำหนดทั่วไปว่าด้วยความสามารถของ ห้องปฏิบัติการทดสอบและห้องปฏิบัติการสอบเทียบ
General requirements for the competence of testing and calibration laboratories

หมายเลขการรับรองที่ ทดสอบ ๐๔๗๐
(Accreditation No. Testing 0470)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้ใบรับรอง แสดงไว้ใน QR CODE และ www.tisi.go.th
(Details of the scheme and scope of the certificate are shown in QR CODE and www.tisi.go.th)

ออกให้ ณ วันที่ ๒๐ กุมภาพันธ์ พ.ศ. ๒๕๖๖
(Issue date : 20 February B.E. 2566 (2023))

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กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)

Reference No. : 0303/17005

Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 10, 10/1-4 and 12 Soi Rama III S.59,
Chong Nonsi, Yan Nawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test item / Range of Testing	Test Method / Technique Used
6 (cont.)	Chemical fertilizer	- Total sulfur 0.02 g/100 g to 32.76 g/100 g	In - house method : SOP LBCH-16010 based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.15.01

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Initial Issue Date 22nd June 2007

Issue Number 13

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Higher Education, Science, Research and Innovation

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 23-LB0119
(Certification No. 23-LB0119)

ฉบับที่ 02 (Issue No.) ออกให้ตั้งแต่วันที่ 19 ธันวาคม พ.ศ. 2565 (Valid from) (19 December B.E. 2565 (2022)) ถึงวันที่ 10 พฤศจิกายน พ.ศ. 2570 (Until) (10 November B.E. 2570 (2027))

สถานภาพห้องปฏิบัติการ (Laboratory status) ☑ ถาวร (Permanent) ☐ นอกสถานที่ (Site) ☐ ชั่วคราว (Temporary) ☐ เคลื่อนที่ (Mobile) ☐ หลายสถานที่ (Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (Environmental field) น้ำและน้ำเสีย (ต่อ) (Water and wastewater) ((Cont.))	- Biochemical oxygen demand (BOD) 2 mg/L to 5 000 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 5210 B and part 4500-O G
	- Chemical oxygen demand (COD) 40 mg/L to 10 000 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 5220 C
	- Chloride (Cl^-) 1 mg/L to 10 000 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 4500-Cl^- D
	- Chromium hexavalent (Cr(VI)) 0.01 mg/L to 2.00 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 3500-Cr B
	- Oil and grease 2 mg/L to 100 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 5520 B
	- pH 2.0 to 10.0	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 4500-H^+ B
	- Phenol 0.01 mg/L to 1.00 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 5530 D

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 23-LB0119
(Certification No. 23-LB0119)

ชื่อห้องปฏิบัติการ (Laboratory Name) บริษัท เอสจีเอส (ประเทศไทย) จำกัด ห้องปฏิบัติการทดสอบสิ่งแวดล้อม (สาขาระยอง) (SGS (Thailand) Limited, Environmental Laboratory (Rayong Branch))

หมายเลขการรับรองที่ (Accreditation No.) ทดสอบ 0470 (Testing 0470)

ฉบับที่ 02 (Issue No.) ออกให้ตั้งแต่วันที่ 19 ธันวาคม พ.ศ. 2565 (Valid from) (19 December B.E. 2565 (2022)) ถึงวันที่ 10 พฤศจิกายน พ.ศ. 2570 (Until) (10 November B.E. 2570 (2027))

สถานภาพห้องปฏิบัติการ (Laboratory status) ☑ ถาวร (Permanent) ☐ นอกสถานที่ (Site) ☐ ชั่วคราว (Temporary) ☐ เคลื่อนที่ (Mobile) ☐ หลายสถานที่ (Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (Environmental field) น้ำและน้ำเสีย (water and wastewater)	- Arsenic (As) 0.01 mg/L to 0.50 mg/L - Barium (Ba) 0.01 mg/L to 10 mg/L - Cadmium (Cd) 0.002 mg/L to 10 mg/L - Chromium (Cr) 0.01 mg/L to 10 mg/L - Copper (Cu) 0.01 mg/L to 10 mg/L - Iron (Fe) 0.02 mg/L to 10 mg/L - Lead (Pb) 0.01 mg/L to 10 mg/L - Manganese (Mn) 0.01 mg/L to 5 mg/L - Nickel (Ni) 0.004 mg/L to 10 mg/L - Selenium (Se) 0.01 mg/L to 0.50 mg/L - Silver (Ag) 0.01 mg/L to 10 mg/L - Zinc (Zn) 0.02 mg/L to 10 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 3120 B and part 3

แบบ กมช./สมอ.๒
Form NSC/TISI 2

ใบรับรองเลขที่ 22-IB0007
(Certificate No.)

ใบรับรองระบบงาน
(Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Incustrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท เอสจีเอส (ประเทศไทย) จำกัด
SGS (Thailand) Limited

ตั้งอยู่เลขที่
(Address)

๑๐๐ ถนนนางลิ้นจี่ แขวงช่องนนทรี เขตยานนาวา กรุงเทพมหานคร
(100 Nanglinchee Road, Chongnonsee, Yannawa, Bangkok)

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๑๗๐๒๐ - ๒๕๕๖
(Standard No. ISO/EC 17020 : 2012)

การตรวจสอบและรับรอง-ข้อกำหนดสำหรับหน่วยตรวจ
(Conformity assessment — Requirements for the operation of various types of bodies performing inspection)

หมายเลขการรับรองที่ หน่วยตรวจ ๐๐๓๔
(Accreditation No. INSPCETION 0034)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้ใบรับรอง แสดงไว้ใน QR CODE และ www.tisi.go.th
(Details of the scope of the certificate are shown in QR CODE and www.tisi.go.th)

ออกให้ ณ วันที่ ๓๑ มกราคม พ.ศ. ๒๕๖๕

[redacted]

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 23-LB0119
(Certification No. 23-LB0119)

ฉบับที่ 02 (Issue No.) ออกให้ตั้งแต่วันที่ 19 ธันวาคม พ.ศ. 2565 (Valid from) (19 December B.E. 2565 (2022)) ถึงวันที่ 10 พฤศจิกายน พ.ศ. 2570 (Until) (10 November B.E. 2570 (2027))

สถานภาพห้องปฏิบัติการ (Laboratory status) ☑ ถาวร (Permanent) ☐ นอกสถานที่ (Site) ☐ ชั่วคราว (Temporary) ☐ เคลื่อนที่ (Mobile) ☐ หลายสถานที่ (Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (Environmental field)		
น้ำและน้ำเสีย (ต่อ) (Water and wastewater) ((Cont.))	- Sulfate (SO_4^{2-}) 1 mg/L to 40 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 4500-SO_4^{2-} E
	- Total hardness 1 mg/L to 1 000 mg/L (expressed as $CaCO_3$)	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 2340 C
	- Total solids (TS) 2.5 mg/L to 10 000 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 2540 B
	- Total dissolved solids (TDS) 2.5 mg/L to 20 000 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 2540 C - ENWA-10243 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 2540 C (dried at 103 - 105 °C)
	- Total suspended solids (TSS) 2.5 mg/l to 10 000 mg/l	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, part 2540 D

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
4. เครื่องจักรกล : ถังก๊าซปิโตรเลียมเหลว (เฉพาะสำนักงานใหญ่)	การตรวจกระบวนการผลิตและการควบคุมคุณภาพ ในรายการต่อไปนี้ – การตรวจชิ้นส่วนประกอบการผลิตถัง – การตรวจระหว่างการประกอบ – การทำกระบวนการทางความร้อน – การทดสอบทั้งทางกล การรั่ว การขยายตัวและการระเบิด และการตรวจสอบปริมาตร – การตรวจสอบก่อนการส่งมอบ	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-071 – ข้อกำหนดของลูกค้า
5. สินค้าเกษตร : ข้าวหอมมะลิไทย (เฉพาะสำนักงานใหญ่และสำนักงานนครราชสีมา)	การตรวจในขั้นตรวจปล่อย ในรายการต่อไปนี้ – ปริมาณ – คุณภาพทางกายภาพและลักษณะทั่วไป ดังต่อไปนี้ • ประเภท ชนิด • ความบริสุทธิ์ • ความชื้น • ขนาดของเมล็ดข้าว • ส่วนผสม (ข้าวเต็มเมล็ด ข้าวหัก ต้นข้าว) • ข้าวและสิ่งที่อาจมีปนได้ (เมล็ดเสีย เมล็ดเหลือง เมล็ดท้องไข่ เมล็ดแดง ฯลฯ) • ไม่มีแมลงที่ยังมีชีวิต • ระดับการขัดสี ไม่ครอบคลุมการตรวจความบริสุทธิ์ด้วยวิธีวิเคราะห์ในห้องปฏิบัติการในรายการปริมาณอมิโลส (Amylose content) และค่าการสลายเมล็ดข้าวในด่าง (Alkali spreading value)	– ประกาศกระทรวงพาณิชย์ เรื่อง หลักเกณฑ์และวิธีการการจัดให้มีการตรวจสอบมาตรฐานสินค้าและการตรวจสอบมาตรฐานสินค้าข้าวหอมมะลิไทย – ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-AGR-IN-004 และ PR-TH-NR-AGR-IN-005 – ข้อกำหนดของลูกค้า

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
ที่ตั้งสถานประกอบการของหน่วยตรวจและข้อมูลติดต่อ

ที่ตั้งสำนักงานใหญ่
เลขที่ 100 ถนนนางลิ้นจี่ แขวงช่องนนทรี เขตยานนาวา กรุงเทพมหานคร

ที่ตั้งสำนักงานสาขา (กรณีแตกต่างจากที่ตั้งสำนักงานใหญ่)
1) **สำนักงานศรีราชา**
เลขที่ 144-146 ถนนศรีราชานคร 1 ตำบลศรีราชา อำเภอศรีราชา จังหวัดชลบุรี
2) **สำนักงานนครราชสีมา**
เลขที่ 1340/46 ถนนสุรนารายณ์ ตำบลในเมือง อำเภอเมือง จังหวัดนครราชสีมา
3) **สาขาหาดใหญ่**
เลขที่ 57, 59, 61 ซอย 10 ถนนเพชรเกษม ตำบลหาดใหญ่ อำเภอหาดใหญ่ จังหวัดสงขลา

หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
1. เครื่องแต่งกาย : เสื้อผ้าสำเร็จรูป (เฉพาะสำนักงานใหญ่)	การตรวจสายการผลิตและการตรวจก่อนการส่งมอบ ในรายการต่อไปนี้ – ลักษณะทั่วไป – รูปแบบและขนาด – ปริมาณและการบรรจุ (เฉพาะการตรวจก่อนการส่งมอบ)	– วิธีปฏิบัติงานของบริษัทหมายเลข P-INSP-WI-SL-001 – ข้อกำหนดของลูกค้า
2. ผลิตภัณฑ์อาหาร : การตรวจผลิตภัณฑ์อาหาร (เฉพาะสำนักงานใหญ่และสาขาหาดใหญ่)	การตรวจระหว่างการผลิตและการตรวจก่อนการส่งมอบ สำหรับกลุ่มผลิตภัณฑ์อาหารแช่แข็งและกลุ่มผลิตภัณฑ์อาหารกระป๋อง	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข P-CORP-I-09 – ข้อกำหนดของลูกค้า
3. ยานยนต์ : รถยนต์ (เฉพาะสำนักงานใหญ่)	การตรวจสภาพทั่วไปก่อนการส่งมอบ ในรายการต่อไปนี้ – จำนวน – สภาพความสมบูรณ์ภายนอกของรถยนต์ เช่น สภาพของกระจก สภาพทั่วไปของตัวถัง สภาพยางและล้อ ความสะอาด และอื่น ๆ ที่อยู่ภายนอก	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-OGC-IN-001 และ PR-TH-NR-OGC-IN-002 – เอกสาร New Vehicle Receiving and Inspection Procedures Issued May 1, 1989 ของ Federal Chamber of Automotive Industries

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
9. สิ่งแวดล้อม (เฉพาะสำนักงานใหญ่)	การตรวจคุณภาพสิ่งแวดล้อมภายในอาคาร ในรายการต่อไปนี้ – ระดับเสียง – ความร้อนสะสม – ปริมาณ CO, CO_2, PM-10, Ozone, Total VOCs – อุณหภูมิ – ความชื้นสัมพันธ์ – ความเร็วลม – ระดับความเข้มแสง	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-035, PR-TH-I&E-IN-036, PR-TH-I&E-IN-038, PR-TH-I&E-IN-050, PR-TH-I&E-IN-051, PR-TH-I&E-IN-052, PR-TH-I&E-IN-054 และ PR-TH-I&E-IN-055 – ข้อกำหนดของลูกค้า – กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง
	การตรวจคุณภาพสิ่งแวดล้อมภายนอกอาคาร ในรายการต่อไปนี้ – ระบบการตรวจสอบคุณภาพอากาศจากปล่องแบบอัตโนมัติอย่างต่อเนื่อง (Continuous Emission Monitoring Systems : CEMs) ด้วยเครื่องมือหรือเครื่องอุปกรณ์พิเศษ (ปริมาณ CO, SO_2, NO_2, O_2, CO_2, NO และ NO_x)	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-015 และ PR-TH-I&E-IN-032 – ข้อกำหนดของลูกค้า – กฎหมาย กฎและระเบียบต่างๆ ที่เกี่ยวข้อง
	การตรวจคุณภาพน้ำ ในรายการ – การเก็บตัวอย่างน้ำ – ลักษณะทางกายภาพ (สี สีตะกอน) – ความเป็นกรด-ด่าง – อุณหภูมิ – ปริมาณออกซิเจนที่ละลายน้ำ (Dissolved Oxygen : DO) – ค่าการนำไฟฟ้า – ค่าความเค็ม – ค่าความขุ่น ทั้งนี้ไม่รวมผลวิเคราะห์ในห้องปฏิบัติการ	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-I&E-IN-043 – ข้อกำหนดของลูกค้า – กฎหมาย กฎและระเบียบต่าง ๆ ที่เกี่ยวข้อง

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
6. สินค้าเกษตร : น้ำตาลทรายขาวและน้ำตาลทรายดิบ (เฉพาะสำนักงานใหญ่ และสำนักงานนครราชสีมา)	การตรวจลักษณะทั่วไปและปริมาณ ทั้งนี้ไม่รวมผลวิเคราะห์ในห้องปฏิบัติการ	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-AGR-IN-002 และ PR-TH-NR-AGR-IN-003 – ข้อกำหนดของลูกค้า
7. สินค้าเทกอง : ถ่านหิน ซีเมนต์ ยิปซัม ปูนเม็ด หินปูน และหินตะกอน (เฉพาะสำนักงานใหญ่ สำนักงานศรีราชา และสาขาหาดใหญ่)	การตรวจสภาพทั่วไปและการสุ่มตัวอย่าง	– ขั้นตอนการดำเนินงานของบริษัท หมายเลข PR-TH-NR-MIN-IN-001 และ PR-TH-NR-MIN-IN-002
8. การตรวจโรงงานเพื่อการรับรองคุณภาพผลิตภัณฑ์ (เฉพาะสำนักงานใหญ่)	การตรวจกระบวนการผลิต ระบบคุณภาพ และการตรวจประเมินผลิตภัณฑ์ สำหรับกลุ่มผลิตภัณฑ์ ดังต่อไปนี้ – วัสดุก่อสร้าง คอนกรีต สุขภัณฑ์ เซรามิก และเครื่องเรือน – บริภัณฑ์ส่องสว่าง – ไฟฟ้ากำลัง – เครื่องใช้ไฟฟ้า – เครื่องใช้อิเล็กทรอนิกส์ – โภคภัณฑ์ และของเล่น – ยาง เคมี สิ่งทอ ปิโตรเลียม และอาหาร – ยานยนต์ ชิ้นส่วนยานยนต์ และเครื่องกล	– หลักเกณฑ์การตรวจสอบเพื่อการอนุญาตของสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม – หลักเกณฑ์เฉพาะในการตรวจสอบเพื่อการอนุญาตผลิตภัณฑ์ที่เกี่ยวข้อง และมาตรฐานผลิตภัณฑ์อุตสาหกรรมที่เกี่ยวข้อง – เอกสารขั้นตอนการดำเนินงานของบริษัทหมายเลข THLPP.01

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007

Name of Inspection Body : SGS (Thailand) Limited

Addresses and contact details

Head office or primary location
100 Nanglinchee Road, Chongnonsee, Yannawa, Bangkok

Additional Locations (If different from Head Office)

1) **Sriracha Office**
144, 146 Sriracha Nakhon 1 Road, Sriracha, Sriracha, Chonburi

2) **Nakhon Ratchasima Office**
1340/46 Suranarai Road, Nai-Muang, Muang, Nakhonratchasima

3) **Hat Yai Branch**
57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai, Songkhla

Accreditation No. : INSPECTION 0034

Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
1. Apparel : Readymade Garment (Head office)	In-line process and Pre-shipment inspection of readymade garment with the items as follows : – General appearance – Style, Size and Weight of unit – Quantity and Packing (Pre-shipment inspection)	– Work instruction of SGS (Thailand) Limited : P-INSP-WI-SL-001 – Customer's requirements
2. Food Products : Food Inspection (Head Office and Hat Yai Branch)	During process inspection and Pre-shipment inspection of food products covering frozen food products and canned food products	– Operating procedure of SGS (Thailand) Limited : P-CORP-I-09 – Customer's requirements
3. Motor Vehicle : Automotive (Head Office)	Pre-shipment inspection of general condition of vehicle with the items as follows : – Quantity – Visual inspection of external condition e.g. glass, body, tires, wheels, cleanliness etc.	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-OGC-IN-001 and PR-TH-NR-OGC-IN-002 – New Vehicle Receiving and Inspection Procedures Issued May 1, 1989 of Federal Chamber of Automotive Industries

Date of Initial Issue: 11 September B.E. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

รายละเอียดแนบท้ายใบรับรองระบบงานหน่วยตรวจ
ใบรับรองเลขที่ 22-IB0007

ชื่อหน่วยตรวจ : บริษัท เอสจีเอส (ประเทศไทย) จำกัด
หมายเลขการรับรอง : หน่วยตรวจ 0034
ประเภทของหน่วยตรวจ : ประเภท A

หมวดหมู่ / สาขาการตรวจ	ขั้นตอนและช่วงการตรวจ	ข้อกำหนดที่ใช้
10. สินค้าเกษตร : ข้าวสาลีและกากถั่วเหลือง* (เฉพาะสำนักงานใหญ่และสำนักงานศรีราชา)	การตรวจสอบสภาพทั่วไป การสุ่มตัวอย่าง และการสังเกตการณ์การชั่งน้ำหนัก	– GAFTA Weighing Rules No. 123 – GAFTA Sampling Rules No.124 – วิธีปฏิบัติงานของบริษัทหมายเลข PR-TH-NR-AGR-IN-006 – ข้อกำหนดของลูกค้า

หมายเหตุ : * สาขาและขอบข่ายที่ได้รับการรับรองระบบงานเพิ่มเติม วันที่ 8 ธันวาคม 2564

ตั้งแต่ วันที่ 8 ธันวาคม พ.ศ. 2564
ถึง วันที่ 10 กันยายน พ.ศ. 2569
ออกให้ ณ วันที่ 31 มกราคม พ.ศ. 2565

ออกให้ครั้งแรกเมื่อวันที่ 11 กันยายน พ.ศ. 2561
กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
6. Agricultural Products : White sugar and raw sugar (Head Office and Nakhon Ratchasima Office)	General appearance and quantity inspection Excluding analysis by laboratory testing	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-002 and PR-TH-NR-AGR-IN-003 – Customer's requirements
7. Bulk Solids : Coal, cement, gypsum, clinker, limestone and sedimentary rock (Head Office, Sriracha Office and Hat Yai Branch)	General appearance inspection and sampling	– Operating procedure of SGS (Thailand) Limited : PR-TH-NR-MIN-IN-001 and PR-TH-NR-MIN-IN-002
8. Manufacturing inspection for product certification (Head Office)	Production process and quality control system inspection including the evaluation of the following group of products : – Construction materials, concretes, sanitary wares, ceramics, and furniture – Electrical lighting and similar equipment – Electrical power devices – Electrical appliances – Electronic apparatus, parts, and components – Consumer goods and toys – Rubbers, chemicals, textiles, petroleum, and food products – Automotive products, parts, and mechanical products	– Criteria for product certification of Thai Industrial Standards Institute – Criteria for the relevant particular requirements and Thai Industrial Standards for product certification – Operating procedure of SGS (Thailand) Limited : THLPP.01

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
4. Machinery : LPG Cylinder (Head Office)	Production process and quality control inspection with the items as follows : – Component parts – During assembly – Heat treatment – Mechanical, Hydraulic pressure leak, Volumetric expansion, Burst test and Capacity check – Pre-delivery inspection	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-071 – Customer's requirements
5. Agricultural Products : Thai Hom Mali Rice (Head Office and Nakhon Ratchasima Office)	Pre-shipment inspection with the items as follows : – Quantity – Physical quality and general feature as follows : • Type, Grade • Purity • Moisture • Kernel size • Composition (whole kernel, broken, head rice) • Rice and matters that may be present (damaged kernel, yellow kernel, chalky kernel, red kernel, etc.) • No live insects • Milling degree Not covering the purity check by laboratory analysis for determination of Amylose content and Alkali spreading value	– Notification of Ministry of Commerce on Criteria and procedures of organizing the inspection of commodity standards and the inspection of the standards of Thai Hom Mali Rice – Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-004 and PR-TH-NR-AGR-IN-005 – Customer's requirements

Date of Initial Issue: 11 September B.E. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
10. Agricultural Products : Wheat and soybean meal* (Head Office and Sriracha Office	General appearance inspection, Sampling, and weighing observation	– GAFTA Weighing Rules No. 123 – GAFTA Sampling Rules No.124 – Operating procedure of SGS (Thailand) Limited : PR-TH-NR-AGR-IN-006 – Customer's requirement

Note: * Extent scope: 8 December B.E. 2564 (2021)

Valid from : 8 December B.E. 2564 (2021)
Until : 10 September B.E. 2569 (2026)
Issue Date : 31 January B.E. 2565 (2022)

Date of Initial Issue: 11 September B.E. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

Scope of Accreditation for Inspection Body
Certificate No. 22-IB0007

Name of Inspection Body : SGS (Thailand) Limited
Accreditation No. : INSPECTION 0034
Type of Inspection Body : Type A

Category / Field of Inspection	Stage and Range of Inspection	Inspection Requirements or Criteria
9. Environmental (Head Office)	Indoor Environment Inspection with the items as follows : – Sound level – Heat stress – CO, CO_2, PM-10, Ozone, Total VOCs – Temperature – Relative humidity – Air velocity – Light intensity	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-035, PR-TH-I&E-IN-036, PR-TH-I&E-IN-038, PR-TH-I&E-IN-050, PR-TH-I&E-IN-051, PR-TH-I&E-IN-052, PR-TH-I&E-IN-054, and PR-TH-I&E-IN-055 – Customer's requirement – Related laws and regulations
	Outdoor Environment Inspection, the items as follows : – Continuous Emission Monitoring System : CEMS (CO, SO_2, NO_2, O_2, CO_2, NO, and NO_x)	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-015 and PR-TH-I&E-IN-032 – Customer's requirement – Related laws and regulations
	Water Inspection, the items as follows : – Water sampling – Physical appearance (Color, Suspended Solids) – pH – Temperature – Dissolved Oxygen : DO – Conductivity – Salinity – Turbidity Excludes laboratory analysis result	– Operating procedure of SGS (Thailand) Limited : PR-TH-I&E-IN-043 – Customer's requirement – Related laws and regulations

Date of Initial Issue: 11 September B.E. 2561 (2018)
Ministry of Industry Thailand, Thai Industrial Standards Institute

Certificate No. QMS26004/1916

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

SGS (Thailand) Limited

Premise(s)	Activities in the scope
SGS (Thailand) Limited Head Office Certificate No.: QMS26004/1916/M01 238 TRR Tower, 19th-21st Floor Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa District, Bangkok 10120, Thailand	Management of QMS, Inspection, and Fumigation Service
SGS (Thailand) Limited Rayong Branch Certificate No.: QMS26004/1916/M02 1/209 and 1/211 Moo 1, Ban Chang, Ban Chang District, Rayong 21130, Thailand	Inspection and Testing Service
SGS (Thailand) Limited Sriracha Branch Certificate No.: QMS26004/1916/M03 165/61-62 Moo 10, Surasak, Sriracha District, Chonburi 20110, Thailand	Inspection and Fumigation Service
SGS (Thailand) Limited Nakornratchasima Branch Certificate No.: QMS26004/1916/M04 949/32 Moo 1, Ban Koh, Muang Nakornratchasima District, Nakornratchasima 30000, Thailand	Inspection and Fumigation Service

By

Management System Certification Institute (Thailand),

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.

Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

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Certificate No. QMS26004/1916

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited

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

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

As detailed in the accompanying schedule of scope

This is multi-site certification. Certified sites are listed on the subsequent page.

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.

Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Certificate No. QMS26004/1916

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

SGS (Thailand) Limited

Premise(s)	Activities in the scope
SGS (Thailand) Limited Surat Thani Branch Certificate No.: QMS26004/1916/M08 55/57-58 Moo 1, Kanjanavithi Road, Bangkoong, Muang District, Suratthani 84000, Thailand	Inspection and Fumigation Service
SGS (Thailand) Limited SGS (Cambodia) Limited Certificate No.: QMS26004/1916/M09 1076 A-F, Street No. 371, Phum Trea II, Sangkat Steung Meanchey, Khan Meanchey, Phnom Penh, Kingdom of Cambodia	Inspection Service

By

Management System Certification Institute (Thailand),

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

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Previous cycle expire date 24 July 2026

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Certificate No. QMS26004/1916

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

SGS (Thailand) Limited

Premise(s)	Activities in the scope
SGS (Thailand) Limited Hat Yai Branch Certificate No.: QMS26004/1916/M05 57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai District, Songkhla 90110, Thailand	Inspection and Testing Service
SGS (Thailand) Limited Rama III Branch – Laboratory Services Certificate No.: QMS26004/1916/M06 10, 10/1-4, 12 Soi Rama III, Soi 59 Rama III Road, Chongmonsee, Yannawa District, Bangkok 10120, Thailand	Testing and Calibration Service
SGS (Thailand) Limited Rama III Branch - Soft Line & Hard goods Laboratory Services Certificate No.: QMS26004/1916/M07 1025/1 Soi Rama III, Soi 61, Rama III Road, Chongmonsee, Yannawa District, Bangkok 10120, Thailand	Testing Service

By

Management System Certification Institute (Thailand),

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

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Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

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MASCI

Certificate No. QMS26004/1916/M02

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Rayong Branch

Address of premises : 1/209 and 1/211 Moo 1, Ban Chang, Ban Chang District, Rayong 21130, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Inspection and Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.

Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M01

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Head Office

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

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Management of QMS, Inspection, and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

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Previous cycle expire date 24 July 2026

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M04

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Nakomratchasima Branch

Address of premises : 949/32 Moo 1, Ban Koh, Muang Nakomratchasima District, Nakomratchasima 30000, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Inspection and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M03

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Sriracha Branch

Address of premises : 165/61-62 Moo 10, Surasak, Sriracha District, Chonburi 20110, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Inspection and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M06

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Rama III Branch – Laboratory Services

Address of premises : 10, 10/1-4, 12 Soi Rama III, Soi 59 Rama III Road, Chongnonsee, Yannawa District, Bangkok 10120, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Testing and Calibration Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.

Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M05

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Hat Yai Branch

Address of premises : 57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai District, Songkhla 90110, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Inspection and Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M08

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Surat Thani Branch

Address of premises : 55/57-58 Moo 1, Kanjanavithi Road, Bangkoong, Muang District, Suratthani 84000, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Inspection and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.
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Previous cycle expire date 24 July 2026

First issue date 4 March 2026

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MASCI

Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. QMS26004/1916/M07

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Rama III Branch - Soft Line & Hard goods Laboratory Services

Address of premises : 1025/1 Soi Rama III, Soi 61, Rama III Road, Chongnonsee, Yannawa District, Bangkok 10120, Thailand

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 24 July 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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MASCI

Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. OHSMS26002/261

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited

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

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

As detailed in the accompanying schedule of scope

This is multi-site certification. Certified sites are listed on the subsequent page.

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand) Foundation for Industrial Development

Certificate No. QMS26004/1916/M09

certification

ISO 9001

QUALITY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited SGS (Cambodia) Limited

Address of premises : 1076 A-F, Street No. 371, Phum Trea II, Sangkat Steung Meanchey, Khan Meanchey, Phnom Penh, Kingdom of Cambodia

has been assessed and found to be conforming to the requirements of Quality management systems.

TIS 9001-2559 (ISO 9001:2015)

For scope of:

Inspection Service

The validity of this certificate depends on the validity and the certified scope of main certificate: QMS26004/1916

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 25 July 2026

Current certification cycle 25 July 2026 to 24 July 2029

which remains valid, subject to satisfactory surveillance audits.
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President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand) Foundation for Industrial Development

Certificate No. OHSMS26002/261

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

SGS (Thailand) Limited

Premise(s)	Activities in the scope
SGS (Thailand) Limited Hat Yai Branch Certificate No.: OHSMS26002/261/M05 57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai District, Songkhla 90110, Thailand	Inspection and Testing Service
SGS (Thailand) Limited Rama III Branch – Laboratory Services Certificate No.: OHSMS26002/261/M06 10, 10/1-4, 12 Soi Rama III, Soi 59 Rama III Road, Chongnonsee, Yannawa District, Bangkok 10120, Thailand	Testing and Calibration Service
SGS (Thailand) Limited Rama III Branch - Soft Line & Hard goods Laboratory Services Certificate No.: OHSMS26002/261/M07 1025/1 Soi Rama III, Soi 61, Rama III Road, Chongnonsee, Yannawa District, Bangkok 10120, Thailand	Testing Service

By

Management System Certification Institute (Thailand),

Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.

Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

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MASCI

Certificate No. OHSMS26002/261

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

SGS (Thailand) Limited

Premise(s)	Activities in the scope
SGS (Thailand) Limited Head Office Certificate No.: OHSMS26002/261/M01 238 TRR Tower, 19th-21st Floor Naradhiwas Rajanagarindra Road, Chong Nonsi, Yannawa District, Bangkok 10120, Thailand	Management of OHS, Inspection, and Fumigation Service
SGS (Thailand) Limited Rayong Branch Certificate No.: OHSMS26002/261/M02 1/209 and 1/211 Moo 1, Ban Chang, Ban Chang District, Rayong 21130, Thailand	Inspection and Testing Service
SGS (Thailand) Limited Sriracha Branch Certificate No.: OHSMS26002/261/M03 165/61-62 Moo 10, Surasak, Sriracha District, Chonburi 20110, Thailand	Inspection and Fumigation Service
SGS (Thailand) Limited Nakornratchasima Branch Certificate No.: OHSMS26002/261/M04 949/32 Moo 1, Ban Koh, Muang Nakornratchasima District, Nakornratchasima 30000, Thailand	Inspection and Fumigation Service

By

Management System Certification Institute (Thailand),

Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.

Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

First issue date 4 March 2026

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FP-005-02 Rev. 10 01/09/65 e/n CR2605-0022 2026-07-13 07:38:14

MASCI

Certificate No. OHSMS26002/261/M01

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Head Office

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

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Management of OHS, Inspection, and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

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Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. OHSMS26002/261

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

SGS (Thailand) Limited

Premise(s)	Activities in the scope
SGS (Thailand) Limited Eastern Seaboard Branch Certificate No.: OHSMS26002/261/M08 300/109 Moo 1, Ta Sit, Pluak Daeng District, Rayong 21140, Thailand	Testing Service
SGS (Thailand) Limited Amata City Chonburi Branch Certificate No.: OHSMS26002/261/M09 700/693 Moo7, Don Hua Roh, Muang Chonburi District, Chonburi 20000, Thailand	Testing Service
SGS (Thailand) Limited Surat Thani Branch Certificate No.: OHSMS26002/261/M10 55/57-58 Moo 1, Kanjanavithi Road, Bangkoong, Muang District, Suratthani 84000, Thailand	Inspection and Fumigation Service

By
Management System Certification Institute (Thailand),
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

First issue date 4 March 2026

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. OHSMS26002/261/M03

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Sriracha Branch

Address of premises : 165/61-62 Moo 10, Surasak, Sriracha District, Chonburi 20110, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Inspection and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Certificate No. OHSMS26002/261/M02

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Rayong Branch

Address of premises : 1/209 and 1/211 Moo 1, Ban Chang, Ban Chang District, Rayong 21130, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Inspection and Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
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Previous cycle expire date 6 September 2026

First issue date 4 March 2026

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Certificate No. OHSMS26002/261/M05

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Hat Yai Branch

Address of premises : 57, 59 and 61 Soi 10, Phetkasem Road, Hat Yai, Hat Yai District, Songkhla 90110, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Inspection and Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

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Previous cycle expire date 6 September 2026

First issue date 4 March 2026

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Certificate No. OHSMS26002/261/M04

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Nakomratchasima Branch

Address of premises : 949/32 Moo 1, Ban Koh, Muang Nakomratchasima District, Nakomratchasima 30000, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Inspection and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
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Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Certificate No. OHSMS26002/261/M07

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Rama III Branch - Soft Line & Hard goods Laboratory Services

Address of premises : 1025/1 Soi Rama III, Soi 61, Rama III Road, Chongnonsee, Yannawa District, Bangkok 10120, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. OHSMS26002/261/M06

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Rama III Branch – Laboratory Services

Address of premises : 10, 10/1-4, 12 Soi Rama III, Soi 59 Rama III Road, Chongnonsee, Yannawa District, Bangkok 10120, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Testing and Calibration Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.
Recertification audit is due 60 days before the expiry date.

Previous cycle expire date 6 September 2026

First issue date 4 March 2026

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. OHSMS26002/261/M09

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Amata City Chonburi Branch

Address of premises : 700/693 Moo7, Don Hua Roh, Muang Chonburi District, Chonburi 20000, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

which remains valid, subject to satisfactory surveillance audits.

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Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand), Foundation for Industrial Development

Certificate No. OHSMS26002/261/M08

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Eastern Seaboard Branch

Address of premises : 300/109 Moo 1, Ta Sit, Pluak Daeng District, Rayong 21140, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Testing Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By

Management System Certification Institute (Thailand)

Foundation for Industrial Development

Date of issue 7 September 2026

Current certification cycle 7 September 2026 to 6 September 2029

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Previous cycle expire date 6 September 2026

First issue date 4 March 2026

President, Management System Certification Institute (Thailand)

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Management System Certification Institute (Thailand), Foundation for Industrial Development

ใบรับรองเลขที่ EMS20001/506

certification

ISO 14001

ENVIRONMENTAL MANAGEMENT SYSTEM

ใบรับรองระบบการจัดการสิ่งแวดล้อม

ใบรับรองฉบับนี้ให้ไว้เพื่อแสดงว่า

บริษัท เอสจีเอส (ประเทศไทย) จำกัด

สถานประกอบการตั้งอยู่เลขที่ : 1/209, 1/211 หมู่ 1 ซอยสุขุมวิท 2 ถนนสุขุมวิท
ตำบลบ้านฉาง อำเภอบ้านฉาง
จังหวัดระยอง 21130

ได้รับการรับรองระบบการจัดการสิ่งแวดล้อมตามมาตรฐานเลขที่
มอก. 14001-2559 (ISO 14001:2015)

สำหรับขอบข่าย :
ห้องปฏิบัติการทดสอบสิ่งแวดล้อม

โดย
สถาบันรับรองมาตรฐานไอเอสโอ
อุตสาหกรรมพัฒนาบูลมิธ

ออกให้ ณ วันที่ 24 มกราคม 2569
มีผลถึง ณ วันที่ 23 มกราคม 2572
ออกให้ครั้งแรก ณ วันที่ 24 มกราคม 2563

[redacted]

สรอ.

Management System Certification Institute (Thailand), Foundation for Industrial Development

FP-005-02 Rev. 10 09/09/65 ปรับ

Certificate No. OHSMS26002/261/M10

certification

ISO 45001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

This certificate is issued to certify that

SGS (Thailand) Limited Surat Thani Branch

Address of premises : 55/57-58 Moo 1, Kanjanavithi Road, Bangkoong, Muang District, Suratthani 84000, Thailand

has been assessed and found to be conforming to the requirements of Occupational health and safety management systems.

TIS 45001-2561 (ISO 45001:2018)

For scope of:

Inspection and Fumigation Service

The validity of this certificate depends on the validity and the certified scope of main certificate: OHSMS26002/261

By
Management System Certification Institute (Thailand)
Foundation for Industrial Development

Date of issue 7 September 2026
Current certification cycle 7 September 2026 to 6 September 2029
which remains valid, subject to satisfactory surveillance audits.
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First issue date 4 March 2026

[redacted]

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CR2605-0002 2026-07-13 07:38:14

MASCI

Certificate Number EMS20001/506

certification

ISO 14001

ENVIRONMENTAL MANAGEMENT SYSTEM

Certificate of Approval

This is to certify that

SGS (Thailand) Limited

Address of premises : 1/209, 1/211 Moo 1, Soi Sukhumvit 2, Sukhumvit Road, Ban Chang, Ban Chang District, Rayong 21130, Thailand

has been assessed and found to be conforming to the requirements of TIS 14001-2559 (ISO 14001:2015)

for the scope :

Environmental Laboratory

by
Management System Certification Institute (Thailand),
Foundation for Industrial Development

Date of Issue 24th January 2026

Valid Until 23rd January 2029

First Issued Date 24th January 2020

MASCI

Management System Certification Institute (Thailand), Foundation for Industrial Development

MASCI

When you need to be sure

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Naradhiwas Rajanagarindra Road,
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www.sgs.co.th

SGS