ภาคผนวก จ

เอกสารการสอบเทียบความถูกต้องของเครื่องมือ

ตารางสรุปรายการเอกสารการสอบเทียบความถูกต้องของเครื่องมือเก็บตัวอย่าง
และเครื่องมือตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

รายการตรวจวัด	เครื่องมือเก็บตัวอย่าง	เครื่องมือตรวจวิเคราะห์
	ชื่อเครื่องมือ	ชื่อเครื่องมือ
1. คุณภาพน้ำผิวดิน		
pH	-	- pH Meter
Temperature	-	- Thermometer
Turbidity	-	- Turbidity Meter
Conductivity	-	- Conductivity Meter
Total Suspended Solids	-	- Digital Balance
Total Dissolved Solids	-	- Digital Balance
BOD_5	-	- BOD Analyzer
Grease & Oil	-	- Digital Balance
Total Coliform Bacteria	-	- Incubator
Fecal Coliform Bacteria	-	- Incubator
2. คุณภาพอากาศในบรรยากาศ		
Total Suspended Particulate (TSP)	- High Volume Air Sampler No. R01, R10, R15, R07, R03, B27	- Digital Balance
Particulate Matter less than 10 Microns (PM-10)	- High Volume PM_{10} Air Sampler No. R03, R05, R12, R13, R16	- Digital Balance
Carbon Monoxide (CO)	- CO Analyzer No. B01, B02, B03, B11, B13, B14	- CO Analyzer No. B01, B02, B03, B11, B13, B14
Nitrogen Dioxide (NO_2)	- NO_2 Analyzer No. B07, B10, B13, R06, R08, R11	- NO_2 Analyzer No. B07, B10, B13, R06, R08, R11
3. ระดับเสียง		
L_{eq} 24 hr, L_{max}, L_{90}, และ L_{dn}	- Acoustic Calibrator - Sound Level Meter No. ACO-R04, R07, R09, R10, R31, R45	-

คุณภาพน้ำผิวดิน

QUALITY CALIBRATION CO., LTD.
235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

NSC-TISI-TIS17025
CALIBRATION 0049

CERTIFICATE No : 26E3363
REFERENCE No : 80514-1

Certificate of Calibration

EQUIPMENT	:	pH METER
MANUFACTURER	:	HANNA
MODEL	:	HI3512
SERIAL No	:	TH118035
ID No	:	PH 04/56
CONDITION AS RECEIVED	:	USED ITEM
SUBMITTED BY	:	S.P.S. CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD., JOMPOL, CHATUCHAK, BANGKOK 10900
CALIBRATED BY	:	ATSAWIN Y.
CALIBRATION DATE	:	02-Apr-26
APPROVED BY	:	[redacted]
ISSUED DATE	:	02-Apr-26
RECEIVED DATE	:	01-Apr-26

Certificate

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF QUALITY CALIBRATION CO., LTD.

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Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

CERTIFICATE No : 26E3363

Calibration Report

EQUIPMENT	:	pH METER			
MANUFACTURER	:	HANNA	**MODEL**	:	HI3512
ID No	:	PH 04/56	**SERIAL NUMBER**	:	TH118035
RECEIVED DATE	:	01-Apr-26	**CALIBRATION DATE**	:	02-Apr-26
AMBIENT TEMPERATURE	:	23 ° C ± 3 ° C	**RELATIVE HUMIDITY**	:	50 % RH ± 10% RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY DIRECT MEASUREMENT METHOD BASED ON WI-TQ-062 AND WI-TQ-063. THE DISPLAY UNIT WAS TESTED BY GENERATING STANDARD VOLTAGE TO THE UNIT AND READING THE VALUE COMPARED WITH THE CALCULATED VALUE. THE DISPLAY AND ELECTROD WAS CALIBRATED BY USING STANDARD pH BUFFER
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No/ LOT No	CERTIFICATE No	DUE DATE
1) pH STANDARD SOLUTION	00651-36	CC829914	4956-16178366	11-Sep-27
2) pH STANDARD SOLUTION	00651-38	CC831093	4957-16224157	01-Oct-27
3) pH STANDARD SOLUTION	00651-40	CC826321	4958-16046326	10-Jul-27
4) PROCESS CALIBRATOR	CA150	91S6079	26E936	17-Mar-27
5) BATH	260014	1247 48074	25T9431	12-Sep-26
6) THERMOMETER WITH PROBE	421504	55000379	25T9466	12-Sep-26

3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO SI UNIT MAINTAINED AT :-
   - NATIONAL INSTITUTE OF STANDARD AND TECHNOLOGY, USA.
   - NATIONAL INSTUTITE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION : ADJUSTMENT

1. DISPLAY UNIT ONLY

SLOPE FACTOR k = 2.303 RT/F = 59 mV/pH

mV APPLIED	UUC READING (mV)	CORRECTION (mV)	UUC READING (pH)	UNCERTAINTY OF MEASUREMENT (± mV)	COVERAGE FACTOR k
414.11	414.3	-0.19	-0.256	0.15	2.00
354.95	355.1	-0.15	0.759	0.15	2.00
295.80	296.0	-0.20	1.773	0.15	2.00
236.64	236.8	-0.16	2.787	0.15	2.00
177.48	177.7	-0.22	3.801	0.15	2.00
118.32	118.5	-0.18	4.816	0.15	2.00
59.16	59.4	-0.24	5.831	0.15	2.00
0.00	0.2	-0.20	6.845	0.15	2.00
-59.16	-58.9	-0.26	7.878	0.15	2.00
-118.32	-118.1	-0.22	8.915	0.15	2.00
-177.48	-177.2	-0.28	9.952	0.15	2.00
-236.64	-236.4	-0.24	10.990	0.15	2.00
-295.80	-295.5	-0.30	12.027	0.15	2.00
-354.95	-354.7	-0.25	13.064	0.15	2.00
-414.11	-413.8	-0.31	14.101	0.15	2.00

END OF CALIBRATION REPORT PAGE 2 OF 3

[redacted]

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CERTIFICATE No : 26E3363

Calibration Report

RESULT OF CALIBRATION (CONTINUE) :

2. DISPLAY UNIT WITH pH ELECTRODE S/N: 11340D0M

STANDARD pH BUFFER SOLUTION (pH)	UUC READING (pH)	CORRECTION (pH)	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT (± pH)	COVERAGE FACTOR k
4.008	4.008	0.000	4.142	0.012	2.00
6.998	7.000	-0.002	7.068	0.012	2.00
10.007	10.009	-0.002	10.226	0.014	2.00

3. DISPLAY UNIT WITH TEMPERATURE

STANDARD READING (°C)	UUC READING (°C)	CORRECTION (°C)	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT (± °C)	COVERAGE FACTOR k
25.004	25.0	0.004	---	0.0085	2.00

4. PERCENT SLOPE 91%

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 APPROXIMATELY 95%.

END OF CALIBRATION REPORT

Scientific

[redacted]

CAL
Calibratech Co.,Ltd.
7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech_cal@yahoo.com, calibratech_cal@hotmail.com

NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : **69-400023-2**

Submitted by : S. P. S Consulting Service Co., Ltd.
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900

Equipment : Liquid in Glass Thermometer

Manufacturer :	SK	Model :	N/A
Range :	0 °C to 100 °C	Resolution :	1 °C
Serial No. :	N/A	Immersion :	Total
ID No. :	TM21/59		

Environment :

Ambient Temperature :	(23 ± 2)	°C
Relative Humidity :	(50 ± 15)	%
Line Voltage :	(220 ± 22)	VAC

Date of Received : 13 January 2026
Date of Calibration : 16 January 2026
Date of Issue : 16 January 2026
Calibrated by : Chortip Samchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400001	TT-0023-24	16 Feb 2026	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400003	25E1656	22 May 2027	National Institute of Metrology Thailand (NIMT)
400004	25E1656	22 May 2027	National Institute of Metrology Thailand (NIMT)

Approved by : [redacted]
(Permpon Chanpu)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL
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7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech_cal@yahoo.com, calibratech_cal@hotmail.com

Certificate of Calibration

Certificate No. : 69-400023-2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Ice point check : UUC* reading 0 °C Standard reading 0.4773 °C

Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.3922	20	0.4	0.31

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2 , providing a level of confidence of approximately 95%

- oOo -

[redacted]

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

Certificate of Calibration

Equipment :	Turbidity Meter
Manufacturer :	Eutech
Model :	CyberScan WLTB1000
Serial No. :	201802206
ID. No. :	TB 02/50
Condition As-Received:	Used Item
Received Date :	09 February 2026
Calibration Date :	16 February 2026
Reference :	2602-0291WN-1
Submitted by :	S.P.S. Consulting Service Co.,Ltd. 7 Phaholyothin 24, Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900
Ambient Temperature :	(23 ± 3.0) ºC
Relative Humidity :	(50 ± 20) %
Calibration Procedure :	In - house method : CP-CH11 Direct measurement by using Formazin standard solution
Calibrated by :	Walalak Sirithean
Approved by :	_____ Approved Signatory

(✓) Chakrit Waewwanjua
( ) Ponpan Paipim
( ) Saithip Meangmai

Issue Date : 22 February 2026

The Uncertainties are for a confidence probability of approximately 95%

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Condition of this calibration result

1. Reference Standard Instruments :

Instruments	ID No.	Certificate No.	Due date
1) Liquid-in Glass Thermometer	130RC114	25I972	10 Sep 2026

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

2. Certified Reference Materials : Turbidity Standard solution (Formzin)

- The measurement results are traceable to SI through CPA chem Ltd.,

Turbidity Solution	Manufacturer	Lot No.	Exp. date
20.0 NTU	CPA Chem	1135349	16 Aug 2026
40.0 NTU	CPA Chem	1135350	16 Aug 2026
100.0 NTU	CPA Chem	1135352	16 Aug 2026
400 NTU	CPA Chem	1135360	16 Aug 2026

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

Calibration result

Performing three - Formazin suspension standard curve by using 0, 10, 1000 NTU
Tubidity Meter serial number : 201802206

Standard Formazine suspension (NTU)	UUC* Reading (NTU)	Uncertainty of Measurement (± NTU)	Coverage Factor *k*
20.0	19.8	0.20	2.00
40.0	40.5	0.28	2.00
100.0	101	1.2	2.00
400	392	2.3	2.00

Remark **- UUC* = Unit Under Calibration**
- NTU = Nephelometric Turbidity Units

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 %.

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CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com

CLC
Accredited
ISO/IEC 17025

NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	CONDUCTIVITY METER
MANUFACTURER	:	METTLER TOLEDO
MODEL / TYPE	:	SEVEN COMPACT S230
SERIAL NO.	:	C141708983/5821320179[CD 05/65]
CLID. NO.	:	272300452
JOB CONTROL NO.	:	260202014122

CALIBRATION SERVICE : ☑ IN-LABORATORY ☐ ON-SITE

CUSTOMER : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24 ROAD., JOMPOL,
CHATUCHAK, BANGKOK 10900

DATE OF RECEIVED : 02 February 2026 DATE OF ISSUED : 04 February 2026

The report of calibration shall not be reproduced except in full without approval of the calibration Laboratory Co., Ltd.

Calibrated By : Sukgasem Seehanart
Wenick Inchaisri
Calibration Engineer

[redacted]

Approved By : Mongkol Yotsoontorn
Authorized Signatory
04 February 2026

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q26014122

F3-011-05/12-23

@clccalibration

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Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com

CLC Accredited ISO/IEC 17025

NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**CONDUCTIVITY METER**
MANUFACTURER	:	**METTLER TOLEDO**
MODEL / TYPE	:	**SEVEN COMPACT S230**
SERIAL NO.	:	**C141708983/5821320179[CD 05/65]**
DATE OF CALIBRATION	:	**03 February 2026**

ENVIRONMENT CONDITIONS :

Temperature : **(25 ± 2.5) °C** **Relative Humidity :** **(50 ± 15) % RH**

PROCEDURE USED :

This instrument [Conductivity Meter] was calibrated under procedure No. **WI-305-130.**

The calibration was performed by direct measurement with Certified Reference Material (CRM) and Reference Material (RM) .

This instrument [Temperature] was calibrated by comparison with Temperature Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Conductivity Standard , Hanna Product Code HI7033L Lot Number 0101.
2. Potassium Chloride Solution, Sigma-Aldrich Canada Co Product No. 1.01203.0500.
3. Potassium Chloride Solution, Sigma-Aldrich Canada Co Product No. 1.01254.0500.
4. Temperature Bath, Jingmi Model RTS-35S S/N. 16339.
5. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
6. IPRT, ASL Model T100-250-1D S/N. PO106346-1-13.

@clccalibration

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI) , through Hanna instruments.

Certificate No. 07D45, Due Date April 2027.

2. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.

Lot Number. HC56384703, Due Date 31 January 2028.

3. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.

Lot Number. HC33528554, Due Date 30 November 2026.

4. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q25097314, Due Date 29 August 2026.

5. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0177/68, Due Date 10 February 2026.

6. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand).

Certificate No. TT-1008-25, Due Date 04 March 2026.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

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CLC Accredited ISO/IEC 17025
NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

The table in the following gives the calibration results and associated measurement uncertainties

of Conductivity Meter.

CALIBRATION DATA

1. Conductivity Solution Test @ 25°C

Standard Conductivity Solution	DUC Reading	Uncertainty of Measurement	*k* Factor
*84 µS/cm	83.95 µS/cm [Cell Constant 0.470]	± 1.15 µS/cm	2,00
1414 µS/cm	1414 µS/cm [Cell Constant 0.510]	± 21 µS/cm	2,00
12.83 mS/cm	12.83 mS/cm [Cell Constant 0.570]	± 0.19 mS/cm	2,00

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 91 of 138

* means Calibrations marked "Not TISI Accredited" in this Certificate have been included for completeness.

*2. TEMPERATURE RESULT

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
100	25.00	25.1	-0.10	0.08

Technical Note. Type of sensor : Conductivity Probe

Probe Ø 12 mm

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$.

Note. * means Calibrations marked "Not TISI Accredited" in this Certificate have been included for completeness.

This report is valid for the above stated instrument/s only.

End of Certificate

@clccalibration

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Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qcalibration.com

NSC-TISI-TIS17025
CALIBRATION 0049

CERTIFICATE No : 26M2268
REFERENCE No : 80204-3

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	SARTORIUS
MODEL	:	BSA224S-CW
SERIAL No	:	36591843
ID No	:	BA 09/61
CONDITION AS RECEIVED	:	USED ITEM
SUBMITTED BY	:	S.P.S. CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD., JOMPOL, CHATUCHAK, BANGKOK 10900
CALIBRATED BY	:	SUCHAT S.
CALIBRATION DATE	:	05-Mar-26
APPROVED BY	:	[redacted]
ISSUED DATE	:	06-Mar-26
RECEIVED DATE	:	05-Mar-26

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Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qcalibration.com

CERTIFICATE No : 26M2268

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	BSA224S-CW
MANUFACTURER	:	SARTORIUS	**S/N**	:	36591843
ID No	:	BA 09/61	**RECEIVED DATE**	:	05-Mar-26
AIR PRESSURE	:	1004mbar ± 1mbar	**CALIBRATION DATE**	:	05-Mar-26
AMBIENT TEMPERATURE	:	25° C ± 1° C	**RELATIVE HUMIDITY**	:	50 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARLITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02250116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02250117	29-Jan-27

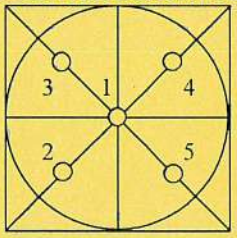
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
   - NATIONAL INSTITUTE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.0	0.0000	0.0000	0.00010
0.1	0.1000	0.0000	0.00011
0.2	0.2000	0.0000	0.00010
0.5	0.5000	0.0000	0.00011
1.0	1.0000	0.0000	0.00011
2.0	2.0000	0.0000	0.00011
5.0	5.0000	0.0000	0.00011
10.0	10.0000	0.0000	0.00011
20.0	20.0001	-0.0001	0.00011
50.0	50.0000	0.0000	0.00013
100.0	100.0001	-0.0001	0.00019
200.0	200.0001	-0.0001	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	100.0000
2	100.0000
3	100.0000
4	100.0000
5	100.0000
OFF-CENTER LOADING	0.0000

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

Harikul Science Co.,Ltd.
694 Soi Ratchadanivet 24, Pracharatbamphen,
Samsaennok, Huaikhwang, Bangkok 10310
Tel: 0-2274-2456 Fax: 0-2274-2443
Email: info@harikul.com www.harikul.com

CERT.No.: HS-X014C

Certificate of Calibration

Calibration Date : 16 March 2026

Submitted by : S.P.S CONSULTING SERVICE CO.,LTD
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol,
Chatuchak, Bangkok, Thailand 10900

Avg Room Temp : 20 °C
Avg Water Temp : 20 °C
Air Pressure : 760.00 mmHg
Salinity : 0 ppt

Model : YSI 5000
S/N : 15B100751
Probe : YSI 5010
S/N : 22D100097
ID NO. :
Air Temp ref : S/N. F8065C26
Barometric ref : S/N. F8065C26
Water Temp ref : -
ID NO. HS001
Technician : Kittipong M.

Calibration Details

Calibration Point	100% air sat. (@20 °C, DO = 9.09 mg/l)	(status)		(status)
Measurement 1 (mg/l)	9.09	(PASS)	-	-
Measurement 2 (mg/l)	9.09	(PASS)	-	-
Measurement 3 (mg/l)	9.09	(PASS)	-	-
Measurement 4 (mg/l)	9.09	(PASS)	-	-
Measurement 5 (mg/l)	9.09	(PASS)	-	-
Measurement 6 (mg/l)	9.08	(PASS)	-	-
Measurement 7 (mg/l)	9.08	(PASS)	-	-
Measurement 8 (mg/l)	9.08	(PASS)	-	-
Measurement 9 (mg/l)	9.08	(PASS)		-
Measurement 10 (mg/l)	9.08	(PASS)	-	-
Mean Measurement	9.09	mg/l	-	-
Inaccuracy	0.00	mg/l	-	-
Overall Status	(PASS)			

Manufacturer Specification

Accuracy = +/- 0.02 mg/l

1) This certificate is issued based on the result that are found as shown on date and place of test only.
2) The calibration procedure followed in accordance with Harikul Science Co., Ltd.
3) This result shall not be used for advertising purpose.

[redacted]

Technician Signature
(Kittipong Maekwong)

[redacted]

Laboratory Manager
(Natenapha Pisatkunchon)

MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD
214 Bangwaek Rd. Bangpai Bangkae Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th

NSC-TISI-TIS 17025
CALIBRATION 0052

CALIBRATION CERTIFICATE

Certificate No. : S2025070410-0002

Date Issued : 24-Jul-25

Customer	: S.P.S. CONSULTING SERVICE CO., LTD. 7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900
Equipment	: Incubator
Manufacturer	: BINDER
Model	: BD 240
Serial No.	: 12-17739
ID No./Tag No.	: IN 04/56
Date Received	: 22-Jul-25
Date Calibrated	: 22-Jul-25
Calibrated by	: Auttapol Kunaumpal

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

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

Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved b [redacted]

(Nathapong Krudaum)

CERTIFIED MIT

Certificate No. : S2025070410-0002

Environment : Ambient Temperature : Start record 25.1 °C, Stop record 25.1 °C

Relative Humidity : Start record 48.9 %RH, Stop record 49.3 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability[1] (°C)	Measured Uniformity[2] (°C)	Overall Variation[3] (°C)
35	35.0	35.0	0.12	0.35	0.40

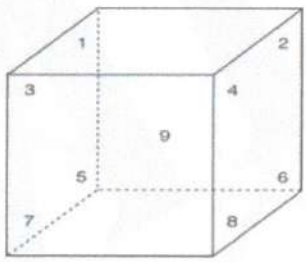
Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty[4] (±°C)
35	34.91	34.82	34.86	34.88	34.75	34.74	34.89	34.87	34.91	0.23

STD = Standard

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. OFF



Condition As-Received : Used Item

The measurment results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. L202412300-0027 for Temperature Indicator with Sensor Serial No. US37020317, Due 09-Sep-25

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.
5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

คุณภาพอากาศ

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
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Tel : (662) 939-4370-72. Fax : (662) 513-4221. E-mail : sale@spscon.com. www.spscon.com

High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B01	B01	05/05/2026	y = 1.106x-2.614	0.997
B02	B02	06/05/2026	y = 1.113x-1.359	0.997
B03	B03	06/05/2026	y = 1.121x-2.504	0.996
B04	B04	05/05/2026	y = 1.099x-1.383	0.997
B05	B05	05/05/2026	y = 1.103x-2.160	0.998
B06	B06	06/05/2026	y = 1.104x-2.338	0.998
B07	B07	05/05/2026	y = 1.110x-1.779	0.997
B08	B08	06/05/2026	y = 1.117x-0.069	0.998
B09	B09	06/05/2026	y = 1.131x+0.633	0.997
B10	B10	06/05/2026	y = 1.109x-1.997	0.996
B11	B11	05/05/2026	y = 1.113x-0.879	0.998
B12	B12	05/05/2026	y = 1.133x-2.636	0.999
B13	B13	06/05/2026	y = 1.121x-1.555	0.996
B14	B14	05/05/2026	y = 1.114x-0.668	0.996
B15	B15	06/05/2026	y = 1.115x-2.223	0.998
B16	B16	06/05/2026	y = 1.119x-1.715	0.996
B17	B17	06/05/2026	y = 1.128x-2.077	0.999
B18	B18	06/05/2026	y = 1.124x-2.201	0.997
B19	B19	06/05/2026	y = 1.126x-2.072	0.998
B20	B20	05/05/2026	y = 1.128x-1.147	0.998
B21	B21	05/05/2026	y = 1.125x-1.507	0.997
B22	B22	06/05/2026	y = 1.129x-3.099	0.998
B23	B23	05/05/2026	y = 1.136x-3.514	0.996
B24	B24	05/05/2026	y = 1.123x-2.620	0.999
B25	B25	07/05/2026	Y = 1.127x-2.205	0.999
B26	B26	06/05/2026	y = 1.101x-1.346	0.997
B27	B27	06/05/2026	y = 1.120x-2.554	0.996
B28	B28	06/05/2026	y = 1.129x-3.221	0.998
B29	B29	06/05/2026	y = 1.123x-2.970	0.996
B30	B30	06/05/2026	y = 1.126x-1.987	0.996
B31	B31	06/05/2026	y = 1.105x-1.053	0.997
B32	B32	05/05/2026	y = 1.118x-2.347	0.998
B33	B33	06/05/2026	y = 1.129x-1.842	0.996
B34	B34	06/05/2026	y = 1.119x-1.939	0.999

Calibrated by :	Approved by :
[redacted]	[redacted]
(Mr.Adul Dangklom)	(Mr. Peera Detudom)

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Tel : (662) 939-4370-72. Fax : (662) 513-4221. E-mail : sale@spscon.com.. www.spscon.com

High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B35	B35	06/05/2026	y = 1.130x-2.698	0.999
B36	B36	05/05/2026	y = 1.112x-2.644	0.998
B37	B37	05/05/2026	y = 1.124x-2.608	0.996
B38	B38	06/05/2026	y = 1.139x-1.817	0.999
B39	B39	05/05/2026	y = 1.099x+0.749	0.997
B40	B40	05/05/2026	y = 1.135x-2.517	0.997
B41	B41	06/05/2026	y = 1.103x-0.803	0.998
B42	B42	05/05/2026	y = 1.138x-3.754	0.999
B43	B43	06/05/2026	y = 1.132x-2.425	0.997
B44	B44	06/05/2026	y = 1.128x-2.443	0.998
R01	R01	07/05/2026	y = 1.103x-2.879	0.997
R02	R02	02/05/2026	y = 1.130x-2.934	0.997
R03	R03	05/05/2026	y = 1.124x-2.685	0.996
R04	R04	05/05/2026	y = 1.114x-0.914	0.998
R05	R05	06/05/2026	y = 1.059x+0.368	0.998
R06	R06	06/05/2026	y = 1.088x+0.020	0.996
R07	R07	06/05/2026	y = 1.122x-2.809	0.996
R08	R08	05/05/2026	y = 1.101x-1.418	0.999
R09	R09	05/05/2026	y = 1.084x+0.212	0.997
R10	R10	05/05/2026	y = 1.104x-2.080	0.998
R11	R11	06/05/2026	y = 1.112x-2.545	0.999
R12	R12	05/05/2026	y = 1.119x-0.906	0.997
R13	R13	05/05/2026	y = 1.116x-3.391	0.997
R14	R14	02/05/2026	y = 1.080x-1.101	0.996
R15	R15	06/05/2026	y = 1.095x-0.708	0.998
R16	R16	02/05/2026	y = 1.104x-1.452	0.997
R17	R17	06/05/2026	y = 1.102x-1.932	0.998
R18	R18	02/05/2026	y = 1.128x-4.180	0.997
R19	R19	02/05/2026	y = 1.090x-3.037	0.996
R20	R20	06/05/2026	y = 1.130x-2.859	0.999

Calibrated by :	Approved by :
[redacted]	[redacted]
(Mr.Adul Dangklom)	(Mr. Peera Detudom)

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High Volume PM-10 Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data

High Volume PM-10 Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B01	B01	05/05/2026	y = 1.058x-0.266	0.999
B02	B02	05/05/2026	y = 1.072x+0.447	0.998
B03	B03	06/05/2026	y = 1.022x+1.142	0.997
B04	B04	06/05/2026	y = 1.046x+2.215	0.998
B05	B05	05/05/2026	y = 1.067x-0.683	0.998
B06	B06	05/05/2026	y = 1.032x+1.745	0.998
B07	B07	06/05/2026	y = 1.036x+3.671	0.999
B08	B08	06/05/2026	y = 1.089x+0.007	0.996
B09	B09	06/05/2026	y = 1.110x-4.169	0.997
B10	B10	05/05/2026	y = 1.093x-1.221	0.999
B11	B11	06/05/2026	y = 1.097x-2.675	0.999
B12	B12	02/05/2026	y = 1.109x-3.242	0.998
B13	B13	05/05/2026	y = 1.100x-2.210	0.998
B14	B14	02/05/2026	y = 1.115x-2.412	0.998
B15	B15	05/05/2026	y = 1.112x-1.692	0.999
B16	B16	05/05/2026	y = 1.063x+1.099	0.998
B17	B17	06/05/2026	y = 1.076x+0.306	0.996
B18	B18	06/05/2026	y = 1.043x+2.348	0.996
B19	B19	05/05/2026	y = 1.059x+0.713	0.999
B20	B20	06/05/2026	y = 1.051x+1.596	0.997
B21	B21	05/05/2026	y = 1.080x-1.280	0.997
B22	B22	05/05/2026	y = 1.120x-1.761	0.996
B23	B23	06/05/2026	y = 1.112x-2.877	0.998
B24	B24	06/05/2026	y = 1.106x-2.523	0.996
B25	B25	05/05/2026	y = 1.010x+1.468	0.997
B26	B26	06/05/2026	y = 1.037x+0.527	0.997
B27	B27	06/05/2026	y = 1.083x-2.178	0.996
B28	B28	05/05/2026	y = 1.116x-2.667	0.997
B29	B29	05/05/2026	y = 1.038x+0.547	0.997
B30	B30	06/05/2026	y = 1.125x-4.369	0.999
B31	B31	02/05/2026	y = 1.045x+3.293	0.999
B32	B32	06/05/2026	y = 1.026x+2.014	0.999
B33	B33	06/05/2026	y = 1.095x-1.577	0.996
B34	B34	06/05/2026	y = 1.040x+2.233	0.996

Calibrated by : [redacted]	Approved by : [redacted]
(Mr.Adul Dangklom)	(Mr. Peera Detudom)

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Tel : (662) 939-4370-72. Fax : (662) 513-4221. E-mail : sale@spscon.com., www.spscon.com

High Volume PM-10 Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume PM-10 Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
R01	R01	06/05/2026	y = 1.023x+2.784	0.996
R02	R02	06/05/2026	y = 1.060x+0.840	0.997
R03	R03	06/05/2026	y = 1.086x-1.550	0.998
R04	R04	05/05/2026	y = 1.117x-3.501	0.999
R05	R05	06/05/2026	y = 1.075x-1.953	0.997
R06	R06	06/05/2026	y = 1.113x-2.377	0.996
R07	R07	06/05/2026	y = 1.104x-1.898	0.997
R08	R08	05/05/2026	y = 1.119x-2.379	0.998
R09	R09	05/05/2026	y = 1.044x+0.730	0.998
R10	R10	06/05/2026	y = 1.103x-2.555	0.997
R11	R11	05/05/2026	y = 1.021x+2.220	0.998
R12	R12	06/05/2026	y = 1.033x+1.005	0.999
R13	R13	06/05/2026	y = 1.112x-3.260	0.997
R14	R14	06/05/2026	y = 1.074x-2.039	0.999
R15	R15	06/05/2026	y = 1.093x-1.992	0.996
R16	R16	06/05/2026	y = 1.113x-2.436	0.997
R17	R17	06/05/2026	y = 1.086x-1.693	0.998
R18	R18	05/05/2026	y = 1.100x-4.540	0.999
R19	R19	05/05/2026	y = 1.067x+1.116	0.997
R20	R20	05/05/2026	y = 1.077x-1.807	0.999

Calibrated by : [redacted]	Approved by : [redacted]
(Mr.Adul Dangklom)	(Mr. Peera Detudom)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	27 May 2026	**Brand :**	API	**Model :**	300E
No.	CO-B01			**Serial No.**	782

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	**mmbar**	**Temp.**	24.5	**°C**	**% RH**	48

Calibration Setting

Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	0.11	-	0
CO Span	40.00	39.94	-0.150	40.00

API Model 300E CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4014.8	mV	2500-4800 mV
CO Reference	3948.5	mV	2500-4800 mV
Measure/Reference Ratio	1.179	-	1.1-1.3 W/Zero Air
Sample Pressure	28.6	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	810	CC/Min	800 ± 10%
Sample Temperature	48.3	°C	48 ± 4
Bench Temperature	48.1	°C	48 ± 2
Wheel Temperature	68.4	°C	68 ± 2
Box Temperature	30.9	°C	Ambient Temp + 7 ± 10
Photo-Drive	3038.2	mV	250 mV to 4750 mV
Slope	1.017	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	27 May 2026	**Brand :**	API	**Model :**	300E
No.	CO-B02			**Serial No.**	965

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	**mmbar**	**Temp.**	24.5	**°C**	**% RH**	48

Calibration Setting

Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	0.11	-	0
CO Span	40.00	40.10	0.250	40.00

API Model 300E CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4016.4	mV	2500-4800 mV
CO Reference	3949.7	mV	2500-4800 mV
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air
Sample Pressure	28.7	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	804	CC/Min	800 ± 10%
Sample Temperature	48.4	°C	48 ± 4
Bench Temperature	48.2	°C	48 ± 2
Wheel Temperature	68.5	°C	68 ± 2
Box Temperature	30.7	°C	Ambient Temp + 7 ± 10
Photo-Drive	3044.6	mV	250 mV to 4750 mV
Slope	1.017	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	27 May 2026	**Brand :**	API	**Model :**	300E
No.	CO-B03			**Serial No.**	3019

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	**mmbar**	**Temp.** 24.5	**°C**	**% RH** 48

Calibration Setting

Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	-0.10	-	0
CO Span	40.00	39.97	-0.075	40.00

API Model 300E CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4014.5	mV	2500-4800 mV
CO Reference	3948.1	mV	2500-4800 mV
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air
Sample Pressure	28.4	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	809	CC/Min	800 ± 10%
Sample Temperature	48.2	°C	48 ± 4
Bench Temperature	48.0	°C	48 ± 2
Wheel Temperature	68.3	°C	68 ± 2
Box Temperature	30.8	°C	Ambient Temp + 7 ± 10
Photo-Drive	3040.8	mV	250 mV to 4750 mV
Slope	1.017	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	27 May 2026	**Brand :**	Thermo	**Model :**	48C
No.	CO-B11			**Serial No.**	401304262

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	**mmbar**	**Temp.** 24.5	**°C**	**% RH** 48

Calibration Setting

Span	Initial Reading (Before Adj.),PPM			Final Reading (After Adj.),PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	0.10	-	0
CO Span	40.00	39.93	-0.175	40.00

Instrument Status

Chamber Temp	47.2 °C	**Flow**	1.5 LPM
Pressure	730.8 mm Hg	**Motor Speed**	100.00%

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	27 May 2026	**Brand :**	API	**Model :**	300E
No.	CO-B13			**Serial No.**	176

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	**mmbar**	**Temp.** 24.5	**°C**	**% RH** 48

Calibration Setting

Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	-0.10	-	0
CO Span	40.00	40.04	0.100	40.00

API Model 300E CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4017.1	mV	2500-4800 mV
CO Reference	3947.4	mV	2500-4800 mV
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air
Sample Pressure	28.6	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	811	CC/Min	800 ± 10%
Sample Temperature	48.2	°C	48 ± 4
Bench Temperature	48.0	°C	48 ± 2
Wheel Temperature	68.2	°C	68 ± 2
Box Temperature	30.8	°C	Ambient Temp + 7 ± 10
Photo-Drive	3025.7	mV	250 mV to 4750 mV
Slope	1.018	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	27 May 2026	**Brand :**	API	**Model :**	300EU
No.	CO-B14			**Serial No.**	131

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	**mmbar**	**Temp.** 24.5	**°C**	**% RH** 48

Calibration Setting

Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	-0.10	-	0
CO Span	40.00	40.07	0.175	40.00

API Model 300EU CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4014.1	mV	2500-4800 mV
CO Reference	3946.8	mV	2500-4800 mV
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air
Sample Pressure	28.5	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	813	CC/Min	800 ± 10%
Sample Temperature	48.3	°C	48 ± 4
Bench Temperature	48.0	°C	48 ± 2
Wheel Temperature	68.4	°C	68 ± 2
Box Temperature	30.6	°C	Ambient Temp + 7 ± 10
Photo-Drive	3051.2	mV	250 mV to 4750 mV
Slope	1.017	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE :	27 May 2026	**BRAND :**	API	**MODEL :**	200E
NO.	NOX-B07			**SERIAL NO.**	4338

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00674SV
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011 **mmbar**	**Temp.**	24.5 **°C**	**% RH**	48

CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.11	-	0	-
NO Span	400	399.9	-0.025	400.0	1.005
NO_X Span	400	400.1	0.025	400.0	1.008

API Model 200E NO_X Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	506	cc/min	500 ± 50
OZONE FLOW	79	cc/min	80 ± 15
PMT	103.2	mV	-20 - 150
AZERO	94.1	mV	-20 - 150
HVPS	670	V	420 - 900 constant
RCELL TEMP	50.2	^{O}C	50 ± 1
BOX TEMP	29.3	^{O}C	8 - 48
PMT TEMP	7.1	^{O}C	7 ± 2
MOLY TEMP	314.9	^{O}C	315 ± 5
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.005	-	1.0 ± 0.3
NO_X Slope	1.008	-	1.0 ± 0.3
NO Offset	0.9	mV	-20 to +150
NO_X Offset	0.5	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE :	27 May 2026	**BRAND :**	API	**MODEL :**	200E
NO.	NOX-B10			**SERIAL NO.**	4465

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00674SV
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011	**mmbar**	**Temp.**	24.5	**°C**	**% RH**	48

CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	399.7	-0.075	400.0	1.007
NO_X Span	400	400.1	0.025	400.0	1.009

API Model 200E NO_X Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	509	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.2	mV	-20 - 150
AZERO	94.4	mV	-20 - 150
HVPS	669	V	420 - 900 constant
RCELL TEMP	50.1	^{O}C	50 ± 1
BOX TEMP	28.9	^{O}C	8 - 48
PMT TEMP	7.5	^{O}C	7 ± 2
MOLY TEMP	314.9	^{O}C	315 ± 5
RCELL PRESS	8.3	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.5	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.007	-	1.0 ± 0.3
NO_X Slope	1.009	-	1.0 ± 0.3
NO Offset	0.8	mV	-20 to +150
NO_X Offset	0.3	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE :	27 May 2026	**BRAND :**	API	**MODEL :**	200A
NO.	NOX-B13			**SERIAL NO.**	1983

Calibrator (Dilution System)

Brand	: Teledyne			Model	: 700E
Last Cal. Date	: 29 October 2025			Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00674SV
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011	**mmbar**	**Temp.**	24.5	**°C**	**% RH**	48

CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.002
NO_X Span	400	400.3	0.075	400.0	1.004

API Model 200E NO_X Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	506	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.3	mV	-20 - 150
AZERO	93.6	mV	-20 - 150
HVPS	669	V	420 - 900 constant
RCELL TEMP	50.2	°C	50 ± 1
BOX TEMP	28.9	°C	8 - 48
PMT TEMP	7.3	°C	7 ± 2
MOLY TEMP	314.9	°C	315 ± 5
RCELL PRESS	8.3	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.5	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.002	-	1.0 ± 0.3
NO_X Slope	1.004	-	1.0 ± 0.3
NO Offset	1.0	mV	-20 to +150
NO_X Offset	0.5	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE :	27 May 2026	**BRAND :**	API	**MODEL :**	200E
NO.	NOX-R06			**SERIAL NO.**	4466

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00674SV
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011	**mmbar**	**Temp.**	24.5	**°C**	**% RH**	48

CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.9	-0.025	400.0	1.001
NO_X Span	400	400.2	0.050	400.0	1.004

API Model 200E NO_X Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	506	cc/min	500 ± 50
OZONE FLOW	79	cc/min	80 ± 15
PMT	103.2	mV	-20 - 150
AZERO	94.1	mV	-20 - 150
HVPS	671	V	420 - 900 constant
RCELL TEMP	50.2	^{O}C	50 ± 1
BOX TEMP	28.9	^{O}C	8 - 48
PMT TEMP	7.1	^{O}C	7 ± 2
MOLY TEMP	314.9	^{O}C	315 ± 5
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.001	-	1.0 ± 0.3
NO_X Slope	1.004	-	1.0 ± 0.3
NO Offset	0.9	mV	-20 to +150
NO_X Offset	0.5	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE :	27 May 2026	**BRAND :**	API	**MODEL :**	200E
NO.	NOX-R08			**SERIAL NO.**	243

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00674SV
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011 **mmbar**	**Temp.**	24.5 **°C**	**% RH**	48

CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.8	-0.050	400.0	1.005
NO_X Span	400	400.2	0.050	400.0	1.009

API Model 200E NO_X Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	507	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.4	mV	-20 - 150
AZERO	94.2	mV	-20 - 150
HVPS	672	V	420 - 900 constant
RCELL TEMP	50.3	°C	50 ± 1
BOX TEMP	28.6	°C	8 - 48
PMT TEMP	7.4	°C	7 ± 2
MOLY TEMP	315.3	°C	315 ± 5
RCELL PRESS	8.5	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.3	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.005	-	1.0 ± 0.3
NO_X Slope	1.009	-	1.0 ± 0.3
NO Offset	1.0	mV	-20 to +150
NO_X Offset	0.6	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพฯ 10900
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Tel : (662) 939-4370-72, Fax : (662) 513-4221, E-mail : sale@spscon.com, www.spscon.com

CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE :	27 May 2026	**BRAND :**	API	**MODEL :**	200E
NO.	NOX-R11			**SERIAL NO.**	2621

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700E
Last Cal. Date	: 29 October 2025	Serial No.	: 201-S

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00674SV
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011 **mmbar**	**Temp.**	24.5 **°C**	**% RH**	48

CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.9	-0.025	400.0	1.001
NO_X Span	400	400.2	0.050	400.0	1.004

API Model 200E NO_X Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	506	cc/min	500 ± 50
OZONE FLOW	79	cc/min	80 ± 15
PMT	103.2	mV	-20 - 150
AZERO	94.1	mV	-20 - 150
HVPS	671	V	420 - 900 constant
RCELL TEMP	50.2	°C	50 ± 1
BOX TEMP	28.9	°C	8 - 48
PMT TEMP	7.1	°C	7 ± 2
MOLY TEMP	314.9	°C	315 ± 5
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.001	-	1.0 ± 0.3
NO_X Slope	1.004	-	1.0 ± 0.3
NO Offset	0.9	mV	-20 to +150
NO_X Offset	0.5	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : [redacted]
(Mr.Heeson Lormae)

Approved by : [redacted]
(Mr.Yutthana Tanatharanit)

QUALITY CALIBRATION CO.,LTD.
235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qcalibration.com

NSC-TISI-TIS17025
CALIBRATION 0049

CERTIFICATE No : 26M2266
REFERENCE No : 80204-1

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	METTLER TOLEDO
MODEL	:	XS105DU
SERIAL No	:	1126422905
ID No	:	BA 05/50
CONDITION AS RECEIVED	:	USED ITEM
SUBMITTED BY	:	S.P.S. CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD., JOMPOL, CHATUCHAK, BANGKOK 10900
CALIBRATED BY	:	SUCHAT S.
CALIBRATION DATE	:	05-Mar-26
APPROVED BY	:	[redacted]
ISSUED DATE	:	06-Mar-26
RECEIVED DATE	:	05-Mar-26

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF QUALITY CALIBRATION CO., LTD.

QUALITY CALIBRATION CO.,LTD.
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www.qcalibration.com

CERTIFICATE No : 26M2266

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	XS105DU
MANUFACTURER	:	METTLER TOLEDO	**S/N**	:	1126422905
ID No	:	BA 05/50	**RECEIVED DATE**	:	05-Mar-26
AIR PRESSURE	:	1004mbar ± 1mbar	**CALIBRATION DATE**	:	05-Mar-26
AMBIENT TEMPERATURE	:	25° C ± 1° C	**RELATIVE HUMIDITY**	:	50 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARLITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02250116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02250117	29-Jan-27

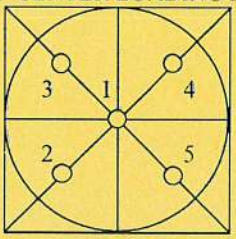
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
   - NATIONAL INSTITUTE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 120 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.00	0.00000	0.00000	0.000065
0.02	0.02000	0.00000	0.000065
0.10	0.10000	0.00000	0.000066
0.20	0.20000	0.00000	0.000066
0.50	0.50001	-0.00001	0.000065
1.00	1.00001	-0.00001	0.000066
2.00	2.00000	0.00000	0.000067
5.00	5.00001	-0.00001	0.000068
10.00	10.00004	-0.00004	0.000070
20.00	20.00006	-0.00006	0.000078
50.00	50.0000	0.0000	0.00012
100.00	100.0002	-0.0002	0.00019
120.00	120.0002	-0.0002	0.00022

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	50.0000
2	50.0000
3	50.0000
4	50.0000
5	50.0000
OFF-CENTER LOADING	0.0000

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

ระดับเสียง

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0204 **MTC No.** EEL. BP. 152/0169

CALIBRATION CERTIFICATE

Submitted by : S.P.S.CONSULTING SERVICE CO.,LTD.

Address : 7 Soi Phaholyothin 24, Phaholyothin Road, Jompol, Chatuchak, Bangkok 10900.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre. Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Calibrator

Manufacturer : ACO

Model : 2127

Serial No. : 130006

Ambient Environment

Temperature : (23 + 3) °C

Relative Humidity : (50 ± 15) %

Ambient Pressure : (101.325 ± 1.500) kPa

Standards used :

1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.
3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Keithley 2015-P S/N 4106495.
7. Condenser Microphone Bruel&Kjaer 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 29 Jan. 2026

Date of Calibration : 11 Feb. 2026

1 / 2 [redacted]

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

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(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

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(66) 08 1889 6827

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0204 **MTC No.** EEL. BP. 152/0169

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20μPa at 1000 Hz

Acoustic Output in dB re 20μPa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	93.89	-0.11	± 0.10	±0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	999.9	-0.1	± 1.5	±1.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.90	± 0.50	±3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by : [redacted]

(Mr.Weerachai Deechaiyae)

Approved by : [redacted]

(Mr.Prawate Kluaypa)

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 11 Feb. 2026

Date of Issue : 12 Feb. 2026

Ref : 2011269012900497001

End of Certificate

The results relate only to the items tested/calibrated or value assigned.
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Noise R_320/26

Sound Level Meter Calibration Report

Acoustic Calibrator Data			
Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	11 February 2026
		Due Date	11 February 2027

Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-R04	ACO	6236	132030	27 May 2569	93.9	93.9
ACO-R07	ACO	6236	00172033	27 May 2569	93.8	93.9
ACO-R09	ACO	6236	00172035	27 May 2569	93.9	93.9
ACO-R10	ACO	6236	00172037	27 May 2569	93.8	93.9
ACO-R31	ACO	6236	00192043	27 May 2569	93.9	93.9
ACO-R45	ACO	6236	00192057	27 May 2569	93.8	93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.81 ± 0.10 dB	

Calibrated by : [redacted]
(Mr. Heeson Lormae)

Approved by : [redacted]
(Mr. Yutthana Tanatharanit)