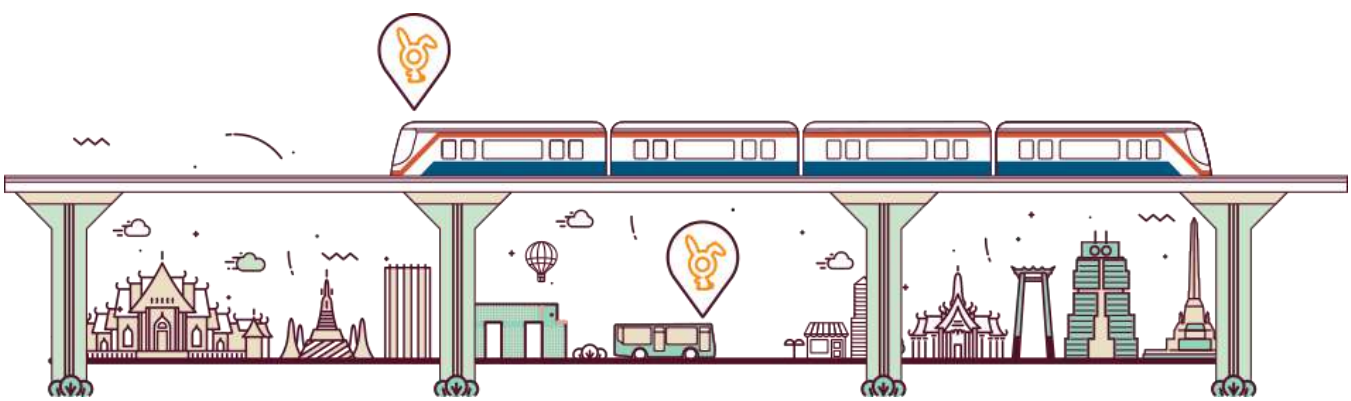
ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือ



List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Tisch Environmental,Inc.	TE-5025A 3383	Jiranatee Associates Co., Ltd.	COF-040-68	30 Sep 25	29 Sep 26	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P3508	9 Sep 25	8 Sep 26	-
3	Aneroid Barometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P1516	22 Apr 26	21 Apr 27	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26H708	17 Apr 26	16 Apr 27	-
5	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i CM08130002	UAE Consultant Co.,Ltd.	17022026	17 Feb 26	16 Feb 27	-
6	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i CM19050148	UAE Consultant Co.,Ltd.	20022026	20 Feb 26	19 Feb 27	-
7	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i CM19050149	UAE Consultant Co.,Ltd.	24022026	24 Feb 26	23 Feb 27	-
8	Standard Gases (Mixture)	Nitrogen Dioxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
9	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i CM08140003	UAE Consultant Co.,Ltd.	04072025	4 Jul 25	3 Jul 26	-
10	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i CM08140004	UAE Consultant Co.,Ltd.	04072025	4 Jul 25	3 Jul 26	-
11	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1180540068	UAE Consultant Co.,Ltd.	11072025	11 Jul 25	10 Jul 26	-
12	Standard Gases (Mixture)	Carbon Monoxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
13	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 GY21PTED	UAE Consultant Co.,Ltd.	07082026	7 Aug 25	6 Aug 26	-
14	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 GAL13KSE	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
15	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	Thermo Scientific	55i 1182920025	UAE Consultant Co.,Ltd.	25072025	25 Jul 25	24 Jul 26	-
16	Standard Gas	Non Methane-Hydrocarbon	Linde	D824432	Linde	09042013	4 Aug 20	4 Aug 28	-
17	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0113	Thai Meteorological Department	033/26	20 Jan 26	19 Jan 27	-
18	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037708	Thai Meteorological Department	395/25	22 Aug 25	21 Aug 26	-
19	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037713	Thai Meteorological Department	394/25	22 Aug 25	21 Aug 26	-
20	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	Larson Davis	CAL150 6855	Innovative Instrument Co.,Ltd.	25-ACT-137	9 Sep 25	8 Sep 26	-
21	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005403	Innovative Instrument Co.,Ltd.	25-SLM-246	30 Jul 25	29 Jul 26	-
22	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0006617	Innovative Instrument Co.,Ltd.	25-SLM-338	9 Oct 25	8 Oct 26	-
23	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005341	Innovative Instrument Co.,Ltd.	25-SLM-339	9 Oct 25	8 Oct 26	-

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Water									
1	pH Meter	pH	Horiba	LAQUA-PH210 HA9M0046	Technology Promotion Association (Thailand-Japan)	25CH1432	11 Dec 25	10 Dec 26	-
2	DO Meter	DO	Horiba	LAQUA-DO210 HE0G0017	Technology Promotion Association (Thailand-Japan)	25TW251	25 Dec 25	24 Dec 26	-

JNAC
JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd.
63/14-15, 67/55-56
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Mobile: +66(0)2999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Flow measurement laboratory
Calibration services department.

ilac-MRA
NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : COF-040-68

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: TISCH
MODEL/TYPE	: TE-5025A
SERIAL NUMBER	: 3383
ID NUMBER	: UAE.EFM.063/2560
CONDITION AS-RECEIVED	: Used Item
CUSTOMER	: United Analyst and Engineering Consultant Co., Ltd. 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
RECEIVED DATE	: 29 Aug 2025
MEASUREMENT DATE	: 29 Sep 2025
ISSUE DATE	: 30 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 23.2 °C and 55.9 %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 GE5/MC/W2-do. 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-0218-23.

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"

Calibrated by:
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: .....
Mr. Parinya Boonchanoen
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR RE... IN WRITING FROM THE LABORATORY

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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 m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	$\Delta p_Orifice$ inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.704	753.311	22.97	22.08	56.514	1.532	1.229	0.652
2	1.001	753.266	22.99	22.37	62.412	3.014	1.734	0.918
3	1.116	753.254	23.08	22.48	41.501	3.969	1.990	1.054
4	1.164	753.258	23.09	22.55	29.909	4.424	2.101	1.117
5	1.410	753.191	23.04	22.66	28.108	6.537	2.554	1.356

Slope (m): 1.87959
Intercept (I): 0.00567
Correlation coefficient (r): 0.99982
Uncertainty (k=2): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	$\Delta p_Orifice$ inH_2O	Y	Standard Flow [Q_a] m^3/min
1	0.704	753.311	22.97	22.08	56.514	1.532	0.771	0.653
2	1.001	753.266	22.99	22.37	62.412	3.014	1.088	0.920
3	1.116	753.254	23.08	22.48	41.501	3.969	1.249	1.056
4	1.164	753.258	23.09	22.55	29.909	4.424	1.319	1.120
5	1.410	753.191	23.04	22.66	28.108	6.537	1.603	1.358

Slope (m): 1.17726
Intercept (I): 0.00356
Correlation coefficient (r): 0.99982
Uncertainty (k = 2): 0.015 m^3/min

End of Certificate of Calibration

JNAC JIRANATEE ASSOCIATES CO.,LTD.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
9/414 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 25P3508
Page : 1 of 2

Equipment :	U Tube Manometer
Manufacturer:	Dwyer
Model :	1221-36-W/M
Serial No.:	-
ID No.:	UAE.EFM.180/2561
Condition As-Received:	Used Item
Received Date:	03 September 2025
Calibration Date:	09 September 2025
Reference:	2509-0144WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Atmospheric Pressure:	1006 mbar

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260.

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P04, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MP-0218-24	24 Sep 2025

2.This result of calibration was made on requested at the point specified by customer.
3.Scale and conversion factor is 1 kPa = 4.0146293 inH_2O
4.This instrument was used clean air as pressure media.
5.This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.
6.This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.
7.The certificate is valid only to the item calibrated on date and place of calibration.
8.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

Calibrated by : Suksan Khanksew
Issue Date : 10 September 2025

Approved Signatory : Attapol P
[ ] Phalinee Prabpaipal
[ ] Sura Suwannasri
[✓] Attapol Panuradh

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Result of calibration:- Without adjustment
Function:- Pressure Measurement
Increasing Pressure

Range : 0 inH_2O to 36 inH_2O
Scale Interval : 0.1 inH_2O (The Second Estimate)

Applied Pressure	UUC indication High-port side	UUC indication Low-port side	ΔP	Error
0.00	0.00	0.00	0.00	0.00
2.00	0.86	-0.95	1.90	-0.10
4.00	1.95	-1.95	3.90	-0.10
6.00	2.96	-3.00	5.95	-0.05
8.00	3.96	-4.00	7.95	-0.05
10.00	4.96	-5.00	9.95	-0.05
12.00	6.00	-6.00	12.00	0.00
14.00	7.00	-7.00	14.00	0.00
16.00	8.00	-8.00	16.00	0.00
18.00	9.00	-9.00	18.00	0.00
20.00	10.00	-10.05	20.05	0.05
22.00	11.00	-11.05	22.05	0.05
24.00	12.00	-12.05	24.05	0.05
26.00	13.00	-13.05	26.05	0.05
28.00	14.00	-14.10	28.10	0.10
30.00	15.00	-15.10	30.10	0.10
32.00	16.05	-16.10	32.15	0.15
34.00	17.05	-17.10	34.15	0.15
36.00	18.00	-18.00	36.00	0.10

This uncertainty of measurement was ± 0.11 inH_2O
* ΔP = High-port side - Low-port side
* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26P1516
Page : 1 of 2

Equipment : Aneroid Barometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.120/2550
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 22 April 2026
Reference: 2604-0316WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P10, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Indicator	DPI142	1422505046	MP-0150-25	20 May 2026

2.This result of calibration was made on requested at the point specified by customer.
3.The certificate is valid only to the item calibrated on date and place of calibration.
4.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Somchai Chaichan
Issue Date : 24 April 2026

Approved Signatory :
[ ] Phalinee Prabpaipat
[√] Sura Suwannasri
[ ] Attapol Panurach

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Technical information and UUC* settings during calibration:

Result of calibration : Without adjustment
Pressure type : Absolute Pressure
Installation : Vertical Orientation
Atmospheric pressure : (1004 ± 10) mbar
Range : 960 hPa to 1030 hPa
Scale Interval: 1 hPa (The Fifth Estimate)
Pressure medium : Clean air
Reference level : at the center of the dial

Increasing Pressure

Applied Pressure (hPa)	960.73	971.51	982.00	991.61	1000.93	1009.75	1019.03	1028.51
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	-0.73	-1.51	-2.00	-1.61	-0.93	0.25	0.97	1.49

Decreasing Pressure

Applied Pressure (hPa)	1028.45	1018.52	1008.98	999.64	990.31	981.35	970.50	960.47
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	1.55	1.48	1.02	0.36	-0.31	-1.35	-0.50	-0.47

The uncertainty of measurement was ± 0.25 hPa

* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26H708
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.016/2547
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 17 April 2026 to 22 April 2026
Reference: 2604-0315WSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Chilled-Mirror Hygrometer	Dew Master	41292	23277	08 May 2026
2) Handheld Thermometer With Sensor	1523	5717086	25I1200	21 Nov 2026

2.The certificate is valid only to the item calibrated on date and place of calibration.
3.This measurement result is traceable to the International System of Unit maintained through:-
-Thunder Scientific Corporation, NVLAB Accreditation No. Calibration 200582-0
-Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Calibrated by : Kraipop Onrat
Issue Date : 23 April 2026

Approved Signatory :
[ ] Chakrit Waewanjua
[ ] Pornthippa Tameyakul
[√] Vipom Tantiyawutti

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Result of Calibration:- Before Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	39	1.1	1.6
25.0	60.0	58	2.0	1.7
25.0	80.0	75	5.0	1.9

Result of Calibration:- After Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	40	0.1	1.6
25.0	60.0	60	0.0	1.7
25.0	80.0	77	3.0	1.9

Result of Calibration:- Without Adjustment
Function: Temperature Measurement.

Standard Temperature (°C)	UUC* Reading (°C)	UUC* Correction (°C)	Uncertainty of Measurement (±°C)
20.012	20.0	0.012	0.65
25.028	25.0	0.028	0.65
30.005	30.0	0.005	0.65
35.019	35.0	0.019	0.65
40.040	39.5	0.540	0.65

UUC* : Unit Under Calibration
The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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United Analyst and Engineering Consultant Co., Ltd.
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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

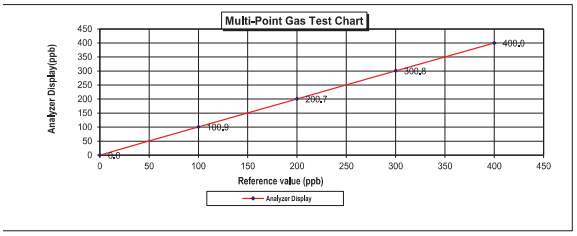
Test Date : Feb 17,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM08130002

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb :Acceptable Limit ± 5%				Average Difference (%)		0.30



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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

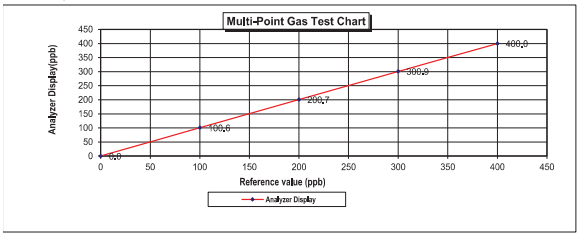
Test Date : Feb 20,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM19050148

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.6	0.60	0.60	0.60
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.9	0.90	0.30	0.30
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb :Acceptable Limit ± 5%				Average Difference (%)		0.25



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20 /...02.../...2569 20 /...Feb.../...2026

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

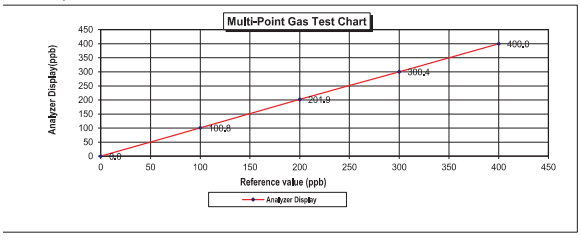
Test Date : Feb 24,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM19050149

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.8	0.80	0.79	0.79
Level 3	40.00%	200.0	201.9	1.90	0.94	0.94
Level 4	60.00%	300.0	300.4	0.40	0.13	0.13
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb :Acceptable Limit ± 5%				Average Difference (%)		0.37



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24 /...02.../...2569 24 /...Feb.../...2026

เอกสารไม่ควบคุม

Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD		
Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	1042202308	CC754384	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12409	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	1534002202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP20102451 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-160	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP20102451 NO	FTIR	Jun 28, 2023
Nicolet iS50 FTIR AUP20102451 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP20102451 SO2	FTIR	Jun 08, 2023

Approved for Release

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 4,2025

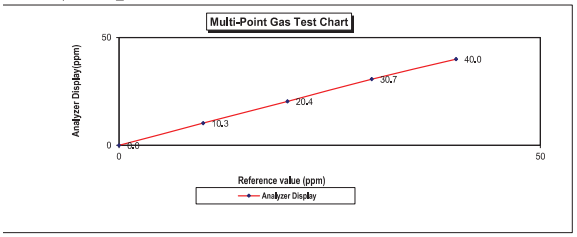
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM08140003

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.3	0.3	2.9	2.9
Level 3	40.00%	20.0	20.4	0.4	2.0	2.0
Level 4	60.00%	30.0	30.7	0.7	2.3	2.3
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		1.43

:Acceptable Limit ± 5%



Calculate by ..... 4 / 07 / 2568

Approve by ..... 4 / July / 2025

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 4,2025

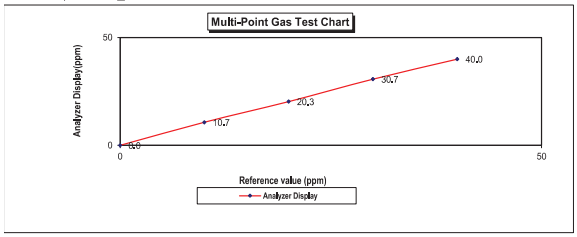
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM08140004

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.3	0.3	1.5	1.5
Level 4	60.00%	30.0	30.7	0.7	2.3	2.3
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.06

:Acceptable Limit ± 5%



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3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 11,2025

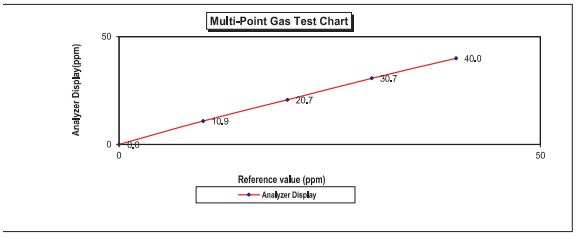
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1180540068

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.9	0.9	8.3	8.3
Level 3	40.00%	20.0	20.7	0.7	3.4	3.4
Level 4	60.00%	30.0	30.7	0.7	2.3	2.3
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.78

:Acceptable Limit ± 5%



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Approve by ..... 11 / July / 2025

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD		
Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	1042202308	CC754384	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C221910	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12409	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	1534002202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP20102451 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-160	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP20102451 NO	FTIR	Jun 28, 2023
Nicolet iS50 FTIR AUP20102451 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP20102451 SO2	FTIR	Jun 08, 2023

Approved for Release

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

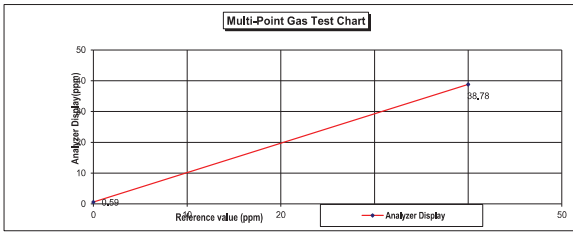
Test Date : Aug 7,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	GY21PTED

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.59	0.59	0.59	0.59
Level 2	80.00%	40.00	38.78	-1.22	-3.15	3.15
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.87



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Approve by ..... 07 / Aug / 2025

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

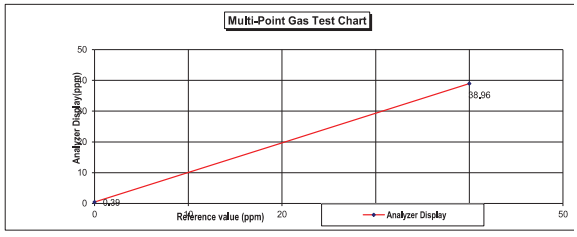
Test Date : July 17,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	GAL13KSE

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.39	0.39	0.39	0.39
Level 2	80.00%	40.00	38.96	-1.04	-2.67	2.67
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.53



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3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

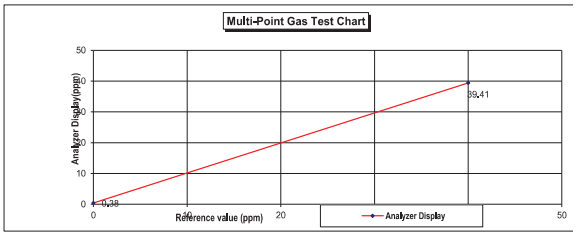
Test Date : July 25,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	55i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1182920025

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.38	0.38	0.38	0.38
Level 2	80.00%	40.00	39.41	-0.59	-1.50	1.50
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		0.94



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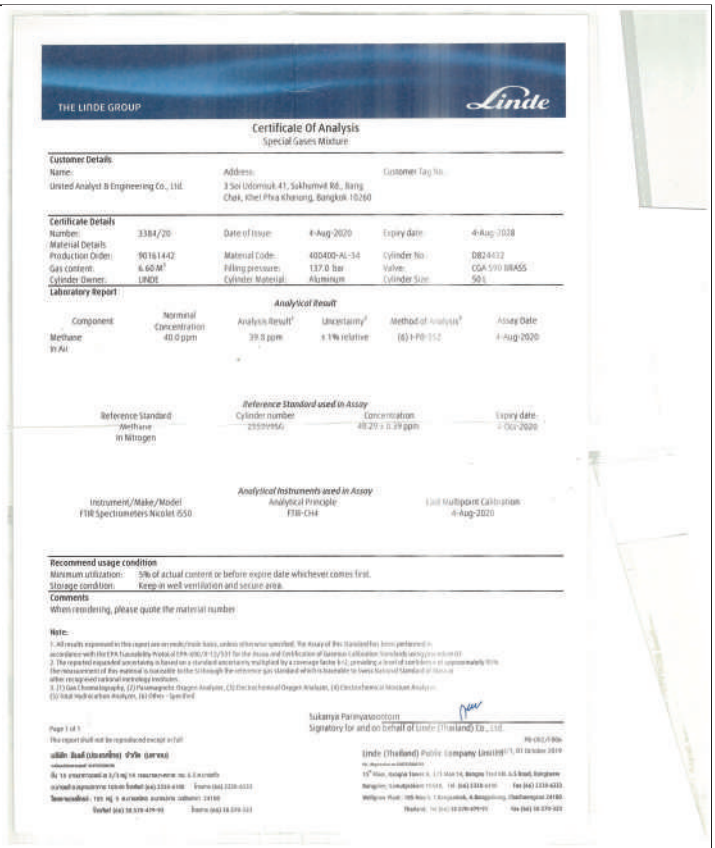

THE LINDE GROUP

Linde

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: United Analyst & Engineering Co., Ltd.

Address: 3 Soi Udomsuk 41, Sukhumvit Rd., Bang Chak, Khet Phra Khanong, Bangkok 10260

Customer Tag No.

Certificate Details

Number:	3384/20	Date of Issue:	4-Aug-2020	Expiry date:	4-Aug-2028
Material Details					
Production Order:	90161442	Material Code:	400400-AL-34	Cylinder No:	D824432
Gas content:	6.60 M³	Filling pressure:	137.0 bar	Valve:	CGA 590 BRASS
Cylinder Owner:	LINDE	Cylinder Material:	Aluminium	Cylinder Size:	50 L

Laboratory Report

Analytical Result

Component	Nominal Concentration	Analysis Result¹	Uncertainty²	Method of Analysis³	Assay Date
Methane In Air	40.0 ppm	39.8 ppm	± 1% relative	(G) I-PO-152	4-Aug-2020

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date
Methane In Nitrogen	[illegible]	48.20 ± 0.39 ppm	4-Oct-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet 650	FTIR-CHI	4-Aug-2020

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol of EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using [illegible]
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95% [illegible] other recognized national metrology institutes.
3. (F) Gas Chromatography, (G) Paramagnetic Oxygen Analyzer, (J) Electrochemical Oxygen Analyzer, (K) Electrochemical Moisture Analyzer, (L) Total Hydrocarbon Analyzer, (M) Others - Specified

Page 1 of 1

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Sukanya Parinyasoontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited

เอกสารไม่ควบคุม

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 20 January, 2026 Certification No. 033/26

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0113

Wind Sensor 2205DT0113

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.7 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V2220019

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisoed Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	mbar
1010.35	1011	-0.65
1010.05	1010	0.05
1009.76	1010	-0.24
1009.43	1009	0.43
1009.14	1009	0.14
1008.84	1009	-0.16
1008.55	1008	0.55
1008.24	1008	0.24
1008.11	1008	0.11
1007.54	1007	0.54
1008.16	1008	0.16
1008.52	1008	0.52
1008.91	1009	-0.09
1009.25	1009	0.25
1009.62	1009	0.62
1009.86	1010	-0.14
1010.05	1010	0.05
1010.53	1011	-0.47
1010.94	1011	-0.06
1011.18	1011	0.18

Average

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	mmHg
757.82	758	-0.18
757.60	757	0.60
757.38	757	0.38
757.13	757	0.13
756.92	757	-0.08
756.69	756	0.69
756.47	756	0.47
756.24	756	0.24
756.14	756	0.14
755.72	756	-0.28
756.18	756	0.18
756.45	756	0.45
756.74	757	-0.26
757.00	757	0.00
757.28	757	0.28
757.46	757	0.46
757.60	758	-0.40
757.96	758	-0.04
758.27	758	0.27
758.45	758	0.45

Average

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 033/26

20 January, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.6	46	-0.4
30.1	30	0.1
15.7	16	-0.3

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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 22 August, 2025 Certification No. 395/25

Page : 1 of 7

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA672.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037708 Wind speed BQ1705626 Wind direction19020250
Thermoigrometers 24070579 Barometer R1605260

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.9 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Signed : Pisood Promsut
[Authorised Signatory]
for the Chief
Non-Standard Instrument

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 2 of 7

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer m/sec	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	2.9	0.12
5.00	-	-	-	5.0	0.00
7.04	-	-	-	6.9	0.14
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 3 of 7

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1009.12	0.08
1009.04	1008.98	0.06
1008.82	1008.85	-0.03
1008.65	1008.72	-0.07
1008.46	1008.45	0.01
1008.15	1008.18	-0.03
1007.84	1007.52	0.12
1007.43	1007.38	0.05
1007.27	1007.25	0.02
1007.04	1006.98	0.06
1006.43	1006.45	-0.02
1006.21	1006.32	-0.11
1008.62	1008.58	0.04
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.85	-0.01
1006.28	1006.32	-0.04
	Average	0.03

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 4 of 7

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.9	0.06
756.84	756.8	0.04
756.68	756.7	-0.02
756.55	756.6	-0.05
756.41	756.4	0.01
756.17	756.2	-0.03
755.79	755.7	0.09
755.63	755.6	0.03
755.51	755.5	0.01
755.34	755.3	0.04
754.88	754.9	-0.02
754.72	754.8	-0.08
756.53	756.5	0.03
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.2	-0.01
754.77	754.8	-0.03
Average		0.02

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 5 of 7

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.14	45.24	-0.10
30.25	30.34	-0.09
15.24	15.29	-0.05

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 6 of 7

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.1	-1.57
65.24	66.1	-0.86
44.12	44.5	-0.38

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 395/25

Page: 7 of 7

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1#C Serial No.PC1705209 ทำการสอบเทียบกับแก้ววัดฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

ลงชื่อ .....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

เอกสารไม่ควบคุม

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 22 August, 2025 Certification No. 394/25

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA572.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037713 Wind speed BQ1705627 Wind direction19050292
Thermoigrometers 24070483 Barometer R1605257

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.5 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 120629686)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Signed : Phoood Promsut
Mr. Phoood Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1008.98	0.22
1009.04	1008.85	0.19
1008.82	1008.72	0.10
1008.65	1008.58	0.07
1008.46	1008.45	0.01
1008.15	1008.05	0.10
1007.64	1007.52	0.12
1007.43	1007.25	0.18
1007.27	1007.12	0.15
1007.04	1006.98	0.06
1006.43	1006.32	0.11
1006.21	1006.18	0.03
1006.62	1008.45	0.17
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.72	0.12
1006.28	1006.18	0.10
Average		0.11

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.8	0.16
756.84	756.7	0.14
756.68	756.6	0.08
756.55	756.5	0.05
756.41	756.4	0.01
756.17	756.1	0.07
755.79	755.7	0.09
755.63	755.5	0.13
755.51	755.4	0.11
755.34	755.3	0.04
754.88	754.8	0.08
754.72	754.7	0.02
756.53	756.4	0.13
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.1	0.09
754.77	754.7	0.07
Average		0.08

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 5 of 7

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.14	45.21	-0.07
30.25	30.31	-0.06
15.24	15.32	-0.08

Calibrated by : Watcharapol

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 6 of 7

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.6	-2.07
65.24	66.5	-1.26
44.12	44.9	-0.78

Calibrated by : Watcharapol

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 394/25

Page: 7 of 7

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1 Serial No.19050180 ทำการสอบเทียบกับแก้วัดฝนแบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

ลงชื่อ .....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

เอกสารไม่ควบคุม

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7 I39 SOO 13, SOI SUNTHAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 1668-2116-5869-1 FAX: 1668-2116-7140

innovative instrument

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-ACT-137
Request No : Req-2025-1828

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : LARSON DAVIS
Model : CAL150
Serial Number : 6855
ID : UAE.EFM.046/2566

Class : 2
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 August 2025
Calibration Date : 9 September 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 provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathuvorn
Calibration Engineer Supervisor

Issue Date : 9 September 2025

The results related only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of the [illegible]

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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: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-ACT-137

Request No : Req-2025-1828

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

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	93.81	-0.19	-	-	0.11
114 dB / 1000 Hz	113.94	-0.06	-	-	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	1.18	-	0.17
114 dB / 1000 Hz	0.63	-	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.

เอกสารไม่ควบคุม

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: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-246

Request No : Req-2025-1638

Unit Under Calibration Details

Measurement item	: Sound Level Meter	Microphone Class	: 2
Manufacturer	: LARSON DAVIS	Microphone Model	: 377A04
Model	: LxT2	Microphone S/N	: 335074
Serial Number	: 0005403	Preamplifier Model	: PRMLxT2C
ID	: UAE.EFM.039/2564	Preamplifier S/N	: 071570
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 : 16 July 2025

Calibrated Date : 30 July 2025

Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-1 : 2013 Electroacoustics - Sound level meters - Part 1: Periodic tests

Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Liangurt — Service Calibration Engineer

Approved By : Mr. Pacit Malhavorn — Calibration Engineer Supervisor

Issue Date : 30 July 2025

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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: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-246

Request No : Req-2025-1638

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.0	0.32	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN. AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.6	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.4	0.10
C	29.0	0.10
Z	33.5	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	1.2	1.3	1.2	0.60
8000 Hz	2.0	2.1	2.1	0.70

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-246

Request No : Req-2025-1638

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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-246
Request No : Req-2025-1638

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	138.9	-0.1	
134.00	134	133.9	-0.1	
129.00	129	128.9	-0.1	
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	98.9	-0.1	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	0.30
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	44.1	0.1	
39.00	39	39.5	0.5	

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Certificate No : 25-SLM-246
Request No : Req-2025-1638

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	44.70	44.8	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	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	117.8	-0.2	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.6	-0.80	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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Certificate No : 25-SLM-246
Request No : Req-2025-1638

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.4	
Negative one-half cycle	143.5	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-338
Request No : Req-2025-2018

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0006617
ID : UAE.EFM.048/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 328669
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071532
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 September 2025
Calibrated Date : 9 October 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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pasit Mathavon
Calibration Engineer Supervisor

Issue Date : 9 October 2025

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TEL: 0660-2110-5860-1 FAX: 0660-2110-7140

Certificate No : 25-SLM-338
Request No : Req-2025-2018

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	114.0	0.25	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.5	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.3	0.10
C	27.7	0.10
Z	32.0	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	0.6	0.6	0.6	0.60
8000 Hz	0.7	0.7	0.7	0.70

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Certificate No : 25-SLM-338
Request No : Req-2025-2018

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 0660-2110-5860-1 FAX: 0660-2110-7140

Certificate No : 25-SLM-338
Request No : Req-2025-2018

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	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	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	98.9	-0.1	
94.00	94	93.9	-0.1	
89.00	89	88.9	-0.1	
84.00	84	83.9	-0.1	
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	53.9	-0.1	
49.00	49	48.9	-0.1	
44.00	44	44.0	0.0	
39.00	39	39.4	0.4	
38.00	38	38.5	0.5	

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Certificate No : 25-SLM-338
Request No : Req-2025-2018

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.60	43.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.7	-0.3	
	0.25	109.0	108.6	-0.4	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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Certificate No : 25-SLM-338
Request No : Req-2025-2018

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	142.4	
Negative one-half cycle	142.4	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-339
Request No : Req-2025-2019

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005341
ID : UAE.EFM.038/2563
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377B02
Microphone S/N : 11793
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056133
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 September 2025
Calibrated Date : 9 October 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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 October 2025

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Certificate No : 25-SLM-339
Request No : Req-2025-2019

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	113.9	0.15	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.3	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.9	0.10
C	28.6	0.10
Z	32.8	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	1.1	1.2	1.1	0.60
8000 Hz	0.4	0.4	0.4	0.70

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.1	
125 Hz	-0.1	0.0	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	0.0	-0.1	
1000 Hz	0.0	0.0	-0.1	0.20
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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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: 10640-2116-5860-1 FAX: 10640-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.1	0.1	
44.00	44	44.2	0.2	
39.00	39	39.5	0.5	
38.00	38	38.7	0.7	

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TEL: 10640-2116-5860-1 FAX: 10640-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.70	43.9	0.2	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.6	-0.4	
	0.25	109.0	108.6	-0.4	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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FM-708-SLM-01 Rev.00 Issue date 17/2/25

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 10640-2116-5860-1 FAX: 10640-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	142.7	
Negative one-half cycle	142.7	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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FM-708-SLM-01 Rev.00 Issue date 17/2/25

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

Cert.No.: 25CH1432
Page.: 1 of 3

Equipment :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA9M0046
ID No. :	UAE.EFM.001/2563(EFM.pH.01/63)
Condition As-Received:	Used Item
Received Date :	09 December 2025
Calibration Date :	11 December 2025
Reference :	2512-0243WSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
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 :	Warakorn Lerngagtrakul
Approved by :	Approved Signatory

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

Issue Date : 12 December 2025

The Uncertainties are for a confidence probability of approximately 95%

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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 Hach Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
: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 4.007	CPA chem	1114384	12 June 2027
pH 6.999	Hach Lenge GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1114385	08 June 2026

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 (4,7)(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	4.00	177.48	177.6	4.01	0.058	2.00
S/N.: HA9M0046	7.00	0.00	0.2	7.00	0.058	2.00
	7.00	0.00	0.2	7.00	0.058	2.00
	10.00	-177.48	-177.1	10.01	0.058	2.00

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Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(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	4.007	4.00	173.1	0.0079	2.00
S/N.: Q9AA0227	6.999	6.99	-1.6	0.0085	2.00
	6.999	7.00	-0.8	0.0092	2.00
	10.010	10.00	-165.5	0.0095	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : 9652-10D
- Serial No. : Q9AA0227

Dimension of probe

- Length : 112 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor *k*
15.0	15.005	15.0	-0.005	0.13	2.00
30.0	30.005	30.0	-0.005	0.13	2.00
45.0	45.003	45.0	-0.003	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 %.

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

Certificate of Testing

Equipment : DO Meter
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE0G0017
ID No. : UAE.EFM.082/2564(EFM.DO.01/64)
Received Date : 24 December 2025
Test Date : 25 December 2025
Reference : 2512-0641WSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak,
Phrakhanong, Bangkok 10260
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Wallalak Sirithean
Approved by :
Approved Signatory

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

Issue Date : 29 December 2025

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Condition of this result of calibration

1. Reference Standard Instruments :
This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 9K0E0163

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.22	0.0045

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL.0-2717-3000-29 FAX.0-2719-9484

Certificate of Calibration

Cert. No.: 26LM1
Page.: 1 of 2

Equipment : Do Meter with Sensor
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE0G0017
ID No. : UAE.EFM.082/2564(EFM.DO.01/64)
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Location : TPA On Site Calibration Laboratory

Received Order : 24 December 2025
Calibrated Date : 05 January 2026
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngagtrakul

Approved by : Kunchit
Approved Signatory

( ) Chakrit Waewwanjua
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 05 January 2026

The Uncertainties are for a confidence probability of approximately 95%

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Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	251953	TPA	05 Sep 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This measurement result is traceable to the International System of Unit maintained through :

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 9K0E0163

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor *k*
15.0	80	15.003	15.0	-0.003	0.16	2.00
30.0	80	30.003	29.9	-0.103	0.16	2.00
45.0	80	45.006	44.8	-0.206	0.16	2.00

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 %.

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เอกสารไม่ควบคุม

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	PARTICULATE MATTER (PM10) TOTAL SUSPENDED PARTICULATE	Mettler Toledo	MS204TS/00 / C252436235	United Analyst and Engineering Consultant. Co., Ltd. (UAE)	260311-3-BL-004-26	13/3/2026	12/3/2027

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 260311-3-BL004-26
Code No.: BL004-26
Page: 1 of 3

Customer Name:	United Analyst and Engineering Consultant Co., Ltd.				
Address:	3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260				
Equipment:	Electronic Balance				
Manufacturer:	Mettler Toledo				
Model:	MS204TS/00				
Serial No.:	C252436235				
Asset No. :	UAE.AIR.023/2566				
Building :	UAE number 3	Floor : 2		Room : 206	
Received Date:	March 11, 2026				
Date of Calibation :	March 13, 2026				
Calibration Conditions:	Temperature	start	19.6 °C	end	18.1 °C
	Humidity	start	59.8 %	end	56.5 %
	Pressure	start	758.6 mmHg	end	756.4 mmHg
Calibrated by:	Thanachat Chatpahol				
Approved by:	Suwit Chotnok	Signature:			
Issued Date:	March 17, 2026				

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance — Manufacturer: Mettler Toledo
Model: MS204TS/00 — Readability: 0.0001 (g)
Serial No.: C252436235 — ID No.: UAE.AIR.023/2566
Max. Capacity: 220 (g)
Calibration Date: March 13, 2026
Condition As-Received: In Condition
Condition of Equipment:
Condition of This Result of Calibration:
1. Calibration Method: This instrument was calibrated by method UAE CP-CAL-006 In-House Method based on UKAS Lab 24 : 2022
2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	CS10641605	METTLER TOLEDO GmbH	CS10641605	METTLER TOLEDO GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	8749109122	AMARC	25-008359	AMARC	21-Jan-27

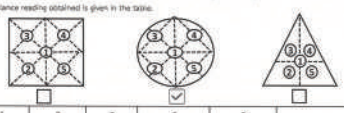
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	TPA	25P4464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration was found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH CS10641605, SAS accreditation number SCS 0032
7. Through the reference standard laboratory of AMARC 25-008359, TISI accreditation number 0152

Calibraton Result:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.000089

2. Eccentric or off-center loading
A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
99.9998	99.9998	99.9996	99.9995	99.9996	0.0003

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United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance — Manufacturer: Mettler Toledo
Model: MS204TS/00 — Readability: 0.0001 (g)
Serial No.: C252436235 — ID No.: UAE.AIR.023/2566
Max. Capacity: 220 (g)
Calibration Date: March 13, 2026

Calibraton Result: (Continued)
Calibraton Range: 0 to 200 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value:

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.15	2.28
0	0.1000083	0.0999	0.0001	0.15	2.28
1	1.0000119	0.9999	0.0001	0.15	2.28
3	3.0000244	2.9999	0.0001	0.16	2.28
5	5.0000146	4.9999	0.0001	0.16	2.28
10	10.0000330	10.0000	0.0000	0.15	2.25
20	20.0000280	19.9999	0.0001	0.16	2.25
40	40.0000560	39.9999	0.0002	0.16	2.18
60	60.0000700	59.9996	0.0005	0.17	2.14
80	80.0000980	79.9999	0.0002	0.18	2.09
100	100.0000420	99.9997	0.0003	0.19	2.07
120	120.0000680	119.9996	0.0005	0.21	2.05
160	160.0001120	159.9996	0.0005	0.25	2.00
200	200.0001460	199.9998	0.0004	0.28	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	19.9998	0.0002
	40.000054	39.9999	0.0002
	60.000070	59.9997	0.0004
	80.000098	79.9998	0.0003
	100.000109	100.0001	0.0000

Remark: Test weight by Filter pan at 1g = 1.0000 g, 3g = 2.9998 g, 5g = 4.9998 g
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximately 95%

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List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	United Analyst and Engineering Consultant Co., Ltd.	260318-1-BL007-26	3/4/2026	2/4/2027
2	Analytical Balance	TOTAL DISSOLVED SOLIDS	Mettler Toledo	XSR205DU / C210685394	United Analyst and Engineering Consultant.Co.,Ltd (UAE)	260311-2-BL001-26	12/3/2026	11/3/2027
3	Analytical Balance	TOTAL SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	United Analyst and Engineering Consultant. Co., Ltd. (UAE)	260311-2-BL002-26	12/3/2026	11/3/2027
4	Auto Clave	TOTAL COLIFORM BACTERIA	ALP Co.,Ltd. (Japan)	CL-40L / 808763	National Food Institute,Ministry of Industry, Thailand	2602303-007-01	11/3/2026	11/3/2027
5	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UC4-1320 / 1021	Technology Promotion Association (Thailand-Japan)	25TM1001	7/7/2025	6/7/2026
6	DO Meter	DO	Horiba	LAQUA-DO210 / HE9M0013	Technology Promotion Association (Thailand-Japan)	25TW236	20/11/2025	19/11/2026
7	DO Meter	BIOCHEMICAL OXYGEN DEMAND	YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	26TW50	2/3/2026	1/3/2027
8	Digestion Units	TOTAL KJELDAHL NITROGEN	FOSS Analytical Co.,Ltd (China)	DT2508/2520 / 91905060	FOSS South East Asia	15257	12/2/2026	11/2/2027
9	Hot Air Oven	TOTAL DISSOLVED SOLIDS TOTAL SUSPENDED SOLIDS	Memmert	UF55 / B212.0411	National food intitute ministry of Industry	2602300 001 01	11/3/2026	11/3/2027
10	Incubator	TOTAL COLIFORM BACTERIA	Binder	KB400 / 20220000022479	National food institute ministry of Industry	2503682 004 01	1/7/2025	30/6/2026
11	Kjeltec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	KT9 / 91905393	FOSS South East Asia	15256	12/2/2026	11/2/2027
12	pH Meter	pH	Horiba	LAQUA-PH210 / HA0A0005	technology promotion association (thailand-japan	25CH1433	11/12/2025	10/12/2026

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

สุดสาหกรรมแห่งชาติ กระทรวงอุตสาหกรรม
ศูนย์บริการห้องปฏิบัติการสุดสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

NSC-TISI-TIS 17025 CALIBRATION 0061

Calibration Certificate

Certificate No.: 2503682-004-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Equipment: CHAMBER (Incubator)
Manufacturer: BINDER
Model: KB 400
Serial No.: 20220000022479
ID No.: UAE.MIC.028/2566
Order No.: 2503682
Operation No.: 2503682-004
Date of Receipt: 1 July 2025
Date of Calibration: 1 July 2025

Calibrated by Mr.Pheraphat Tuanjit, Scientist
Approved by (Miss Preeyaporn Jaengkarnkit), Vice President, Department of Laboratory Services, Responsible for the Technical Management Team
Date of Issue: 3 July 2025

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65

เอกสารไม่ควบคุม

สุดสาหกรรมแห่งชาติ กระทรวงอุตสาหกรรม
ศูนย์บริการห้องปฏิบัติการสุดสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

NSC-TISI-TIS 17025 CALIBRATION 0061

Calibration Report

Certificate No.: 2503682-004-01
Equipment: CHAMBER (Incubator)
Model: KB 400 Serial No.: 20220000022479
Resolution: 0.1 °C ID No.: UAE.MIC.028/2566
Manufacturer: BINDER
Date of Calibration: 1 July 2025

Location: Microbiology Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition:
Ambient Temperature (21 ± 1) °C
Relative Humidity (55 ± 10) %
Line Voltage (230 ± 5) Volt

Condition of this results of Calibration:

1. This instrument was calibrated by insert 13 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
   - The temperature scale used was based on ITS - 90.
   - All data show below were final values and the initial data may be obtained upon request.
2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY59003377	2501168-001-01	13 January 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#101-203 / RTD#101-203			

3. This certificate is traceable to International System of Units (SI Units).
4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of Calibrated item : Good
   UUC Description :
   Time of Record 1 Hour 9 Minute At 35.0 °C
   Fresh air Damper - Open Position -
   X Close Fan 100%
   - Not Available
7. Result of Calibration : [X] Without adjustment [ ] After adjustment

3 July 2025

F-CS-013 Revision: 01 Date: 20-04-65

เอกสารไม่ควบคุม

nfi
สถาบันอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

ilac-MRA
NSC-TISI-TIS 17025 CALIBRATION 0081

Calibration Report

Certificate No.: 2503682-004-01
Equipment: CHAMBER (Incubator)
Model: KB 400 Serial No.: 20220000022479
Resolution: 0.1 °C ID No.: UAE.MIC.028/2566
Manufacturer: BINDER

Date of Calibration: 1 July 2025
Calibration point: 35.0 °C
Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	20.1	45	225.0
MAX	22.0	65	235.0

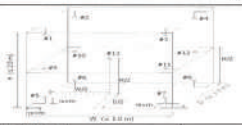

Table1 : Reporting of Temperature

Calibration point	Measured Temperature (°C) @ Sensor No. (Sensor No.13 is REF)													Uncertainty
(°C)	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	± (°C)
35.0	35.19	35.03	34.83	35.21	34.96	34.94	34.84	34.84	35.06	34.94	35.15	34.79	34.92	0.27

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Temperature Stability ± (°C)	Temperature Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
34.8	34.8	34.8	34.8	0.040	0.29	0.50

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "
UUC* = Unit Under Calibration
Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.
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.
Overall Variation = The difference of the maximum and minimum measured temperatures througout observation time.
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k= 2, providing a level of confidence of approximately 95 %.

--------- End ---------

3 July 2025

2008 ซอยพัฒนาการ 36 ถนนพัฒนาการ แขวงสวนหลวง เขตสวนหลวง กรุงเทพมหานคร 10250
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8888 Fax +66(0) 2422 8545

เอกสารไม่ควบคุม

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.0-2718-9484

ilac-MRA
NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : ARCO
Model : UC4-1320
Serial No. : -
ID No. : UAE.WAO.018/2559
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2

Received Order : 07 July 2025
Calibration Date : 07 July 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Man Pattanapongpaiboon

Approved by : Kunchit
Approved Signatory

( ) Chakrit Waewwanjua
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 17 July 2025

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

Procedure Used :-
Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

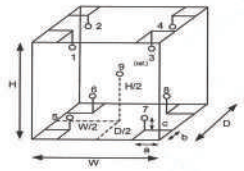
Condition of this result of calibration
1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY59003411	24LM192	TPA	24 Dec 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This measurement result is traceable to the International System of Unit maintained through :
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	54	57
AC Supply (Volt)	224	226



Position :	Ref. Std. ID No.:
1	25-20RTD-2/1
2	25-20RTD-2/2
3	25-20RTD-2/3
4	20RTD-2/4
5	20RTD-2/5
6	20RTD-2/6
7	20RTD-2/7
8	20RTD-2/8
9 (ref.)	20RTD-2/9

Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :
D = 0.62 m
W = 1.2 m
H = 1.2 m
Capacity = 0.89 m³

เอกสารไม่ควบคุม

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	19.9	0.18	0.60	0.83	2

Calibration Point (°C)	Measured Temperature (°C) Position									Uncertainty (±°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	20.202	19.900	20.390	20.077	20.111	20.044	20.275	20.173	19.835	0.38

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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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เอกสารไม่ควบคุม

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 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 25TW236
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE9M0013
ID No. : UAE.EFM.016/2563 (EFM.DO.05/63)
Received Date : 18 November 2025
Test Date : 20 November 2025
Reference : 2511-0529WSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak,
Phrakhanong, Bangkok 10260
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In-house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirithean
Approved by : Saithip
Approved Signatory

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

Issue Date : 21 November 2025

Condition of this result of calibration

1. Reference Standard Instruments :
This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 9K9M0021

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.20	0.0055

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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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

Cert. No.: 25LM172
Page.: 1 of 2

Equipment : DO Meter with Sensor
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE9M0013
ID No. : UAE.EFM.016/2563(EFM.DO.05/63)
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : TPA On Site Calibration Laboratory
Received Order : 18 November 2025
Calibrated Date : 21 November 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Warakorn Lerngagtrakul
Approved by : Kunchit
Approved Signatory

( ) Chakrit Waewwanjua
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 24 November 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.

Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2511-0529WSC-2
Procedure Used :-
Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	A7B843	25I17	TPA	06 Jan 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This measurement result is traceable to the International System of Unit maintained through :
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function : Temperature measurement.
This instrument was connected with temperature sensor, S/N.: 9K9M0021

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor *k*
15.0	80	14.998	15.0	0.002	0.16	2.00
30.0	80	30.003	29.9	-0.103	0.16	2.00
45.0	80	45.000	44.8	-0.200	0.16	2.00

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 %.

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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 : pH Meter
Manufacturer : Horiba
Model : LAQUA-PH210
Serial No. : HA0A0005
ID No. : UAE.EFM.004/2563(EFM.pH.04/63)
Condition As-Received: Used Item
Received Date : 09 December 2025
Calibration Date : 11 December 2025
Reference : 2512-0243WSC-2
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak,
Phrakhanong, Bangkok 10260

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 : Warakorn Lerngagtrakul

Approved by : _____
Approved Signatory

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

Issue Date : 12 December 2025

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

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 Hach Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
: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 4.007	CPA chem	1114384	12 June 2027
pH 6.999	Hach Lenge GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1114385	08 June 2026

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 (4,7)(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	4.00	177.48	177.4	4.01	0.058	2.00
S/N.: HA0A0005	7.00	0.00	0.1	7.00	0.058	2.00
	7.00	0.00	0.1	7.00	0.058	2.00
	10.00	-177.48	-177.2	10.01	0.058	2.00

เอกสารไม่ควบคุม

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(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	4.007	4.01	175.4	0.0085	2.05
S/N.: -	6.999	7.00	-0.3	0.0095	2.00
	6.999	7.01	-0.5	0.0096	2.00
	10.010	10.01	-170.6	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;
- Model : -
- Serial No. : -

Dimension of probe
- Length : 112 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
15.0	15.002	15.0	-0.002	0.13	2.00
30.0	30.002	30.0	-0.002	0.13	2.00
45.0	45.003	45.0	-0.003	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 %.

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เอกสารไม่ควบคุม

FOSS

Customer Service Report

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Report No.: 15256

Date: Feb 12, 2026
Customer: UAE
Job No.: 14589
Address: Bangkok
Instrument: kg Distillator
Serial: 9191053093

	Travel To Customer (Hrs)		Labour (Hrs)		Travel From Customer (Hrs)	
Start	08.00	1.5	09.30	4	-	-
Finish	09.50		13.30		-	-

Job Type

Application		Special		Standard			
Distributor		Courtesy Visit		Installation		In House	
Digital Service		PMA Approval Check		Quote		PM	X
Internal		Warranty -		Repair		HC Visit	
Training		Sales Support		Investigate		Others	

PMA Type	Smartcare		Smartcare Pro		Fosscare	X
	Smartcare Advance		Fosscare Pro		N/A	

Details of Work / Test

- PM -
- Visual Check
+ No leak - ok
+ No damage - ok
- change PM kit + 1 Set - ok
- Function Check
+ Dilution - ok
+ Alkali - ok
+ Receiver - Not use
+ Steam Nozzle - ok

Instrument Ready for Use	OK	X	Not OK*	

Part No:	Batch	Description	Q'ty
60100196	11-03-2025	PM kit kjeltec 8 Dist. Heater	1

I confirm this report is accurate and complete

Signed FOSS		Signed Customer	
Name:	Awanit Phetchan	Name	
Tel:		Tel:	0614504984
Email:		Email:	Pitiya.Sakumnoi@gmail.com

*Remark:

Please scan QR code

เอกสารไม่ควบคุม

FOSS

Customer Service Report

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Report No.: 15257

Date:	Feb 12, 2026	Customer:	UAE
Job No.:	14590	Address:	Bangkok
Instrument:	DT2520	Serial:	91905060

	Travel To Customer (Hrs)		Labour (Hrs)		Travel From Customer (Hrs)	
Start	–		13:30	1.5	–	
Finish	–	–	15:00		–	–

Job Type						
Application		Special		Standard		
Distributor		Courtesy Visit		Installation	In House	
Digital Service		PMA Approval Check		Quote	PM	X
Internal		Warranty -		Repair	HC Visit	
Training		Sales Support		Investigate	Others	

PMA Type		Smartcare		Smartcare Pro		Fosscare	X
		Smartcare Advance		Fosscare Pro		N/A	

Details of Work / Test

- PM
- Visual Check
  - + No leak – ok
  - + No Burning – ok
- Change PM kit x 1 Set – ok
- Function Check
  - + Quick mode
    - + Set Temp /Timer – ok
    - + Run – ok
  - heating – ok
  - Lift up/down – ok
- clean x3 probes with Cloud head

Instrument Ready for Use	OK	X	Not OK*	

Part No:	Batch	Description	Q'ty
60079780	29.09.2025	FoD PM kit, Digester 20 per, 12 month	1

I confirm this report is accurate and complete

Signed FOSS		Signed Customer	
Name:	Anut Patchimsiklanin	Name	
Tel:		Tel:	
Email:		Email:	

*Remark:

Please scan QR code

เอกสารไม่ควบคุม

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 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 26TW50
Page.: 1 of 2

Equipment :	DO Meter
Manufacturer :	YSI
Model :	5100
Serial No. :	11B 101863
ID No. :	UAE.WAO.004/2554
Received Date :	27 February 2026
Test Date :	02 March 2026
Reference :	2602-0915DSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walalak Sirithean
Approved by :	Saithip Approved Signatory

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

Issue Date : 03 March 2026

เอกสารไม่ควบคุม

Cert.No.: 26TW50
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :
   This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 24F100202

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.20	0.0084

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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เอกสารไม่ควบคุม

UAE United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 260311-2-BL002-26
Code No.: BL002-26
Page: 1 of 4

Customer Name:	United Analyst and Engineering Consultant Co., Ltd.			
Address:	3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260			
Equipment:	Electronic Balance			
Manufacturer:	Mettler Toledo			
Model:	XSR205DU			
Serial No.:	C009071872			
Asset No. :	UAE.WAO.012/2563			
Building :	UAE number 3	Floor : 2		Room : 208
Received Date:	March 11, 2026			
Date of Calibation :	March 12, 2026			
Calibration Conditions:	Temperature	23.8 °C	to	24.1 °C
	Humidity	50.0 %	to	59.0 %
	Pressure	755.5 mmHg	to	755.6 mmHg
Calibrated by:	Thanachat Chatpahol			
Approved by:	Suwit Chotnok	Signature:		
Issued Date:	March 16, 2026			

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the United Analyst and Engineering Consultant Co.,Ltd. (UAE)

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Condition As-Received: In Condition

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g) : 01 mg
ID No.: UAE.WAO.012/2563

Condition of Equipment:
Condition of This Result of Calibration:
1. Calibration Method: This instrument was calibrated by method UAE CF CAL 006 In-House Method based on UKAS Lab 14 : 2022
2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	Mettler-Toledo GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	8749109122	AMARC	25-009359	Mettler-Toledo	21-Jan-27

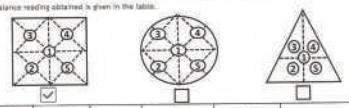
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	TPA	25P0464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH CS10641605, SAS accreditation number SCS 003E
7. Through the reference standard laboratory of AMARC 25-009359, TSI accreditation number 0152

Calibraton Result:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000008
200*	0.000045

2. Eccentric or off-center loading
A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0000	100.0000	100.0000	100.0000	100.0000	0.0000

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g) : 01 mg
ID No.: UAE.WAO.012/2563

Calibraton Result: (Continued)
Calibraton Range: 0 to 80 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: 0 to 81 (g) ; Resolution: 0.00001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.015	2.25
0.001	0.0010020	0.0010	0.00000	0.015	2.23
0.005	0.0050025	0.0050	-0.00002	0.015	2.23
0.01	0.0100005	0.0100	-0.00002	0.015	2.23
0.05	0.0500003	0.0500	-0.00001	0.015	2.21
0.10	0.1000083	0.1000	-0.00001	0.015	2.20
0.50	0.5000121	0.5000	-0.00002	0.016	2.15
1	1.0000119	1.0000	0.00000	0.016	2.12
2	2.0000125	2.0000	-0.00001	0.017	2.09
5	5.0000146	5.0000	-0.00002	0.020	2.05
10	10.0000330	10.0001	-0.00002	0.023	2.00
20	20.000028	20.0001	-0.00005	0.033	2.00
30	30.000061	30.0001	-0.00004	0.051	2.00
40	40.000054	40.0001	-0.00004	0.063	2.00
50	50.000037	50.0001	-0.00005	0.064	2.00
60	60.000070	60.0001	-0.00004	0.081	2.00
80	80.000098	80.0001	-0.00001	0.11	2.00

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United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g) : 01 mg
ID No.: UAE.WAO.012/2563

Calibraton Result: (Continued)
Calibraton Range: > 80 to 200 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: > 80 to 200 (g) ; Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.02	2.25
90	90.0000910	90.0000	0.0000	0.16	2.00
100	100.0000420	100.0000	0.0000	0.16	2.00
110	110.0000750	110.0000	0.0000	0.17	2.00
120	120.0000680	120.0000	0.0001	0.18	2.00
130	130.0001010	130.0000	0.0000	0.20	2.00
140	140.0000960	140.0003	0.0001	0.21	2.00
150	150.0000790	150.0003	0.0001	0.21	2.00
160	160.0001120	160.0003	0.0001	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0004	-0.0002	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0000	0.0000
	40.000054	40.0002	-0.0001
	60.000070	60.0002	-0.0001
	80.000098	80.0002	-0.0001
	100.000042	100.0003	-0.0002

Remark:
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximately 95%

o—o-End-o—o

เอกสารไม่ควบคุม

nfi สัมฤทธิ์การพัฒนาอุตสาหกรรมการอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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NSC-TISI-TIS 17025 CALIBRATION 0081

Calibration Certificate

Certificate No.: 2602300-001-01
Page : 1 of 2

Equipment: CHAMBER (Hot Air Oven)
Manufacturer: MEMMERT
Model: UF55
Serial No.: B212.0411
ID No.: UAE.WAO.005/2556
Order No.: 2602300
Operation No.: 2602300-001
Date of Receipt: 11 March 2026
Date of Calibration: 11 March 2026

Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Metrological traceability:

1. Calibration Method:
- This instrument was calibrated by inserting 9 standard thermometers into its chamber, in accordance with W-TE-014 based on TLAS G-20-1/02-06 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
- The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90).
- All data shown below are final values, and the initial data may be obtained upon request.

2. Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A RTD	MY59002002 CH#201-209/ RTD#201-209	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE

3. This certificate is traceable to the International System of Units (SI).
4. This certificate is valid only for the instrument that was calibrated.
5. The result of this calibration was found to be accurate only on the date and at the place of calibration shown.

Calibrated by: Mr.Manas Somsak, Specialist
Approved by: (Mr.Pheraphat Tuanjit), Manager, Division of Calibration Laboratory, Responsible for the Technical Management Team
Date of Issue: 18 March 2026

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 02 Date: 01-10-68

2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่เรือ เขตบางกอกน้อย กรุงเทพฯ 10700
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เอกสารไม่ควบคุม

สุดสาหกรรมพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการสุดสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Certificate

Certificate No.: 2602300-001-01
Page : 2 of 2

Calibration Condition:

Equipment: CHAMBER (Hot Air Oven)
UUC* Resolution: 0.1 °C
Condition of the Item: Normal & Good
Without adjustment / As Found
- Time of record 1 hour 9 minute / point

Place of Calibration: Laboratory
UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Conditions: Ambient Temperature (29.6 ± 1.0) °C
Relative Humidity (47.8 ± 4) %
Line Voltage (222 ± 3) V.

Calibration Results:

Table1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF) Std.#1	Std.#2	Std.#3	Std.#4	Std.#5	Std.#6	Std.#7	Std.#8	Std.#9	Measurement Uncertainty (±°C)
104.0	104.22	103.87	103.90	104.17	103.56	103.58	104.22	104.17	104.00	0.53
120.0	120.21	119.76	119.86	120.16	119.53	119.58	120.24	120.20	119.96	0.73
180.0	180.27	179.37	179.73	180.31	178.91	179.13	180.35	180.25	179.84	0.99

Table 2 : Reporting of Characterization Results

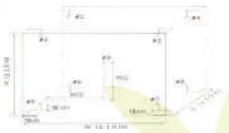
UUC* Setting (°C)	UUC* Reading (°C) Max	Min	Average	Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
104.0	104.0	104.0	104.0	0.05	0.44	0.75
120.0	120.0	120.0	120.0	0.06	0.43	0.79
180.0	180.0	180.0	180.0	0.07	0.93	1.56

Note
- UUC* : Unit Under Calibration
-The quoted uncertainty includes contributions from 'Stability' and 'Loading Effect (20% of Temperature Uniformity)
- Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.
- 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.
- Overall Variation = The difference of The maximum and minimum measured temperatures througout observation time.
For more information, details of the sensor installation should be reported.

Fresh air Damper	-	Open	- Position
	X	Close	100% Fan speed
	-	Not Available	

Dimension of inside chamber and sensor installation location (cm.)

W x H x D	40	x 40	x 30
a b & a c	10	x 10	x 10



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

------ End of Report ------

F-CS-009 Revision: 02 Date: 01-10-68

เอกสารไม่ควบคุม

2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่ขัน เขตบางพลัด กรุงเทพมหานคร 10700
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
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สุดสาหกรรมพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการสุดสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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CALIBRATION 0061

Calibration Certificate

Certificate No.: 2602303-007-01
Page : 1 of 2

Equipment: Autoclave
Manufacturer: ALP
Model: CL-40L
Serial No.: 808763
ID No.: UAE.MIC.026/2563
Order No.: 2602303
Operation No.: 2602303-007
Date of Receipt: 11 March 2026
Date of Calibration: 11 March 2026

Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Metrological traceability:

1. Calibration Method:
- This instrument was calibrated by inserting 3 standard data loggers with RTDs into its autoclave, in accordance with W-TE-018, based on BS 2646-1:2021, Autoclaves for sterilization in laboratories Part 1: Design, construction, safety and performance - specification.
- The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90).
- All data shown below are final values, and the initial data may be obtained upon request.

2. Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with RTD (Data Logger)	HiTemp140-PT	S33753	2502245-002-01	22 March 2026	NATIONAL FOOD INSTITUTE
	HiTemp140	S25603	2601300-004-01	10 January 2027	NATIONAL FOOD INSTITUTE
	PRTemp140	R38546	2601300-003-01	10 January 2027	NATIONAL FOOD INSTITUTE

3. This certificate is traceable to the International System of Units (SI).
4. This certificate is valid only for the instrument that was calibrated.
5. The result of this calibration was found to be accurate only on the date and at the place of calibration shown.

Calibrated by: Mr.Nuttapol Niyomchat
Specialist

Approved by: (Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 19 March 2026

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 02 Date: 01-10-68

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2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่ขัน เขตบางพลัด กรุงเทพมหานคร 10700
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สุดสาหกรรมพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการสุดสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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CALIBRATION 0061

Calibration Certificate

Certificate No.: 2602303-007-01
Page : 2 of 3

Calibration Condition:

Equipment: Autoclave
Resolution: 0.1 °C
Condition of the Item: Normal & Good
Without adjustment / As Found
- Setting program function sterilization STERILIZE/NORMAL
- Time of sterilization 15 Minute at 115.0, 121.0 °C

Place of Calibration: Room 301
UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Conditions: Ambient Temperature (26.0 ± 1) °C
Relative Humidity (47.5 ± 3) %
Line Voltage (228.5 ± 4) V.

Calibration Results:

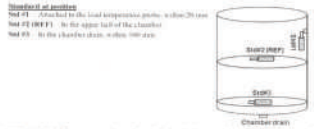
Table1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. Std.# 1	Std.# 2 (REF)	Std.# 3	Measurement Uncertainty (±°C)
115.0	115.29	115.33	115.37	0.64
121.0	121.17	121.18	121.06	0.64

Table 2 : Reporting of Characterization Results

UUC* Setting (°C)	UUC* Reading (°C) Max	Min	Average	MPa	Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
115.0	115.1	114.9	115.0	0.08	0.23	0.53	0.51
121.0	121.1	120.9	121.0	0.12	0.24	0.67	0.67

Note
- UUC* : Unit Under Calibration
- The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity)"
- Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.
- 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.
- Overall Variation = The difference of the maximum and minimum measured temperatures througout observation time.
For more information, details of the sensor installation should be reported.



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

------ End of Report ------

F-CS-009 Revision: 02 Date: 01-10-68

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2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่ขัน เขตบางพลัด กรุงเทพมหานคร 10700
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NSC-TISI-TIS 17025
CALIBRATION 0610

Certificate of Calibration

Certificate No.: 260311-2-BL001-26
Code No.: BL001-26
Page: 1 of 4

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR205DU
Serial No.: C210685394
Asset No. : UAE.WAO.010/2565
Building : UAE number 3 Floor : 2 Room : 208

Received Date: March 11, 2026
Date of Calibation : March 12, 2026
Calibration Conditions: Temperature 23.0 °C to 23.6 °C
Humidity 51.5 % to 54.4 %
Pressure 755.7 mmHg to 757.9 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok Signature:

Issued Date: March 16, 2026

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Condition As-Received: In Condition
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.004 In-House Method based on LNAS Lab 14 : 2022
2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	CS10641605	METTLER TOLEDO GmbH	CS10641605	METTLER TOLEDO GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	AMARC	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	TPA	25P6464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration was found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH CS10641605, SAS accreditation number SCS 0032
7. Through the reference standard laboratory of AMARC 25-009359, TISI accreditation number 0132

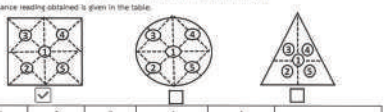
Calibraton Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000019
200*	0.000055

2. Eccentric or off-center loading

A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0002	100.0002	100.0003	100.0004	100.0003	0.0001

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Calibraton Result: (Continued)
Calibraton Range: 0 to 80 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: 0 to 81 (g) ; Resolution: 0.00001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.00000	0.00000	0.032	2.65
0.001	0.0010020	0.00101	0.00000	0.032	2.65
0.005	0.0050025	0.00501	-0.00001	0.032	2.65
0.01	0.0100005	0.01001	-0.00001	0.032	2.65
0.05	0.0500003	0.05001	-0.00001	0.032	2.65
0.10	0.1000083	0.10000	0.00001	0.033	2.65
0.50	0.5000121	0.50001	0.00000	0.033	2.65
1	1.0000119	1.00003	-0.00002	0.032	2.52
2	2.0000125	2.00003	-0.00002	0.033	2.52
5	5.0000146	5.00003	-0.00002	0.033	2.32
10	10.0000330	10.00006	-0.00003	0.034	2.21
20	20.000028	20.00006	-0.00003	0.041	2.07
30	30.000061	30.00017	-0.00011	0.055	2.00
40	40.000054	40.00021	-0.00016	0.066	2.00
50	50.000037	50.00023	-0.00019	0.068	2.00
60	60.000070	60.00029	-0.00022	0.084	2.00
80	80.000098	80.00039	-0.00030	0.12	2.00

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Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Calibraton Result: (Continued)
Calibraton Range: > 81 to 200 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: > 81 - 220 (g) ; Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.032	2.65
90	90.0000910	90.0004	-0.0003	0.16	2.00
100	100.0000420	100.0003	-0.0003	0.16	2.00
110	110.0000750	110.0004	-0.0003	0.18	2.00
120	120.0000680	120.0004	-0.0003	0.19	2.00
130	130.0001010	130.0005	-0.0004	0.20	2.00
140	140.0000960	140.0004	-0.0003	0.21	2.00
150	150.0000790	150.0005	-0.0004	0.22	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0001	0.0000	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0001	0.0000
	40.000054	40.0001	0.0000
	60.000070	60.0000	0.0001
	80.000098	80.0000	0.0001
	100.000109	100.0000	0.0001

Remark: -
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No.: 260318-1-BL007-26
Code No.: BL007-26
Page: 1 of 3

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Serial No.: 1129361010
Asset No. : UAE.WAS.002/2552
Building : UAE No.3 Floor : 1 Room : 107

Received Date: April 2, 2026
Date of Calibation : April 3, 2026
Calibration Conditions: Temperature start 21.9 °C end 22.1 °C
Humidity start 60.6 % end 60.1 %
Pressure start 756.6 mmHg end 755.1 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok Signature: e.Cif

Issued Date: April 7, 2026

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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Certificate No.: 260318-1-BL007-26
Code No.: BL007-26
Page: 2 of 3

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Readability: 0.0001 g
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Max. Capacity: 220 g
Calibration Date: April 3, 2026
Condition As-Received: In Condition
Condition of Equipment:
Condition of This Result of Calibration:
1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.006 In-House Method based on UAAS Lab 14 : 2022
2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	Mettler-Toledo	3-Mar-27

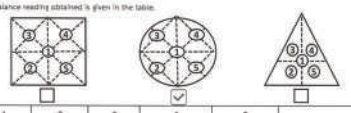
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	TPA	25P4464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration was found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH C510641605, SAS accreditation number SCS 0032

Calibration Result:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.00010

2. Eccentric or off-center loading
A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0025	100.0022	100.0022	100.0029	100.0030	0.0008

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Certificate No.: 260318-1-BL007-26
Code No.: BL007-26
Page: 3 of 3

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Readability: 0.0001 g
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Max. Capacity: 220 g
Calibration Date: April 3, 2026

Calibration Result: (Continued)
Calibration Range: 0 - 200 g
Calibration Adjustment: Internal Calibration

3. Error of Indication from nominal or conventional mass value:

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.17	2.37
0.01	0.0100005	0.0099	0.0001	0.17	2.32
0.05	0.0500003	0.0499	0.0001	0.17	2.32
0.1	0.1000083	0.0999	0.0001	0.17	2.32
0.5	0.5000121	0.5000	0.0000	0.17	2.32
1.0	1.0000119	1.0000	0.0000	0.17	2.32
10.0	10.000033	10.0003	-0.0003	0.17	2.32
40.0	40.000054	40.0010	-0.0010	0.18	2.23
50.0	50.000037	50.0013	-0.0012	0.18	2.23
80.0	80.000098	80.0020	-0.0019	0.19	2.11
100.0	100.000042	100.0025	-0.0024	0.20	2.10
120.0	120.000068	120.0028	-0.0027	0.22	2.06
150.0	150.000079	150.0035	-0.0035	0.24	2.04
160.0	160.000112	160.0036	-0.0035	0.25	2.03
200.0	200.000146	200.0049	-0.0047	0.28	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0004	-0.0003
	40.000054	40.0009	-0.0008
	60.000070	60.0013	-0.0012
	80.000098	80.0017	-0.0016
	100.000042	100.0021	-0.0021

Remark: -
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximately 95%

o---o-End-o---o

เอกสารไม่ควบคุม

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต -สะพานใหม่									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Thermo Scientific	G25A 158M	Jiranatee Associates Co., Ltd.	COF-025-68	21 Jul 25	20 Jul 26	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P3506	9 Sep 25	8 Sep 26	-
3	Aneroid Barometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P1523	23 Apr 26	22 Apr 27	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26H713	17 Apr 26	16 Apr 27	-
5	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1180540063	UAE Consultant Co.,Ltd.	17022026	17 Feb 26	16 Feb 27	-
6	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920005	UAE Consultant Co.,Ltd.	20022025	20 Feb 26	19 Feb 27	-
7	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920006	UAE Consultant Co.,Ltd.	17022026	17 Feb 26	16 Feb 27	-
8	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920009	UAE Consultant Co.,Ltd.	20022025	20 Feb 26	19 Feb 27	-
9	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1201778106	UAE Consultant Co.,Ltd.	24022026	24 Feb 26	23 Feb 27	-
10	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1200636463	UAE Consultant Co.,Ltd.	24022026	24 Feb 26	23 Feb 27	-
11	Standard Gases (Mixture)	Nitrogen Dioxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
12	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778119	UAE Consultant Co.,Ltd.	24072025	24 Jul 25	23 Jul 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต -สะพานใหม่									
13	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497730	UAE Consultant Co.,Ltd.	09072025	9 Jul 25	8 Jul 26	-
14	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497732	UAE Consultant Co.,Ltd.	09072025	9 Jul 25	8 Jul 26	-
15	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497733	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
16	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778117	UAE Consultant Co.,Ltd.	11072025	11 Jul 25	10 Jul 26	-
17	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778118	UAE Consultant Co.,Ltd.	29072025	29 Jul 25	28 Jul 26	-
18	Standard Gases (Mixture)	Carbon Monoxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
19	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 93JN1MN9	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
20	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 KWWV1R96	UAE Consultant Co.,Ltd.	01082026	1 Aug 25	31 Jul 26	-
21	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 RATFJBXS	UAE Consultant Co.,Ltd.	07082026	7 Aug 25	6 Aug 26	-
22	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 GY21PTED	UAE Consultant Co.,Ltd.	07082026	7 Aug 25	6 Aug 26	-
23	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 GAL13KSE	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
24	Total Hydrocarbons Analyzer	Total Hydrocarbons	Thermo Scientific	55i 1182920025	UAE Consultant Co.,Ltd.	25072025	25 Jul 25	24 Jul 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต -สะพานใหม่									
25	Standard Gas	Total Hydrocarbons	Linde	D824432	Linde	09042013	4 Aug 20	4 Aug 28	-
26	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0105	Thai Meteorological Department	133/26	2 Mar 26	1 Mar 27	-
27	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0113	Thai Meteorological Department	033/26	20 Jan 26	19 Jan 27	-
28	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0114	Thai Meteorological Department	225/26	17 Apr 26	16 Apr 27	-
29	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0116	Thai Meteorological Department	132/26	2 Mar 26	1 Mar 27	-
30	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037708	Thai Meteorological Department	395/25	22 Aug 25	21 Aug 26	-
31	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037713	Thai Meteorological Department	394/25	22 Aug 25	21 Aug 26	-
32	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	Larson Davis	CAL150 6307	Innovative Instrument Co.,Ltd.	25-ACT-136	9 Sep 25	8 Sep 26	-
33	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0005343	Innovative Instrument Co.,Ltd.	25-SLM-340	10 Oct 25	9 Oct 26	-
34	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0005349	Innovative Instrument Co.,Ltd.	25-SLM-337	9 Oct 25	8 Oct 26	-
35	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0005395	Electrical And Electronics Institute Foundation For Industrial Development	CP20250041EA	3 Feb 25	2 Feb 27	-
36	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0005398	Innovative Instrument Co.,Ltd.	25-SLM-247	30 Jul 25	29 Jul 27	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต -สะพานใหม่									
37	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0005403	Innovative Instrument Co.,Ltd.	25-SLM-246	30 Jul 25	29 Jul 26	-
38	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0005405	Innovative Instrument Co.,Ltd.	25-SLM-245	30 Jul 25	29 Jul 27	-
39	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0006615	Innovative Instrument Co.,Ltd.	25-SLM-131	8 Apr 25	7 Apr 27	-
40	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0006617	Innovative Instrument Co.,Ltd.	25-SLM-338	9 Oct 25	8 Oct 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงสะพานใหม่ -คูคต									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Tisch Environmental,Inc.	TE-5025A 3383	Jiranatee Associates Co., Ltd.	COF-040-68	30 Sep 25	29 Sep 26	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P3507	9 Sep 25	8 Sep 26	-
3	Aneroid Barometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P1519	22 Apr 26	21 Apr 27	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26H711	17 Apr 26	16 Apr 27	-
5	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i CM22387035	UAE Consultant Co.,Ltd.	17022026	17 Feb 26	16 Feb 27	-
6	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i CM22387037	UAE Consultant Co.,Ltd.	02052025	20 Feb 26	19 Feb 27	-
7	Standard Gases (Mixture)	Nitrogen Dioxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
8	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1200636467	UAE Consultant Co.,Ltd.	09072025	9 Jul 25	8 Jul 26	-
9	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1200906880	UAE Consultant Co.,Ltd.	09072025	9 Jul 25	8 Jul 26	-
10	Standard Gases (Mixture)	Carbon Monoxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
11	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 VUPVTC21	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
12	Total Hydrocarbons Analyzer	Total Hydrocarbons	HORIBA	APHA-370 PDXEGXF7	UAE Consultant Co.,Ltd.	01082026	1 Aug 25	31 Jul 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงสะพานใหม่-คูคต									
13	Standard Gas	Total Hydrocarbons	Linde	D824432	Linde	09042013	4 Aug 20	4 Aug 28	-
14	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037708	Thai Meteorological Department	395/25	22 Aug 25	21 Aug 26	-
15	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037713	Thai Meteorological Department	394/25	22 Aug 25	21 Aug 26	-
16	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	Larson Davis	CAL150 6695	Innovative Instrument Co.,Ltd.	25-ACT-135	9 Sep 25	8 Sep 27	-
17	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0006689	Innovative Instrument Co.,Ltd.	26-SLM-095	2 Mar 26	1 Mar 28	-
18	Sound Level Meter	$L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{A10}, L_{A50}	Larson Davis	LxT2 0006694	Innovative Instrument Co.,Ltd.	25-SLM-271	11 Aug 25	10 Aug 27	-

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Water โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงสะพานใหม่-คูคต									
1	pH Meter	pH	Horiba	LAQUA-PH210 HA1M0036	Technology Promotion Association (Thailand-Japan)	25CH1473	26 Dec 25	25 Dec 26	-
2	DO Meter	DO	Horiba	LAQUA-DO210 HE0G0017	Technology Promotion Association (Thailand-Japan)	25TW251	25 Dec 25	24 Dec 26	-

JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
63/14-15, 67/35-36
Petchkasem 7,7/1, Rd. Wattitapra, Bangkokyai,
Bangkok 10600(Thailand)
Tel: +6678680811
Mobile: +66863888453
E-mail: jnac-calibration@jiranatee.com
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-025-68

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: Graseby GMW
MODEL/TYPE	: G25A
SERIAL NUMBER	: 15BM
ID NUMBER	: UAE.EMA2.033/2554
CONDITION AS-RECEIVED	: Used Item
CUSTOMER	: United Analyst and Engineering Consultant Co., Ltd. 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
RECEIVED DATE	: 08 Jul 2025
MEASUREMENT DATE	: 21 Jul 2025
ISSUE DATE	: 23 Jul 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 24.1 °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 G63/MC/W2 s/n. The. 161-C1-004 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: MM-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'

Calibrated by:
☐ Mr. Sorayot Thachalad
☑ Miss Jittraporn Lertsomphol

Approved signatory: .....
Mr. Parinya Boonchanoen
Calibration Department Manager

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

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JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number COF-025-68

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 m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow $[Q_s]$ m^3/min
1	0.705	754.349	23.73	22.79	49.056	1.591	1.259	0.659
2	1.001	754.437	24.15	23.35	53.261	3.204	1.786	0.928
3	1.117	754.417	24.28	23.76	35.572	4.198	2.044	1.061
4	1.172	754.507	24.30	23.80	26.997	4.736	2.171	1.127
5	1.409	754.551	24.20	23.66	25.669	6.905	2.622	1.357

Slope (*m*): 1.95153
Intercept (*b*): -0.02703
Correlation coefficient (*r*): 0.99990
Uncertainty (*k=2*): 0.015 m^3/min

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

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow $[Q_a]$ m^3/min
1	0.705	754.349	23.73	22.79	49.056	1.591	0.791	0.661
2	1.001	754.437	24.15	23.35	53.261	3.204	1.124	0.933
3	1.117	754.417	24.28	23.76	35.572	4.198	1.287	1.067
4	1.172	754.507	24.30	23.80	26.997	4.736	1.366	1.132
5	1.409	754.551	24.20	23.66	25.669	6.905	1.650	1.363

Slope (*m*): 1.22228
Intercept (*b*): -0.01696
Correlation coefficient (*r*): 0.99990
Uncertainty (*k = 2*): 0.015 m^3/min

End of Certificate of Calibration

Jiranatee Associates Co., Ltd.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 25P3S06
Page : 1 of 2

Equipment :	U-Tube Manometer
Manufacturer:	Dwyer
Model :	1221-36-W/M
Serial No.:	-
ID No.:	UAE.EFM.022/2560
Condition As-Received:	Used Item
Received Date:	03 September 2025
Calibration Date:	09 September 2025
Reference:	2509-0144WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Atmospheric Pressure:	1009 mbar

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P04, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MP-0216-24	24 Sep 2025

2.This result of calibration was made on requested at the point specified by customer.
3.Scale and conversion factor is 1 kPa = 4.0146293 inH₂O
4.This instrument was used clean air as pressure media.
5.This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.
6.This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.
7.The certificate is valid only to the item calibrated on date and place of calibration.
8.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

Calibrated by : Suksan Khankaew
Issue Date : 10 September 2025

Approved Signatory : Attapol P
[ ] Phalinee Prabpaipal
[ ] Sura Suwannasri
[√] Attapol Panurach

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Result of calibration:- Without adjustment
Function:- Pressure Measurement
Inoreasing Pressure

Range : 0 inH₂O to 36 inH₂O
Scale Interval : 0.1 inH₂O (The Second Estimate)

	UUC Indication			
Applied Pressure	High-port side	Low-port side	ΔP	Error
0.00	0.00	0.00	0.00	0.00
2.00	0.95	-0.95	1.90	-0.10
4.00	2.00	-1.95	3.95	-0.05
6.00	3.00	-2.95	5.95	-0.05
8.00	4.00	-3.95	7.95	-0.05
10.00	5.00	-4.95	9.95	-0.05
12.00	6.00	-5.95	11.95	-0.05
14.00	7.05	-7.00	14.05	0.05
16.00	8.05	-7.95	16.00	0.00
18.00	9.05	-8.95	18.00	0.00
20.00	10.05	-8.95	20.00	0.00
22.00	11.10	-11.00	22.10	0.10
24.00	12.10	-12.00	24.10	0.10
26.00	13.10	-13.00	26.10	0.10
28.00	14.10	-14.00	28.10	0.10
30.00	15.10	-15.00	30.10	0.10
32.00	16.10	-16.00	32.10	0.10
34.00	17.10	-17.00	34.10	0.10
35.70	18.00	-17.85	35.85	0.15

The uncertainty of measurement was ± 0.11 inH₂O
* ΔP = High-port side - Low-port side
* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26P1523
Page : 1 of 2

Equipment :	Aneroid Barometer
Manufacturer:	Barigo
Model :	-
Serial No.:	-
ID No.:	UAE.ANV.152/2550
Condition As-Received:	Used Item
Received Date:	10 April 2026
Calibration Date:	23 April 2026
Reference:	2604-0316WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %

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.

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P10, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Indicator	DPI142	1422505046	MP-0150-25	20 May 2026

2.This result of calibration was made on requested at the point specified by customer.
3.The certificate is valid only to the item calibrated on date and place of calibration.
4.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Somchai Chaichan
Issue Date : 24 April 2026

Approved Signatory :
[ ] Phalinee Prabpaipal
[√] Sura Suwannasri
[ ] Attapol Panurach

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Technical information and UUC* settings during calibration:

Result of calibration	: Without adjustment	**Range**	: 960 hPa to 1030 hPa
Pressure type	: Absolute Pressure	**Scale Interval:**	1 hPa (The Fifth Estimate)
Installation	: Vertical Orientation	**Pressure medium**	: Clean air
Atmospheric pressure	: (1004 ± 10) mbar	**Reference level**	: at the center of the dial

Increasing Pressure

Applied Pressure (hPa)	955.29	966.54	977.66	988.18	998.94	1008.96	1019.79	1030.21
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	4.71	3.46	2.34	1.82	1.06	1.04	0.21	-0.21

Decreasing Pressure

Applied Pressure (hPa)	1030.19	1019.81	1008.97	998.89	988.30	977.68	966.66	955.22
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-0.19	0.19	1.03	1.11	1.70	2.32	3.34	4.78

The uncertainty of measurement was ± 0.25 hPa

* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26H713
Page : 1 of 2

Equipment :	Dial Thermo-Hygrometer
Manufacturer:	Barigo
Model :	-
Serial No.:	-
ID No.:	UAE.ANV.132/2550
Condition As-Received:	Used Item
Received Date:	10 April 2026
Calibration Date:	17 April 2026 to 22 April 2026
Reference:	2604-0315WSC
Ambient Temperature:	(25 ± 3) °C
Relative Humidity:	(50 ± 20) %

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.

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Chilled-Mirror Hygrometer	Dew Master	41292	23277	06 May 2026
2) Handheld Thermometer With Sensor	1523	5717096	25I1200	21 Nov 2026

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

3.This measurement result is traceable to the International System of Unit maintained through:-
-Thunder Scientific Corporation, NVLAB Accreditation No. Calibration 200582-0
-Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Calibrated by : Kraipop Onrat
Issue Date : 23 April 2026

Approved Signatory : Vipom
[ ] Chakrit Waewwanjua
[ ] Pornthippa Tameyakul
[✓] Vipom Tantiyawutti

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Cert. No.: 26H713
Page.: 2 of 2

Result of Calibration:- Before Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	42	-1.9	1.6
25.0	60.0	59	1.0	1.7
25.0	80.0	75	5.0	1.9

Result of Calibration:- After Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	43	-2.9	1.6
25.0	60.0	60	0.0	1.7
25.0	80.0	76	4.0	1.9

Result of Calibration:- Without Adjustment
Function: Temperature Measurement.

Standard Temperature (°C)	UUC* Reading (°C)	UUC* Correction (°C)	Uncertainty of Measurement (±°C)
20.012	20.5	-0.488	0.65
25.028	25.0	0.028	0.65
30.005	29.5	0.505	0.65
35.019	34.5	0.519	0.65
40.040	39.5	0.540	0.65

UUC* : Unit Under Calibration
The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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United Analyst and Engineering Consultant Co., Ltd.
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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

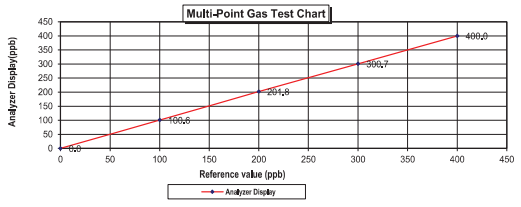
Test Date : Feb 17,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1180540063

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.6	0.60	0.60	0.60
Level 3	40.00%	200.0	201.8	1.80	0.89	0.89
Level 4	60.00%	300.0	300.7	0.70	0.23	0.23
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range :Acceptable Limit ± 5%		500.0 ppb		Average Difference (%)		0.34



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Approve by .....17.../...Feb...../...2026.

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

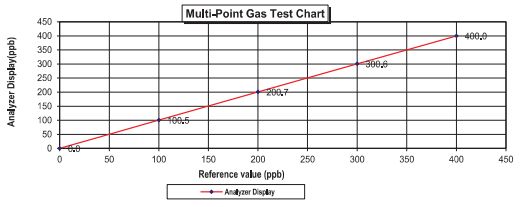
Test Date : Feb 20,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920005

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.5	0.50	0.50	0.50
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.6	0.60	0.20	0.20
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range :Acceptable Limit ± 5%		500.0 ppb		Average Difference (%)		0.21



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Approve by 20/Feb/2026

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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Feb 17,2026

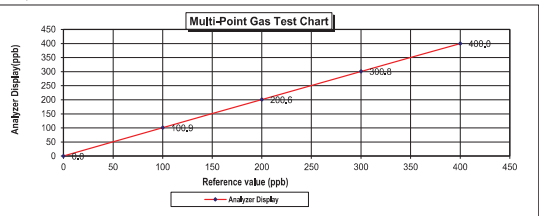
Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920006

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.6	0.60	0.30	0.30
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb				Average Difference (%)		0.29

:Acceptable Limit ± 5%



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Approve by ..... 17 / Feb / 2026

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MULTI-POINT GAS TEST REPORT

Test Date : Feb 20,2026

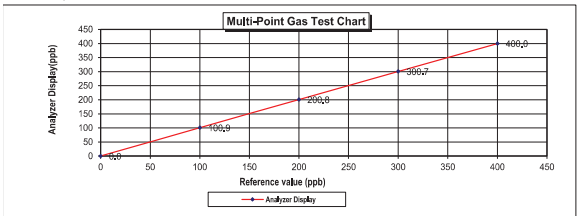
Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920009

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.8	0.80	0.40	0.40
Level 4	60.00%	300.0	300.7	0.70	0.23	0.23
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb				Average Difference (%)		0.30

:Acceptable Limit ± 5%



Calculate by ..... 20 / 02 / 2569

Approve by ..... 20 / Feb / 2026

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Feb 24,2026

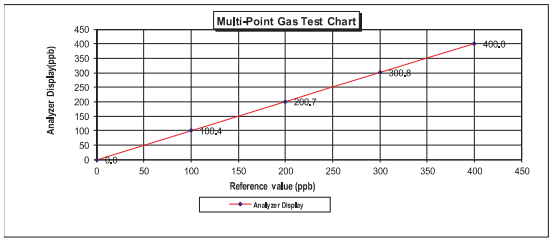
Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201778106

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.4	0.40	0.40	0.40
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb				Average Difference (%)		0.20

:Acceptable Limit ± 5%



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MULTI-POINT GAS TEST REPORT

Test Date : Feb 24,2026

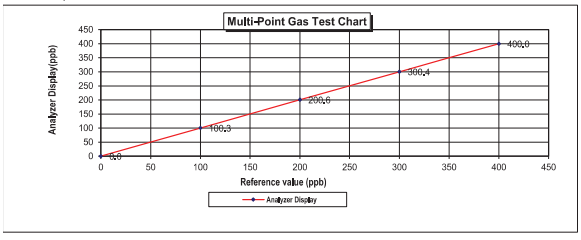
Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1200636463

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.3	0.30	0.30	0.30
Level 3	40.00%	200.0	200.6	0.60	0.30	0.30
Level 4	60.00%	300.0	300.4	0.40	0.13	0.13
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb				Average Difference (%)		0.15

:Acceptable Limit ± 5%



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Approve by ..... 24 / Feb / 2026

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD

Part Number: E05NI91E15A0014
Cylinder Number: EB0162121
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: CO,CO2,NO,NOX,SO2,BALN

Reference Number: 160-402772205-1
Cylinder Volume: 144.0 CF
Cylinder Pressure: 2016 PSIG
Valve Outlet: 660
Certification Date: Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	104282308	CC754364	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12408	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	153400202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.358 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-180	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 29, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 24,2025

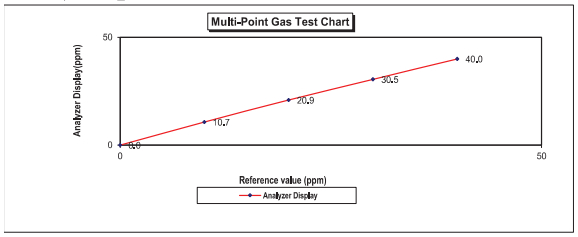
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1201778119

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.9	0.9	4.3	4.3
Level 4	60.00%	30.0	30.5	0.5	1.6	1.6
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.50

:Acceptable Limit ± 5%



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 9,2025

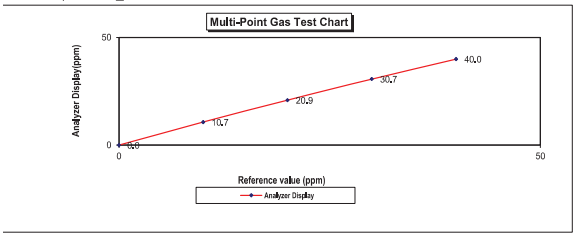
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201497730

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.9	0.9	4.3	4.3
Level 4	60.00%	30.0	30.7	0.7	2.3	2.3
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.63

:Acceptable Limit ± 5%



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MULTI-POINT GAS TEST REPORT

Test Date : July 9,2025

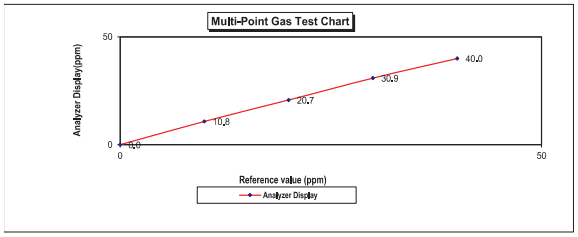
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201497732

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.7	0.7	3.4	3.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.74

:Acceptable Limit ± 5%



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United Analyst and Engineering Consultant Co., Ltd.
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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 17,2025

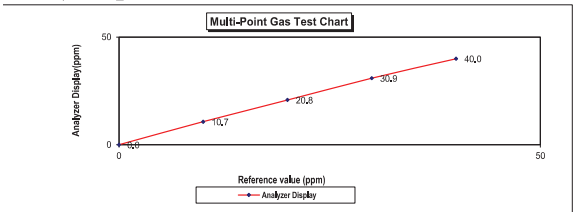
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201497733

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.8	0.8	3.8	3.8
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.66

:Acceptable Limit ± 5%



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 11,2025

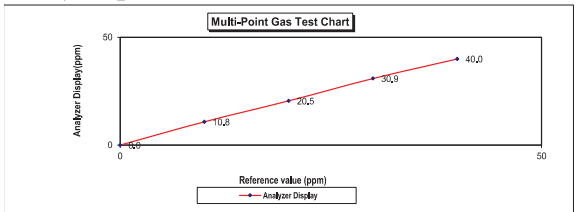
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201778117

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.5	0.5	2.4	2.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.55

:Acceptable Limit ± 5%



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3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 29,2025

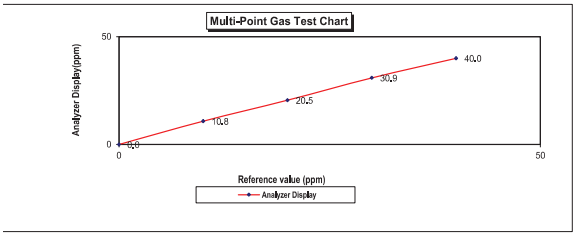
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1201778118

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.5	0.5	2.4	2.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.55

:Acceptable Limit ± 5%



Calculate by ..... 29 / 07 / 2568

Approve by ..... 29 / July / 2025

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD		
Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023
		Expiration Date:	Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	1042202308	CC754384	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C221910	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12409	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	1534002202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-160	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 28, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 17,2025

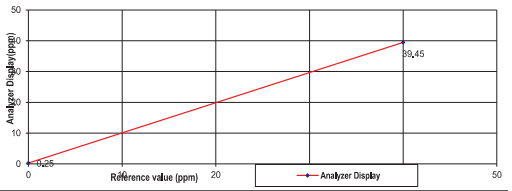
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	93JN1MN9

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.25	0.25	0.25	0.25
Level 2	80.00%	40.00	39.45	-0.55	-1.39	1.39
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		0.82

Multi-Point Gas Test Chart



Calculate by ..... 17 / 07 / 2568

Approve by ..... 17 / July / 2025

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Aug 1,2025

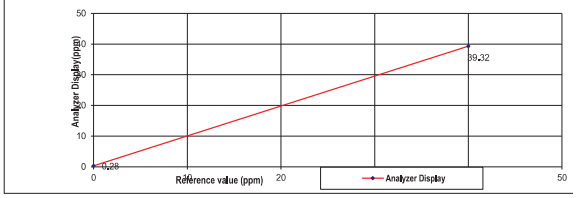
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	KWWV1R96

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.28	0.28	0.28	0.28
Level 2	80.00%	40.00	39.32	-0.68	-1.73	1.73
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.00

Multi-Point Gas Test Chart



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Approve by ..... 01 / Aug / 2025

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Aug 7,2025

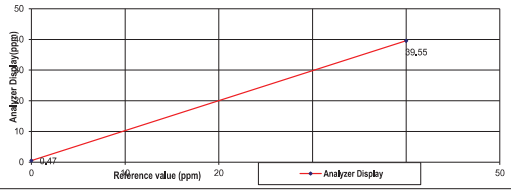
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	RATFJBXS

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.47	0.47	0.47	0.47
Level 2	80.00%	40.00	39.55	-0.45	-1.14	1.14
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		0.80

Multi-Point Gas Test Chart



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Aug 7,2025

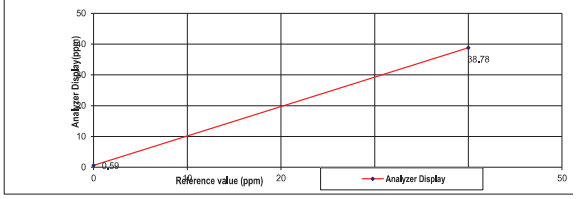
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	GY21PTED

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.59	0.59	0.59	0.59
Level 2	80.00%	40.00	38.78	-1.22	-3.15	3.15
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.87

Multi-Point Gas Test Chart



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3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

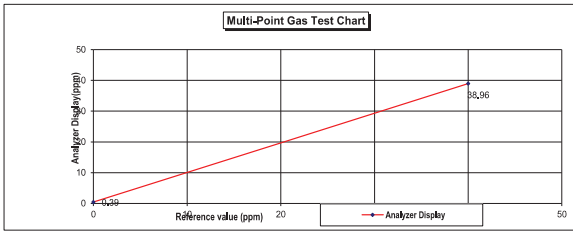
Test Date : July 17,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	GAL13KSE

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.39	0.39	0.39	0.39
Level 2	80.00%	40.00	38.96	-1.04	-2.67	2.67
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.53



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Approve by ..... 17 / July / 2025

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United Analyst and Engineering Consultant Co., Ltd.
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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

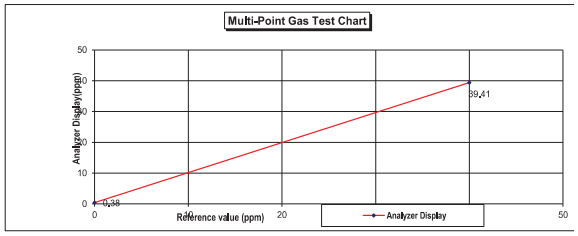
Test Date : July 25,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	55i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1182920025

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.38	0.38	0.38	0.38
Level 2	80.00%	40.00	39.41	-0.59	-1.50	1.50
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		0.94



Calculate by ..... 25 / 07 / 2568

Approve by ..... 25 / July / 2025

เอกสารไม่ควบคุม

THE LINDE GROUP

Linde

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: United Analyst & Engineering Co., Ltd.

Address: 3 Soi Udomsuk 41, Sukhumvit Rd., Bang Chak, Khet Phra Khanong, Bangkok 10260

Customer Tag No.:

Certificate Details

Number: 3384/20 Date of Issue: 4-Aug-2020 Expiry date: 4-Aug-2028

Material Details

Production Order: 90161442 Material Code: 480400-AL-34 Cylinder No.: D824432

Gas content: 6.60 M^3 Filling pressure: 137.0 bar Valve: CGA 590 BRASS

Cylinder Owner: LINDE Cylinder Material: Aluminium Cylinder Size: 50 L

Laboratory Report

Analytical Result

Component	Nominal Concentration	Analysis Result[1]	Uncertainty[2]	Method of Analysis[3]	Assay Date
Methane In Air	40.0 ppm	39.8 ppm	± 1% relative	(G) I-PIR-152	4-Aug-2020

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date
Methane In Nitrogen	[illegible]	40.29 ± 0.39 ppm	2-Oct-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet 650	FTIR-CH4	4-Aug-2020

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The assay of this Standard has been performed in accordance with the EIGA Traceability Protocol EIGA 205/17 [1/531] for the Assay and Certification of Gaseous Calibration Standards using [illegible]
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95% the measurement of this material is traceable to the SI through the reference gas standard which is traceable to [illegible] other recognised national metrology institutes.
3. (F) Gas Chromatography, (G) Paramagnetic Oxygen Analyser, (S) Electrochemical Oxygen Analyser, (K) Electrochemical Moisture Analyser, (V) Total Hydrocarbon Analyser, (X) Other - Specified

Sukanya Parinyasootsom
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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[illegible] (Thailand) Public Company Limited

[illegible]

เอกสารไม่ควบคุม

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 2 March, 2026 Certification No. 133/26

Page : 1 of 5

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0105
Wind Sensor 2205DT0105

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1004.1 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: testo, testo 645 Serial No. 02648057 : Thermoschneider No.918802
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015
: Digital Barometer Vaisala Type PTB330 No. K4520001

Calibrated by : Nathnarpol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Signed : Pisoed Promsut
Mr. Pisoed Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 2 of 5

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
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
180	180
270	270

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 3 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1005.83	1006	-0.17
1006.10	1006	0.10
1006.34	1006	0.34
1006.69	1006	0.69
1007.09	1007	0.09
1007.43	1007	0.43
1007.93	1008	-0.07
1008.57	1009	-0.43
1008.05	1008	0.05
1008.94	1009	-0.06
1009.34	1009	0.34
1009.06	1009	0.06
1008.75	1009	-0.25
1008.54	1008	0.54
1007.98	1008	-0.02
1007.62	1008	-0.38
1006.87	1007	-0.13
1005.48	1005	0.48
1004.81	1005	-0.19
1003.82	1004	-0.18
	Average	0.06

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
754.43	754	0.43
754.64	755	-0.36
754.82	755	-0.18
755.08	755	0.08
755.38	755	0.38
755.63	755	0.63
756.01	756	0.01
756.49	756	0.49
756.10	756	0.10
756.77	757	-0.23
757.07	757	0.07
756.86	757	-0.14
756.62	757	-0.38
756.47	756	0.47
756.05	756	0.05
755.78	756	-0.22
755.21	755	0.21
754.17	754	0.17
753.67	754	-0.33
752.93	753	-0.07
	Average	0.00

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 5 of 5

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
45.2	45	0.2
30.2	30	0.2
15.4	15	0.4

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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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 20 January, 2026 Certification No. 033/26

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0113

Wind Sensor 2205DT0113

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.7 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V2220019

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisoed Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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The Result of Calibration

Certification No. 033/26

20 January, 2026

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	mbar
1010.35	1011	-0.65
1010.05	1010	0.05
1009.76	1010	-0.24
1009.43	1009	0.43
1009.14	1009	0.14
1008.84	1009	-0.16
1008.55	1008	0.55
1008.24	1008	0.24
1008.11	1008	0.11
1007.54	1007	0.54
1008.16	1008	0.16
1008.52	1008	0.52
1008.91	1009	-0.09
1009.25	1009	0.25
1009.62	1009	0.62
1009.86	1010	-0.14
1010.05	1010	0.05
1010.53	1011	-0.47
1010.94	1011	-0.06
1011.18	1011	0.18

Average

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	mmHg
757.82	758	-0.18
757.60	757	0.60
757.38	757	0.38
757.13	757	0.13
756.92	757	-0.08
756.69	756	0.69
756.47	756	0.47
756.24	756	0.24
756.14	756	0.14
755.72	756	-0.28
756.18	756	0.18
756.45	756	0.45
756.74	757	-0.26
757.00	757	0.00
757.28	757	0.28
757.46	757	0.46
757.60	758	-0.40
757.96	758	-0.04
758.27	758	0.27
758.45	758	0.45

Average

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.6	46	-0.4
30.1	30	0.1
15.7	16	-0.3

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 17 April, 2026 Certification No. 225/26

Page : 1 of 5

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21 ID No. : UAE.EFM.165/2565

Mfg Code : Wireless Receiver 2205DR0114

Wind Sensor 2205DT0114

Customer : United Analyst and Engineering Consultant Co.,Ltd.

81 Soi Udomsuk 41, Sukhumvit Road,

Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1006.5 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

: testo, testo 645 Serial No. 02848057 : Thermoschneider No.918802

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

: Digital Barometer Vaisala Type PTB330 No. H4320001

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Signed : Pisoot

Mr. Pisoot Promsut

Authorised Signatory

for the Chief

Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 225/26

17 April, 2026 Page : 2 of 5

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer m/sec	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
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
270	270

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 225/26

17 April, 2026 Page : 3 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1006.10	1006	0.10
1006.03	1006	0.03
1005.82	1006	-0.18
1006.54	1007	-0.46
1008.54	1008	0.54
1008.90	1009	-0.10
1009.09	1009	0.09
1009.38	1009	0.38
1009.71	1010	-0.29
1009.58	1010	-0.42
1009.91	1010	-0.09
1009.70	1010	-0.30
1009.97	1010	-0.03
1009.56	1010	-0.44
1010.44	1010	0.44
1011.20	1011	0.20
1011.24	1011	0.24
1006.94	1007	-0.06
1007.38	1007	0.38
1007.88	1008	-0.12
	Average	0.09

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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The Result of Calibration

Certification No. 225/26

17 April, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
754.64	754	0.64
754.58	755	-0.02
754.43	754	0.43
754.97	755	-0.03
756.47	756	0.47
756.74	757	-0.26
756.88	757	-0.12
757.10	757	0.10
757.34	757	0.34
757.25	757	0.25
757.49	758	-0.51
757.34	757	0.34
757.54	757	0.54
757.23	757	0.23
757.89	758	-0.11
758.46	758	0.46
758.49	758	0.49
755.27	755	0.27
755.60	755	0.60
755.97	756	-0.03
	Average	0.20

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

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

The Result of Calibration

Certification No. 225/26

17 April, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.4	45	0.4
30.2	30	0.2
15.4	15	0.4

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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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 2 March, 2026 Certification No. 132/26

Page : 1 of 5

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0116

Wind Sensor 2205DT0116

Customer : United Analyst and Engineering Consultant Co.,Ltd.

81 Soi Udomsuk 41, Sukhumvit Road,

Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1004.5 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board

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

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

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

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

: testo, testo 645 Serial No. 02848057 : Thermoschneider No.918802

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

: Digital Barometer Vaisala Type PTB330 No. K0320001

Calibrated by : Watcharapol Signed :

Mr. Watcharapol Subwat Mr. Pisood Promsut

Mechanical Engineer Authorised Signatory

for the Chief

Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 132/26

2 March, 2026 Page : 2 of 5

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
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
270	270

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 132/26

2 March, 2026 Page : 3 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1005.83	1006	-0.17
1006.10	1006	0.10
1006.34	1006	0.34
1006.69	1007	-0.31
1007.09	1007	0.09
1007.43	1007	0.43
1007.93	1008	-0.07
1008.57	1009	-0.43
1008.05	1008	0.05
1008.94	1009	-0.06
1009.34	1009	0.34
1009.06	1009	0.06
1008.75	1009	-0.25
1008.54	1009	-0.46
1007.98	1008	-0.02
1007.62	1008	-0.38
1006.87	1007	-0.13
1005.48	1005	0.48
1004.81	1005	-0.19
1003.82	1004	-0.18
	Average	0.00

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 132/26

2 March, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
754.43	754	0.43
754.64	755	-0.36
754.82	755	-0.18
755.08	755	0.08
755.38	756	0.38
755.63	756	-0.37
756.01	756	0.01
756.49	757	-0.51
756.10	756	0.10
756.77	757	-0.23
757.07	757	0.07
756.86	757	-0.14
756.62	757	-0.38
756.47	756	0.47
756.05	756	0.05
755.78	756	-0.22
755.21	755	0.21
754.17	754	0.17
753.67	754	-0.33
752.93	753	-0.07
	Average	0.00

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
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4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 132/26

2 March, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45	0.2
30.2	30	0.2
15.4	15	0.4

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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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 22 August, 2025 Certification No. 395/25

Page : 1 of 7

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA672.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037708 Wind speed BQ1705626 Wind direction19020250
Thermoigrometers 24070579 Barometer R1605260

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.9 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FG014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. U1220015

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Signed : Pisood Promsut
Mr. Pisood Promsut

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 2 of 7

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	-	-	-	1.0	0.00
3.02	-	-	-	2.9	0.12
5.00	-	-	-	5.0	0.00
7.04	-	-	-	6.9	0.14
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 3 of 7

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1009.12	0.08
1009.04	1008.98	0.06
1008.82	1008.85	-0.03
1008.65	1008.72	-0.07
1008.46	1008.45	0.01
1008.15	1008.18	-0.03
1007.64	1007.52	0.12
1007.43	1007.38	0.05
1007.27	1007.25	0.02
1007.04	1006.98	0.06
1006.43	1006.45	-0.02
1006.21	1006.32	-0.11
1008.62	1008.58	0.04
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.85	-0.01
1006.28	1006.32	-0.04
	Average	0.03

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT
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The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 4 of 7

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.9	0.06
756.84	756.8	0.04
756.68	756.7	-0.02
756.55	756.6	-0.05
756.41	756.4	0.01
756.17	756.2	-0.03
755.79	755.7	0.09
755.63	755.6	0.03
755.51	755.5	0.01
755.34	755.3	0.04
754.88	754.9	-0.02
754.72	754.8	-0.08
756.53	756.5	0.03
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.2	-0.01
754.77	754.8	-0.03
	Average	0.03

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 5 of 7

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
45.14	45.24	-0.10
30.25	30.34	-0.09
15.24	15.29	-0.05

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 6 of 7

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.1	-1.57
65.24	66.1	-0.86
44.12	44.5	-0.38

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 395/25

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ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1#C Serial No.PC1705209 ทำการสอบเทียบกับแก้วัดฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

ลงชื่อ.....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

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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 22 August, 2025 Certification No. 394/25

Page : 1 of 7

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA672.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037713 Wind speed BQ1705627 Wind direction19050292
Thermoigrometers 24070483 Barometer R1605257

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.5 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 120629686)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1250015

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Signed :

Mr. Phood Promsut

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 2 of 7

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer m/sec	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1008.98	0.22
1009.04	1008.85	0.19
1008.82	1008.72	0.10
1008.65	1008.58	0.07
1008.46	1008.45	0.01
1008.15	1008.05	0.10
1007.64	1007.52	0.12
1007.43	1007.25	0.18
1007.27	1007.12	0.15
1007.04	1006.98	0.06
1006.43	1006.32	0.11
1006.21	1006.18	0.03
1008.62	1008.45	0.17
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.72	0.12
1006.28	1006.18	0.10
	Average	0.11

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 394/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.8	0.16
756.84	756.7	0.14
756.68	756.6	0.08
756.55	756.5	0.05
756.41	756.4	0.01
756.17	756.1	0.07
755.79	755.7	0.09
755.63	755.5	0.13
755.51	755.4	0.11
755.34	755.3	0.04
754.88	754.8	0.08
754.72	754.7	0.02
756.53	756.4	0.13
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.1	0.09
754.77	754.7	0.07
	Average	0.08

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.14	45.21	-0.07
30.25	30.31	-0.06
15.24	15.32	-0.08

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.6	-2.07
65.24	66.5	-1.26
44.12	44.9	-0.78

Calibrated by : Watcharapol Subwat
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 394/25

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1 Serial No.19050180 ทำการสอบเทียบกับแก้วัดฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

กรมอุตุนิยมวิทยา METEOROLOGICAL DEPARTMENT

ลงชื่อ.....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

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

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-ACT-136
Request No : Req-2025-1827

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : LARSON DAVIS
Model : CAL150
Serial Number : 6307
ID : UAE.EFM.049/2563

Class : 2
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 August 2025
Calibration Date : 9 September 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 provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

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

Calibrated By : Mr. Noppadon Luangart, Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn, Calibration Engineer Supervisor

Issue Date : 9 September 2025

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

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

Certificate No : 25-ACT-136
Request No : Req-2025-1827

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

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	93.94	-0.06	-	-	0.11
114 dB / 1000 Hz	114.09	0.09	-	-	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	999.01	0.10	-	-	0.01
114 dB / 1000 Hz	999.00	0.10	-	-	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	1.89	-	0.17
114 dB / 1000 Hz	0.65	-	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: 0660-2116-5860-1 FAX: 0660-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-340
Request No : Req-2025-2024

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005343
ID : UAE.EFM.040/2563
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377A04
Microphone S/N : 368644
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056135
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 September 2025
Calibrated Date : 10 October 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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By : Mr. Noppadon Luangart, Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn, Calibration Engineer Supervisor

Issue Date : 10 October 2025

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-340
Request No : Req-2025-2024

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	113.6	-0.15	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	24.7	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	23.9	0.10
C	23.3	0.10
Z	27.6	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	A	C	Z	(± dB)
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.2	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.6	0.7	0.7	0.60
8000 Hz	1.0	1.1	1.1	0.70

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-340
Request No : Req-2025-2024

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.0	
16000 Hz	0.0	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-340
Request No : Req-2025-2024

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
136.00	136	136.0	0.0	0.30
135.00	135	135.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.2	0.2	
34.00	34	34.4	0.4	

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-340
Request No : Req-2025-2024

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	39.60	39.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	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	117.8	-0.2	
	0.25	109.0	108.8	-0.2	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.1	+0.1	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.7	-0.70	0.20
Positive half cycle	136.4	136.1	-0.30	
Negative half cycle	136.4	136.1	-0.30	

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 06(0)-2116-5860-1 FAX: 06(0)-2116-7140

Certificate No : 25-SLM-340
Request No : Req-2025-2024

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.2	
Negative one-half cycle	141.2	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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TEL : 06(0)-2116-5860-1 FAX: 06(0)-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-337
Request No : Req-2025-2017

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LXT2
Serial Number : 0005349
ID : UAE.EPM.046/2563
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377A04
Microphone S/N : 368645
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056141
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 September 2025
Calibrated Date : 9 October 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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 October 2025

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TEL : 06(0)-2116-5860-1 FAX: 06(0)-2116-7140

Certificate No : 25-SLM-337
Request No : Req-2025-2017

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	113.7	-0.05	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	24.3	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	23.7	0.10
C	22.9	0.10
Z	27.4	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.2	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.3	0.4	0.4	0.60
8000 Hz	-0.1	0.0	0.1	0.70

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TEL : 06(0)-2116-5860-1 FAX: 06(0)-2116-7140

Certificate No : 25-SLM-337
Request No : Req-2025-2017

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-337
Request No : Req-2025-2017

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
136.00	136	135.9	-0.1	
135.00	135	134.9	-0.1	
134.00	134	133.9	-0.1	
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	93.9	-0.1	
89.00	89	88.9	-0.1	0.30
84.00	84	83.9	-0.1	
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	53.9	-0.1	
49.00	49	48.9	-0.1	
44.00	44	43.9	-0.1	
39.00	39	39.1	0.1	
34.00	34	34.3	0.3	

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-337
Request No : Req-2025-2017

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	39.30	39.4	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respons	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.8	-0.2	
	0.25	109.0	108.8	-0.2	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.7	-0.70	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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

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Certificate No : 25-SLM-337
Request No : Req-2025-2017

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.8	
Negative one-half cycle	141.8	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT
975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,
Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280
Tel: +66 2709 4860 Fax: +66 2324 0917

Certificate No.: CP20250041EA
Operation No.: CP2024090313

Certificate of Calibration

Equipment:	Sound Level Meter
Manufacturer:	Larson Davis (Meter), PCB (Microphone), PCB (Preamplifier)
Model/Type:	LxT2 (Meter), 375A04 (Microphone), PRMLxT2C (Preamplifier)
Serial No.:	0005395 (Meter), 351846 (Microphone), 073797 (Preamplifier)
ID No.:	UAE.EFM.032/2564
Customer:	United Analyst and Engineering Consultant Co.,Ltd.
Address:	81 Soi Udomsuk 41, Sukhumvit Road, Bangchak Phrakhanong, Bangkok 10260
Received Date:	24 January 2025
Calibrated Date:	3 - 4 February 2025
Issued Date:	5 February 2025
Calibrated by:	Ms. Juntaporn Kunhakorn

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

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.
The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor (k) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.

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Certificate No.: CP20250041EA

Calibration Report

Equipment: Sound Level Meter
Manufacturer: Larson Davis (Meter), PCB (Microphone), PCB (Preamplifier)
Model/Type: LxT2 (Meter), 375A04 (Microphone), PRMLxT2C (Preamplifier)
Serial No.: 0005395 (Meter), 351846 (Microphone), 073797 (Preamplifier)
ID No.: UAE.EFM.032/2564
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :-
IEC 61672-3:2013.

Condition of this result of calibration
1. Reference standards instrument :-

	Instrument	Model	Serial No.	Cert. No.	Due Date
1)	Standard microphone	4180	2661000	AA-1007-24	6 June 2025
2)	Arbitrary Function Generator	AFG2021	C010063	CK20240048EA	23 June 2025
3)	Programmable Attenuator	PA5	2913	EF-0021-24	3 June 2025
4)	6.5 Digit precision multimeter	8846A	9609027	CB20240128EA	31 July 2025
5)	Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P240022 CD20240180EA	20 March 2025 7 August 2025
6)	Performance Audio Analyzer	UB9038	MY56510003	CB20240035EB CK20240069EA	15 February 2025 19 September 2025

2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certification is traceable to the international system of unit maintained at :-
Reference standards instrument for Acoustic function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute; NSC Accredited Calibration No.0119
Reference standards instrument for Electrical function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute; NSC Accredited Calibration No.0119

Result of Calibration:-
Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
-	-	-	-

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250041EA

Calibration Report

Function : 2. Self-generated Noise
2.1 Microphone Installed

Measured value (dB)
31.1

2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	28.1
C-weighting	27.9
Z-weighting	34.1

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)
Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.1	0.0	0.1	±1.5
1000	-0.1	-0.1	-0.1	±1.0
8000	-0.7	-0.8	-0.4	±5.0

Function : 4. Electrical signal tests of frequency weightings
Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	-0.1	0.0	0.0	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	-0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	-0.1	0.0	0.1	±5.0

Function : 5. Frequency and time weighting at 1 kHz
5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2

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FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250041EA

Calibration Report

5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability
Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.3

Function : 7. Level Linearity on the reference level range
7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.1	0.1	±1.1
109.0	109.1	0.1	±1.1
114.0	114.1	0.1	±1.1
119.0	119.1	0.1	±1.1
124.0	124.1	0.1	±1.1
129.0	129.1	0.1	±1.1
134.0	134.1	0.1	±1.1
139.0	139.1	0.1	±1.1

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Certificate No.: CP20250041EA

Calibration Report

7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.1	0.1	±1.1
39.0	39.4	0.4	±1.1

Function : 8. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	136.0	0.0	±1.0
	2	118.9	-0.1	+1.0 ; -2.5
	0.25	109.5	-0.5	+1.5 ; -5.0
Slow	200	129.5	-0.1	±1.0
	2	109.9	-0.1	+1.0 ; -5.0
LAE	200	130.0	0.0	±1.0
	2	110.0	0.0	+1.0 ; -2.5
	0.25	100.9	-0.1	+1.5 ; -5.0

Function : 9. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	135.4	134.7	-0.7	±3.0
Positive half cycle	134.4	134.0	-0.4	±2.0
Negative half cycle	134.4	134.0	-0.4	±2.0

Function : 10. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
142.1	142.1	0.0	±1.5

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FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250041EA

Calibration Report

Function : 11. High-Level Stability
High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	139.0	139.0	0.0	±0.3

Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Tone burst response	0.20	0.30
9) Peak C sound level	0.20	0.35
10) Overload indication	0.24	0.25
11) High-Level Stability	0.10	0.10

Remarks: 1. The acceptance limit is for the deviated value.
2. Acceptance limits was IEC61672-3:2013 Class 2.
3. The coverage factor k = 2.00

- - End of Report - -

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

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-247
Request No : Req-2025-1640

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005398
ID : UAE.EFM.035/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 328675
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 073793
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 : 16 July 2025
Calibrated Date : 30 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 30 July 2025

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Certificate No : 25-SLM-247
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1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.2	0.52	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN. AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.1	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.0	0.10
C	27.5	0.10
Z	31.7	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	0.6	0.8	0.7	0.60
8000 Hz	0.7	0.8	0.8	0.70

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Certificate No : 25-SLM-247
Request No : Req-2025-1640

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.1	
125 Hz	-0.2	0.0	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	0.0	-0.1	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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Certificate No : 25-SLM-247
Request No : Req-2025-1640

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	0.0	0.10
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	93.9	-0.1	
89.00	89	88.9	-0.1	
84.00	84	83.9	-0.1	
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.3	0.3	
38.00	38	38.4	0.4	

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Certificate No : 25-SLM-247
Request No : Req-2025-1640

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.10	43.2	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	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	117.8	-0.2	
	0.25	109.0	108.6	-0.4	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.7	-0.70	0.20
Positive half cycle	136.4	136.1	-0.30	
Negative half cycle	136.4	136.1	-0.30	

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

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TEL: 10610-2116-5860-1 FAX: 10610-2116-7140

Certificate No : 25-SLM-247
Request No : Req-2025-1640

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.9	
Negative one-half cycle	141.9	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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

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: 10610-2116-5860-1 FAX: 10610-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-246
Request No : Req-2025-1638

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005403
ID : UAE.EFM.039/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377A04
Microphone S/N : 335074
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071570
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 : 16 July 2025
Calibrated Date : 30 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-1 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Liangurt
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 30 July 2025

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

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.0	0.32	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN. AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.6	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.4	0.10
C	29.0	0.10
Z	33.5	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	1.2	1.3	1.2	0.60
8000 Hz	2.0	2.1	2.1	0.70

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	134.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 0660-2116-5860-1 FAX: 0660-2116-7140

Certificate No : 25-SLM-246
Request No : Req-2025-1638

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	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	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	98.9	-0.1	
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	44.1	0.1	
39.00	39	39.5	0.5	

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	44.70	44.8	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	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	117.8	-0.2	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.6	-0.80	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.4	
Negative one-half cycle	143.5	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-245
Request No : Req-2025-1637

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005405
ID : UAE.EFM.041/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 329360
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 073800
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 : 16 July 2025
Calibrated Date : 30 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Luangsri
Service Calibration Engineer

Approved By : Mr. Pasit Malhavorn
Calibration Engineer Supervisor

Issue Date : 30 July 2025

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

Certificate No : 25-SLM-245
Request No : Req-2025-1637

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.3	0.62	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN. AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	27.6	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	27.3	0.10
C	26.8	0.10
Z	31.3	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
FAST / 37-139	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.3	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	-0.1	0.1	0.0	0.60
8000 Hz	-0.4	-0.3	-0.3	0.70

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

Certificate No : 25-SLM-245
Request No : Req-2025-1637

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
FAST / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	
125 Hz	-0.1	0.0	0.0	
250 Hz	0.0	0.0	0.0	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.1	0.1	0.1	
4000 Hz	0.1	0.1	0.1	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	0.0	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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TEL: 10610-2116-5860-1 FAX: 10610-2116-7140

Certificate No : 25-SLM-245
Request No : Req-2025-1637

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
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	93.9	-0.1	
89.00	89	88.9	-0.1	
84.00	84	83.9	-0.1	0.10
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	53.9	-0.1	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.2	0.2	
38.00	38	38.3	0.3	
37.00	37	37.4	0.4	

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TEL: 10610-2116-5860-1 FAX: 10610-2116-7140

Certificate No : 25-SLM-245
Request No : Req-2025-1637

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	42.70	42.8	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.9	-0.1	
	0.25	109.0	108.5	-0.5	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.6	-0.80	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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TEL: 10610-2116-5860-1 FAX: 10610-2116-7140

Certificate No : 25-SLM-245
Request No : Req-2025-1637

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-130	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.5	
Negative one-half cycle	141.6	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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TEL: 10610-2116-5860-1 FAX: 10610-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-131
Request No : Req-2025-0719

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0006615
ID : UAE.EFM.046/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 328672
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071539
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 : 24 March 2025
Calibrated Date : 8 April 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	Bruel&Kjaer	4192	2294085	25 June 2025	NIMT
Audio Generator	Svantek	Svan401	131	15 October 2025	WK Electric

Note

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

Calibrated By :
Mr. Noppadon Lungurt
Service Calibration Engineer

Approved By :
Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 8 April 2025

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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: 16040-2116-5860-1 FAX: 16040-2116-7140

Certificate No : 25-SLM-131
Request No : Req-2025-0719

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.76	113.4	-0.36	113.8	0.04	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.3	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.1	0.10
C	27.6	0.10
Z	32.1	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.2	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.7	0.7	0.7	0.60
8000 Hz	0.0	0.1	0.2	0.70

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 16040-2116-5860-1 FAX: 16040-2116-7140

Certificate No : 25-SLM-131
Request No : Req-2025-0719

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.0	
16000 Hz	0.0	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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TEL: 16040-2116-5860-1 FAX: 16040-2116-7140

Certificate No : 25-SLM-131
Request No : Req-2025-0719

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
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	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	0.30
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	44.1	0.1	
39.00	39	39.4	0.4	
38.00	38	38.5	0.5	

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Request No : Req-2025-0719

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.20	43.3	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Tonehurst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	
	2	118.0	117.7	-0.3	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.5	-0.1	0.20
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	108.9	-0.1	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	
Positive half cycle	136.4	136.2	-0.20	0.20
Negative half cycle	136.4	136.2	-0.20	

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

Certificate No : 25-SLM-131
Request No : Req-2025-0719

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	142.2	
Negative one-half cycle	142.2	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-338
Request No : Req-2025-2018

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0006617
ID : UAE.EFM.048/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 328669
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071532
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 September 2025
Calibrated Date : 9 October 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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pasit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 October 2025

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

Certificate No : 25-SLM-338
Request No : Req-2025-2018

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	114.0	0.25	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.5	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.3	0.10
C	27.7	0.10
Z	32.0	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	0.6	0.6	0.6	0.60
8000 Hz	0.7	0.7	0.7	0.70

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Certificate No : 25-SLM-338
Request No : Req-2025-2018

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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Certificate No : 25-SLM-338
Request No : Req-2025-2018

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	138.9	-0.1	
134.00	134	133.9	-0.1	
129.00	129	128.9	-0.1	
124.00	124	123.9	-0.1	
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	98.9	-0.1	
94.00	94	93.9	-0.1	
89.00	89	88.9	-0.1	0.30
84.00	84	83.9	-0.1	
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	53.9	-0.1	
49.00	49	48.9	-0.1	
44.00	44	44.0	0.0	
39.00	39	39.4	0.4	
38.00	38	38.5	0.5	

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9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.60	43.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.7	-0.3	
	0.25	109.0	108.6	-0.4	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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Certificate No : 25-SLM-338
Request No : Req-2025-2018

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	142.4	
Negative one-half cycle	142.4	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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JRANATEE ASSOCIATES CO.,LTD.
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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-040-68

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 3383
ID NUMBER : UAE.EFM.063/2560
CONDITION AS-RECEIVED : Used Item
CUSTOMER : United Analyst and Engineering Consultant Co., Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong,
Bangkok 10260

RECEIVED DATE : 29 Aug 2025
MEASUREMENT DATE : 29 Sep 2025
ISSUE DATE : 30 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 23.2 °C and 55.8 %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 GCS/IMC/M2-qo. 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: MM-0018-23.

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"

Calibrated by:
☐ Mr. Sorawit Thachalad
☑ Miss.Ratchaporn Lertsomphol

JRANATEE ASSOCIATES CO.,LTD.

Approved signatory: .....
Mr. Parinya Booncharoen
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION IS GIVEN IN WRITING FROM THE LABORATORY

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JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number COF-040-68

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 m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.704	753.311	22.97	22.08	56.514	1.512	1.226	0.652
2	1.001	753.266	22.99	22.37	62.412	3.014	1.734	0.918
3	1.116	753.254	23.08	22.48	41.501	3.969	1.997	1.054
4	1.164	753.258	23.09	22.55	29.909	4.434	2.101	1.117
5	1.410	753.191	23.04	22.66	28.108	6.537	2.554	1.356

Slope (m): 1.87959
Intercept (I): 0.00567
Correlation coefficient (-): 0.99982
Uncertainty (k=2): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_a] m^3/min
1	0.704	753.311	22.97	22.08	56.514	1.532	0.771	0.651
2	1.001	753.266	22.99	22.37	62.412	3.014	1.088	0.920
3	1.116	753.254	23.08	22.48	41.501	3.969	1.249	1.056
4	1.164	753.258	23.09	22.55	29.909	4.424	1.319	1.120
5	1.410	753.191	23.04	22.66	28.108	6.537	1.604	1.358

Slope (m): 1.17726
Intercept (I): 0.00356
Correlation coefficient (-): 0.99982
Uncertainty (k = 2): 0.015 m^3/min

End of Certificate of Calibration

Jiranatee Associates Co.,Ltd.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 25P3507
Page : 1 of 2

Equipment : U Tube Manometer
Manufacturer: Dwyer
Model : 1221-38-W/M
Serial No.: -
ID No.: UAE.EFM.179/2561
Condition As-Received: Used Item
Received Date: 03 September 2025
Calibration Date: 09 September 2025

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.

Reference: 2509-0144WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1007 mbar

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P04, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MP-0218-24	24 Sep 2025

2.This result of calibration was made on requested at the point specified by customer.
3.Scale and conversion factor is 1 kPa = 4.0146293 inH_2O
4.This instrument was used clean air as pressure media.
5.This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.
6.This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.
7.The certificate is valid only to the item calibrated on date and place of calibration.
8.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

Calibrated by : Suksan Khankaew
Issue Date : 10 September 2025

Approved Signatory : Attapol P.
[ ] Phalinee Prabpaipal
[ ] Sura Suwannasri
[✓] Attapol Panurach

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Cert.No.: 25P3507
Page: 2 of 2

Result of calibration:- Without adjustment
Function:- Pressure Measurement
Increasing Pressure

Range : 0 inH_2O to 36 inH_2O
Scale Interval : 0.1 inH_2O (The Second Estimate)

Applied Pressure	UUC Indication High-port side	UUC Indication Low-port side	ΔP	Error
0.00	0.00	0.00	0.00	0.00
2.00	0.95	-1.00	1.95	-0.05
4.00	1.95	-2.00	3.95	-0.05
6.00	2.95	-3.00	5.95	-0.05
8.00	4.00	-4.00	8.00	0.00
10.00	5.00	-5.00	10.00	0.00
12.00	6.00	-6.00	12.00	0.00
14.00	7.00	-7.00	14.00	0.00
16.00	8.00	-8.00	16.00	0.00
18.00	9.00	-9.00	18.00	0.00
20.00	10.05	-10.00	20.05	0.05
22.00	11.05	-11.00	22.05	0.05
24.00	12.05	-11.95	24.00	0.00
26.00	13.10	-12.95	26.05	0.05
28.00	14.10	-13.95	28.05	0.05
30.00	15.10	-14.95	30.05	0.05
32.00	16.15	-15.95	32.10	0.10
34.00	17.15	-16.95	34.10	0.10
35.70	18.00	-17.80	35.80	0.10

The uncertainty of measurement was ± 0.11 inH_2O
* ΔP = High-port side - Low-port side
* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
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TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26P1519
Page : 1 of 2

Equipment : Aneroid Barometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.123/2550
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 22 April 2026

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Reference: 2604-0316WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P10, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Indicator	DPI142	1422505046	MP-0150-25	20 May 2026

2.This result of calibration was made on requested at the point specified by customer.
3.The certificate is valid only to the item calibrated on date and place of calibration.
4.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Somchai Chaichan
Issue Date : 24 April 2026

Approved Signatory : S. Sura
[ ] Phalinee Prabpaipal
[✓] Sura Suwannasri
[ ] Attapol Panurach

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Cert.No.: 26P1519
Page: 2 of 2

Technical information and UUC* settings during calibration:

Result of calibration	: Without adjustment	**Range**	: 960 hPa to 1030 hPa
Pressure type	: Absolute Pressure	**Scale Interval**	: 1 hPa (The Fifth Estimate)
Installation	: Vertical Orientation	**Pressure medium**	: Clean air
Atmospheric pressure	: (1006 ± 10) mbar	**Reference level**	: at the center of the dial

Increasing Pressure

Applied Pressure (hPa)	954.50	966.01	977.33	988.29	999.08	1010.17	1021.66	1032.88
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	5.50	3.99	2.67	1.71	0.92	-0.17	-1.66	-2.68

Decreasing Pressure

Applied Pressure (hPa)	1032.67	1021.79	1010.29	999.07	988.40	977.64	965.87	954.39
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-2.67	-1.79	-0.29	0.93	1.60	2.36	4.13	5.61

The uncertainty of measurement was ± 0.25 hPa

* UUC = Unit Under Calibration

The 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 %.

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TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26H711
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.130/2550
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 17 April 2026 to 22 April 2026
Reference: 2604-0315WSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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.

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Chilled-Mirror Hygrometer	Dew Master	41292	23277	06 May 2026
2) Handheld Thermometer With Sensor	1523	5717096	2511200	21 Nov 2026

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

3.This measurement result is traceable to the International System of Unit maintained through:-

-Thunder Scientific Corporation, NVLAB Accreditation No. Calibration 200582-0

-Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Calibrated by : Kraipop Onrat
Issue Date : 23 April 2026

Approved Signatory : Viporn
[ ] Chakrit Waewwanjua
[ ] Pornthippa Tameyakul
[√] Viporn Tantiyawutti

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Cert. No.: 26H711
Page.: 2 of 2

Result of Calibration:- Without Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	42	-1.9	1.6
25.0	60.0	60	0.0	1.7
25.0	80.0	75	5.0	1.9

Result of Calibration:- Without Adjustment
Function: Temperature Measurement.

Standard Temperature (°C)	UUC* Reading (°C)	UUC* Correction (°C)	Uncertainty of Measurement (±°C)
20.012	20.5	-0.488	0.65
25.028	25.0	0.028	0.65
30.005	30.0	0.005	0.65
35.019	34.5	0.519	0.65
40.040	39.5	0.540	0.65

UUC* : Unit Under Calibration

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

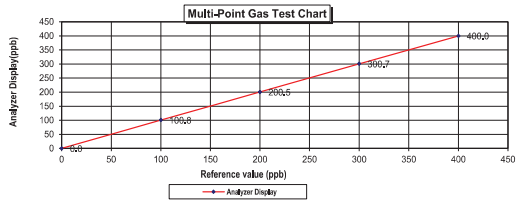
Test Date : Feb 17,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM22387035

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.8	0.80	0.79	0.79
Level 3	40.00%	200.0	200.5	0.50	0.25	0.25
Level 4	60.00%	300.0	300.7	0.70	0.23	0.23
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb :Acceptable Limit ± 5%				Average Difference (%)		0.26



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Approve by
.....17.../...Feb...../...2026.

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MULTI-POINT GAS TEST REPORT

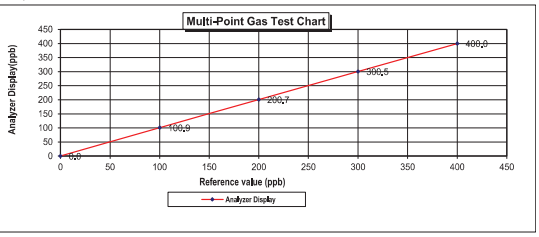
Test Date : Feb 20,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	CM22387037

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.5	0.50	0.17	0.17
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.28
:Acceptable Limit ± 5%						



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Approve by ..... 20 / Feb / 2026

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD

Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	104282308	CC754364	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12409	DB13880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	1534002202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003828	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2026
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-C8-160	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 29, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

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MULTI-POINT GAS TEST REPORT

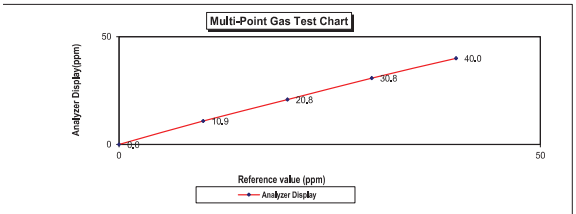
Test Date : July 9,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1200636467

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9	PPM		
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.9	0.9	8.3	8.3
Level 3	40.00%	20.0	20.8	0.8	3.8	3.8
Level 4	60.00%	30.0	30.8	0.8	2.6	2.6
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.94
:Acceptable Limit ± 5%						



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Approve by ..... 9 / July / 2025

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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

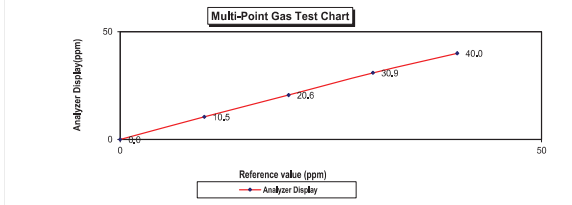
Test Date : July 9,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1200906880

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9	PPM		
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.5	0.5	4.8	4.8
Level 3	40.00%	20.0	20.6	0.6	2.9	2.9
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.12
:Acceptable Limit ± 5%						



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Approve by ..... 9 / July / 2025

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD		
Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	104282308	CC754364	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12408	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	153400202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.358 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-180	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 29, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

เอกสารไม่ควบคุม

UAE
UNITED ANALYST AND ENGINEERING CONSULTANT COMPANY LIMITED

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 17,2025

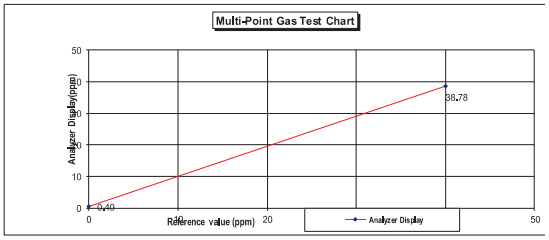
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	VUPVTC21

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.40	0.40	0.40	0.40
Level 2	80.00%	40.00	38.78	-1.22	-3.15	3.15
Remark : Measuring Range 50.00 ppm				Average Difference (%)		1.77

:Acceptable Limit ± 5%



Calculate by .....
.....17...../.....07...../...2568..

Approve by .....
.....17...../...July...../...2025..

เอกสารไม่ควบคุม

UAE
UNITED ANALYST AND ENGINEERING CONSULTANT COMPANY LIMITED

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Aug 1,2025

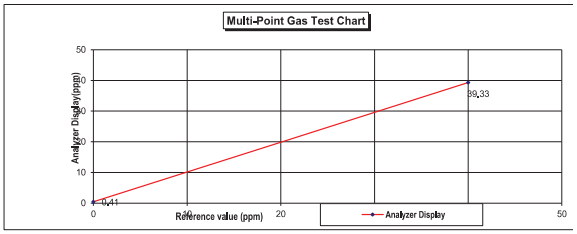
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	PDXEGXF7

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.41	0.41	0.41	0.41
Level 2	80.00%	40.00	39.33	-0.67	-1.70	1.70
Remark : Measuring Range 50.00 ppm				Average Difference (%)		1.06

:Acceptable Limit ± 5%



Calculate by .....
.....01...../.....08../....2568

Approve by .....
.....01...../..Aug...../..2025..

เอกสารไม่ควบคุม

THE LINDE GROUP

Linde

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: United Analyst & Engineering Co., Ltd.
Address: 3 Soi Udomsuk 41, Sukhumvit Rd., Bang Chak, Khet Phra Khanong, Bangkok 10260
Customer Tag No.:

Certificate Details

Number:	3384/20	Date of Issue:	4-Aug-2020	Expiry date:	4-Aug-2028
Material Details:					
Production Order:	90161442	Material Code:	400400-AL-34	Cylinder No:	D824432
Gas content:	6.60 M³	Filling pressure:	137.0 bar	Valve:	CGA 590 BRASS
Cylinder Owner:	LINDE	Cylinder Material:	Aluminium	Cylinder Size:	50 L

Laboratory Report

Analytical Result

Component	Nominal Concentration	Analysis Result¹	Uncertainty²	Method of Analysis³	Assay Date
Methane In Air	40.0 ppm	39.8 ppm	± 1% relative	(6) I-P0-152	4-Aug-2020

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date
Methane In Nitrogen	[illegible]	48.20 ± 0.39 ppm	4-Oct-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-CH4	4-Aug-2020

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol (EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards (May 2012)).
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the U.S. through the reference gas standard which is traceable to Swiss National Standard of Mass and other recognized national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Others - Specified

Sukanya Parinyasootorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

This report shall not be reproduced except in full

Linde (Thailand) Public Company Limited

เอกสารไม่ควบคุม

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 22 August, 2025 Certification No. 395/25

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA672.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037708 Wind speed BQ1705626 Wind direction19020250
Thermoigrometers 24070579 Barometer R1605260

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.9 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. U1220015

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisodd Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 395/25

22 August, 2025

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	2.9	0.12
5.00	-	-	-	5.0	0.00
7.04	-	-	-	6.9	0.14
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 395/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1009.12	0.08
1009.04	1008.98	0.06
1008.82	1008.85	-0.03
1008.65	1008.72	-0.07
1008.46	1008.45	0.01
1008.15	1008.18	-0.03
1007.64	1007.52	0.12
1007.43	1007.38	0.05
1007.27	1007.25	0.02
1007.04	1006.98	0.06
1006.43	1006.45	-0.02
1006.21	1006.32	-0.11
1008.62	1008.58	0.04
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.85	-0.01
1006.28	1006.32	-0.04
Average		0.03

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 395/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.9	0.06
756.84	756.8	0.04
756.68	756.7	-0.02
756.55	756.6	-0.05
756.41	756.4	0.01
756.17	756.2	-0.03
755.79	755.7	0.09
755.63	755.6	0.03
755.51	755.5	0.01
755.34	755.3	0.04
754.88	754.9	-0.02
754.72	754.8	-0.08
756.53	756.5	0.03
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.2	-0.01
754.77	754.8	-0.03
Average		0.02

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 5 of 7

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.14	45.24	-0.10
30.25	30.34	-0.09
15.24	15.29	-0.05

Calibrated by : Watcharapol

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 6 of 7

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.1	-1.57
65.24	66.1	-0.86
44.12	44.5	-0.38

Calibrated by : Watcharapol

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 395/25

Page: 7 of 7

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1#C Serial No.PC1705209 ทำการสอบเทียบกับแก้ววัดฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

ลงชื่อ.....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

เอกสารไม่ควบคุม

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 22 August, 2025 Certification No. 394/25

Page : 1 of 7

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA672.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037713 Wind speed BQ1705627 Wind direction19050292
Thermoigrometers 24070483 Barometer R1605257

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.5 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
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pipood Promsut

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 2 of 7

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 3 of 7

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1008.98	0.22
1009.04	1008.85	0.19
1008.82	1008.72	0.10
1008.65	1008.58	0.07
1008.46	1008.45	0.01
1008.15	1008.05	0.10
1007.64	1007.52	0.12
1007.43	1007.25	0.18
1007.27	1007.12	0.15
1007.04	1006.98	0.06
1006.43	1006.32	0.11
1006.21	1006.18	0.03
1006.62	1006.45	0.17
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.72	0.12
1006.28	1006.18	0.10

Average 0.11

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 4 of 7

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.8	0.16
756.84	756.7	0.14
756.68	756.6	0.08
756.55	756.5	0.05
756.41	756.4	0.01
756.17	756.1	0.07
755.79	755.7	0.09
755.63	755.5	0.13
755.51	755.4	0.11
755.34	755.3	0.04
754.88	754.8	0.08
754.72	754.7	0.02
756.53	756.4	0.13
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.1	0.09
754.77	754.7	0.07

Average 0.08

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 5 of 7

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
45.14	45.21	-0.07
30.25	30.31	-0.06
15.24	15.32	-0.08

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 394/25

22 August, 2025 Page : 6 of 7

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.6	-2.07
65.24	66.5	-1.26
44.12	44.9	-0.78

Calibrated by : Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 394/25

Page: 7 of 7

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1 Serial No.19050180 ทำการสอบเทียบกับแก้ววัดฝนแบบแก้ววงวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

ลงชื่อ .....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

เอกสารไม่ควบคุม

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: 1660-2116-5000-1 FAX: 1660-2116-7140

innovative instrument

Page 1 of 2 .

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-ACT-135
Request No : Req-2025-1826

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : LARSON DAVIS
Model : CAL150
Serial Number : 6695
ID : UAE.EFM.140/2565

Class : 2
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 August 2025
Calibration Date : 9 September 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 %.

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 September 2025

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the laboratory.
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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 1660-2116-5000-1 FAX: 1660-2116-7140

Certificate No : 25-ACT-135
Request No : Req-2025-1826

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

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	93.88	-0.12	-	-	0.11
114 dB / 1000 Hz	113.99	-0.01	-	-	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 Measured (%)	Adjustment Measured (%)	Uncertainty (± %)
94 dB / 1000 Hz	1.44	-	0.17
114 dB / 1000 Hz	0.67	-	0.17

Note :

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

End of Calibration

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

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 26-SLM-095
Request No : Req-2026-0478

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0006689
ID : UAE.EFM.130/2565
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 371171
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071562
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 12 February 2026
Calibrated Date : 2 March 2026
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	Brael&Kjaer	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mallavorn
Calibration Engineer Supervisor

Issue Date : 2 March 2026

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FM-TM-SLM-01 Rev. 1 Issue date 17/2/25
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Certificate No : 26-SLM-095
Request No : Req-2026-0478

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	113.8	0.05	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.2	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	27.9	0.10
C	27.5	0.10
Z	31.6	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.2	0.3	0.2	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.2	0.3	0.3	0.60
8000 Hz	0.3	0.4	0.4	0.70

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

Certificate No : 26-SLM-095
Request No : Req-2026-0478

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.1	0.1	0.20
125 Hz	0.0	0.1	0.1	
250 Hz	0.0	0.0	0.0	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 0660-2116-5860-1 FAX: 0660-2116-7140

Certificate No : 26-SLM-095
Request No : Req-2026-0478

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.1	0.1	
39.00	39	39.3	0.3	
38.00	38	38.4	0.4	

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

Certificate No : 26-SLM-095
Request No : Req-2026-0478

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.20	43.3	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.8	-0.2	
	0.25	109.0	108.6	-0.4	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	108.9	-0.1	
	0.25	100.0	99.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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

Certificate No : 26-SLM-095
Request No : Req-2026-0478

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	141.9	
Negative one-half cycle	142.1	
Deviated	-0.2	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-271
Request No : Req-2025-1705

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0006604
ID : UAE.EFM.134/2565
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 335078
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071563
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 : 22 July 2025
Calibrated Date : 11 August 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Luangsat
Service Calibration Engineer

Approved By : Mr. Pasit Mathavorn
Calibration Engineer Supervisor

Issue Date : 11 August 2025

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

Certificate No : 25-SLM-271
Request No : Req-2025-1705

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.13	114.0	-0.13	114.1	-0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 36, SN. 107224

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	35.2	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	35.2	0.10
C	35.0	0.10
Z	38.4	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	0.9	0.9	0.9	0.60
8000 Hz	1.5	1.5	1.5	0.70

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TEL: 10660-2116-5860-1 FAX: 10660-2116-7140

Certificate No : 25-SLM-271
Request No : Req-2025-1705

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.1	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.0	
16000 Hz	0.0	0.0	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 10660-2116-5860-1 FAX: 10660-2116-7140

Certificate No : 25-SLM-271
Request No : Req-2025-1705

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	138.9	-0.1	0.20
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	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	98.9	-0.1	
94.00	94	93.9	-0.1	
89.00	89	88.9	-0.1	
84.00	84	83.9	-0.1	
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	53.9	-0.1	
49.00	49	49.1	0.1	
44.00	44	44.5	0.5	
39.00	39	40.0	1.0	
38.00	38	39.0	1.0	

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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: 10660-2116-5860-1 FAX: 10660-2116-7140

Certificate No : 25-SLM-271
Request No : Req-2025-1705

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.90	44.4	0.5	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	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	108.7	-0.3	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.9	-0.1	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.7	-0.70	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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

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TEL: 10660-2116-5860-1 FAX: 10660-2116-7140

Certificate No : 25-SLM-271
Request No : Req-2025-1705

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.7	
Negative one-half cycle	143.7	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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

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

Cert.No.: 25CH1473
Page.: 1 of 3

Equipment :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA1M0036
ID No. :	UAE.EFM.012/2565(EFM.pH.02/65)
Condition As-Received:	Used Item
Received Date :	24 December 2025
Calibration Date :	26 December 2025
Reference :	2512-0643WSC-2
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
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 :	Walalak Sirithean
Approved by :	Approved Signatory

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

Issue Date : 29 December 2025

The Uncertainties are for a confidence probability of approximately 95%

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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 Hach Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
: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 4.007	CPA chem	1114384	12 June 2027
pH 6.999	Hach Lenge GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1114385	08 June 2026

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 (4,7)(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	4.00	177.48	177.5	4.01	0.058	2.00
S/N.: HA1M0036	7.00	0.00	0.0	7.00	0.058	2.00
	7.00	0.00	0.0	7.00	0.058	2.00
	10.00	-177.48	-177.4	10.01	0.058	2.00

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Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(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	4.007	4.01	165.6	0.0071	2.00
S/N. -	6.999	7.00	-9.0	0.0095	2.00
	6.999	7.00	-8.5	0.0092	2.00
	10.010	10.02	-175.3	0.0096	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : -

Dimension of probe

- Length : 110 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor *k*
15.0	15.001	15.0	-0.001	0.13	2.00
30.0	30.001	30.0	-0.001	0.13	2.00
45.0	45.001	45.1	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 %.

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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 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 25TW251
Page.: 1 of 2

Equipment :	DO Meter
Manufacturer :	Horiba
Model :	LAQUA-DO210
Serial No. :	HE0G0017
ID No. :	UAE.EFM.082/2564(EFM.DO.01/64)
Received Date :	24 December 2025
Test Date :	25 December 2025
Reference :	2512-0641WSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In-house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walalak Sirithean
Approved by :	Saithip Approved Signatory

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

Issue Date : 29 December 2025

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Condition of this result of calibration

1. Reference Standard Instruments :
This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 9K0E0163

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.22	0.0045

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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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 : Do Meter with Sensor
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE0G0017
ID No. : UAE.EFM.082/2564(EFM.DO.01/64)
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Location : TPA On Site Calibration Laboratory

Received Order : 24 December 2025
Calibrated Date : 05 January 2026
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngagtrakul

Approved by : Kunchit
Approved Signatory

( ) Chakrit Waewwanjua
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 05 January 2026

The Uncertainties are for a confidence probability of approximately 95%

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Procedure Used :-
Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	25I953	TPA	05 Sep 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This measurement result is traceable to the International System of Unit maintained through :
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function : Temperature measurement.
This instrument was connected with temperature sensor, S/N.: 9K0E0163

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor *k*
15.0	80	15.003	15.0	-0.003	0.16	2.00
30.0	80	30.003	29.9	-0.103	0.16	2.00
45.0	80	45.006	44.8	-0.206	0.16	2.00

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 %.

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เอกสารไม่ควบคุม

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต-สะพานใหม่									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Tisch Environmental,Inc.	TE-5025A 3383	Jiranatee Associates Co., Ltd.	COF-040-68	30 Sep 25	29 Sep 26	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P3508	9 Sep 25	8 Sep 26	-
3	Aneroid Barometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P1516	22 Apr 26	21 Apr 27	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26H708	17 Apr 26	16 Apr 27	-
5	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i CM08130002	UAE Consultant Co.,Ltd.	17022026	17 Feb 26	16 Feb 27	-
6	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1200636463	UAE Consultant Co.,Ltd.	24022026	24 Feb 26	23 Feb 27	-
7	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1201778106	UAE Consultant Co.,Ltd.	24022026	24 Feb 26	23 Feb 27	-
8	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920009	UAE Consultant Co.,Ltd.	20022025	20 Feb 26	19 Feb 27	-
9	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920006	UAE Consultant Co.,Ltd.	17022026	17 Feb 26	16 Feb 27	-
10	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920005	UAE Consultant Co.,Ltd.	20022025	20 Feb 26	19 Feb 27	-
11	Standard Gases (Mixture)	Nitrogen Dioxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
12	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1180540068	UAE Consultant Co.,Ltd.	11072025	11 Jul 25	10 Jul 26	-
13	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778119	UAE Consultant Co.,Ltd.	24072025	24 Jul 25	23 Jul 26	-
14	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778118	UAE Consultant Co.,Ltd.	29072025	29 Jul 25	28 Jul 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต-สะพานใหม่									
15	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778117	UAE Consultant Co.,Ltd.	11072025	11 Jul 25	10 Jul 26	-
16	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497733	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
17	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497732	UAE Consultant Co.,Ltd.	09072025	9 Jul 25	8 Jul 26	-
18	Standard Gases (Mixture)	Carbon Monoxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
19	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	LSI 17037708	Thai Meteorological Department	395/25	22 Aug 25	21 Aug 26	-
20	Wind Speed/Wind Direction	WS/WD	LSI Lastem	E-LOG 305 / DNA 821 20020305 / 20040161	Thai Meteorological Department	226/26	17 Apr 26	16 Apr 27	-
21	Wind Speed/Wind Direction	WS/WD	LSI Lastem	E-LOG 305 / DNA 821 20040002 / 20040162	Thai Meteorological Department	232/26	22 Apr 26	21 Apr 27	-
22	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2311DR0037	Thai Meteorological Department	034/26	20 Jan 26	19 Jan 27	-
23	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0008	Thai Meteorological Department	130/26	2 Mar 26	1 Mar 27	-
24	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0105	Thai Meteorological Department	133/26	2 Mar 26	1 Mar 27	-
25	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 93JN1MN9	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
26	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 KWWV1R96	UAE Consultant Co.,Ltd.	01082026	1 Aug 25	31 Jul 26	-
27	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 RATFJBXS	UAE Consultant Co.,Ltd.	07082026	7 Aug 25	6 Aug 26	-
28	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 GY21PTED	UAE Consultant Co.,Ltd.	07082026	7 Aug 25	6 Aug 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงหมอชิต-สะพานใหม่									
29	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 GAL13KSE	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
30	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	Thermo Scientific	55i 1182920025	UAE Consultant Co.,Ltd.	25072025	25 Jul 25	24 Jul 26	-
31	Standard Gas	Non Methane-Hydrocarbon	Linde	D824432	Linde	09042013	4 Aug 20	4 Aug 28	-
32	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	Larson Davis	CAL150 6855	Innovative Instrument Co.,Ltd.	25-ACT-137	9 Sep 25	8 Sep 26	-
33	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005403	Innovative Instrument Co.,Ltd.	25-SLM-246	30 Jul 25	29 Jul 27	-
34	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005286	Innovative Instrument Co.,Ltd.	25-SLM-272	11 Aug 25	10 Aug 27	-
35	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005287	Innovative Instrument Co.,Ltd.	25-SLM-241	29 Jul 25	28 Jul 27	-
36	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005296	Innovative Instrument Co.,Ltd.	26-SLM-165	23 Apr 26	22 Apr 28	-
37	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005298	Electrical And Electronics Institute Foundation For Industrial Development	CP20240341EA	23 Sep 24	22 Sep 26	-
38	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005299	Innovative Instrument Co.,Ltd.	25-SLM-273	11 Aug 25	10 Aug 27	-
39	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005328	Electrical And Electronics Institute Foundation For Industrial Development	CP20250040EA	3 Feb 25	2 Feb 27	-
40	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005341	Innovative Instrument Co.,Ltd.	25-SLM-339	9 Oct 25	8 Oct 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงสะพานใหม่-คูคต									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Thermo Scientific	G25A 158M	Jiranatee Associates Co., Ltd.	COF-025-68	21 Jul 25	20 Jul 26	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P3507	9 Sep 25	8 Sep 26	-
3	Aneroid Barometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P1523	23 Apr 26	22 Apr 27	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26H712	17 Apr 26	16 Apr 27	-
5	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1182920009	UAE Consultant Co.,Ltd.	20022025	20 Feb 26	19 Feb 27	-
6	Nitrogen Dioxide Analyzer	Nitrogen Dioxide	Thermo Scientific	42i 1201778106	UAE Consultant Co.,Ltd.	24022026	24 Feb 26	23 Feb 27	-
7	Standard Gases (Mixture)	Nitrogen Dioxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
8	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201497733	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
9	Carbon Monoxide Analyzer	Carbon Monoxide	Thermo	48i 1201778117	UAE Consultant Co.,Ltd.	11072025	11 Jul 25	10 Jul 26	-
10	Standard Gases (Mixture)	Carbon Monoxide	Airgas	EB0162121 2016PSIG	Airgas an Air Liquide company	E05NI91E15A0014	6 Jul 23	6 Jul 31	-
11	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0105	Thai Meteorological Department	133/26	2 Mar 26	1 Mar 27	-
12	Wind Speed/Wind Direction	WS/WD	Scarlet Tech Ltd.	WL-21 2205DT0113	Thai Meteorological Department	033/26	20 Jan 26	19 Jan 27	-
13	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 VUPVTC21	UAE Consultant Co.,Ltd.	17072025	17 Jul 25	16 Jul 26	-
14	Total Hydrocarbons Analyzer	Non Methane-Hydrocarbon	HORIBA	APHA-370 PDXEGXF7	UAE Consultant Co.,Ltd.	01082026	1 Aug 25	31 Jul 26	-

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงสะพานใหม่-คูคต									
15	Standard Gas	Non Methane-Hydrocarbon	Linde	D824432	Linde	09042013	4 Aug 20	4 Aug 28	-
16	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	Larson Davis	CAL150 6695	Innovative Instrument Co.,Ltd.	25-ACT-135	9 Sep 25	8 Sep 26	-
17	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005288	Innovative Instrument Co.,Ltd.	25-SLM-242	29 Jul 25	28 Jul 27	-
18	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005296	Innovative Instrument Co.,Ltd.	26-SLM-165	23 Apr 26	22 Apr 28	-

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Water									
โครงการรถไฟฟ้าสายสีเขียว เฉพาะช่วงสะพานใหม่-คูคต									
1	pH Meter	pH	Horiba	LAQUA-PH210 HA0C0025	Technology Promotion Association (Thailand-Japan)	26CH149	4 Feb 26	3 Feb 27	-
2	DO Meter	DO	Horiba	LAQUA-DO210 HE9M0048	Technology Promotion Association (Thailand-Japan)	26TW60	18 Mar 26	17 Mar 27	-

JIRANATEE ASSOCIATES CO.,LTD.

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-040-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 3383
ID NUMBER : UAE.EFM.063/2560
CONDITION AS-RECEIVED : Used item
CUSTOMER : United Analyst and Engineering Consultant Co., Ltd.
81 Soi Udomsuk 43, Sukhumvit Road, Bangchak, Phrakhanong,
Bangkok 10260

RECEIVED DATE : 29 Aug 2025
MEASUREMENT DATE : 29 Sep 2025
ISSUE DATE : 30 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 23.2 °C and 55.9 %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 GBS/IMC/W2-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: MM-0218-25.

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"

Calibrated by:
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol

Approved signatory:
Mr. Parinya Boonchuroen
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR RE... IN WRITING FROM THE LABORATORY

เอกสารไม่ควบคุม

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number COF-040-68

Page 2 of 2 Pages

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 m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	$\Delta p_Orifice$ inH$_2$O	Y	Standard Flow [Q_s] m^3/min
1	0.704	753.311	22.97	22.08	56.514	1.512	1.229	0.652
2	1.001	753.266	22.99	22.37	62.412	3.014	1.734	0.918
3	1.116	753.254	23.08	22.48	41.501	3.969	1.990	1.054
4	1.164	753.258	23.09	22.55	29.909	4.424	2.101	1.117
5	1.410	753.191	23.04	22.66	28.108	6.537	2.554	1.356

Slope (m): 1.87959
Intercept (I): 0.00567
Correlation coefficient (r): 0.99982
Uncertainty (k=2): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	$\Delta p_Orifice$ inH$_2$O	Y	Standard Flow [Q_a] m^3/min
1	0.704	753.311	22.97	23.08	56.514	1.532	0.771	0.653
2	1.001	753.266	22.99	22.37	62.412	3.014	1.088	0.920
3	1.116	753.254	23.08	22.48	41.501	3.969	1.249	1.056
4	1.164	753.258	23.09	23.55	29.909	4.424	1.319	1.120
5	1.410	753.191	23.04	22.66	28.108	6.537	1.603	1.358

Slope (m): 1.17726
Intercept (I): 0.00356
Correlation coefficient (r): 0.99982
Uncertainty (k = 2): 0.015 m^3/min

End of Certificate of Calibration

Jiranatee Associates Co.,Ltd.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 25P3508
Page : 1 of 2

Equipment :	U Tube Manometer
Manufacturer:	Dwyer
Model :	1221-36-WM
Serial No.:	-
ID No.:	UAE.EFM.180/2561
Condition As-Received:	Used Item
Received Date:	03 September 2025
Calibration Date:	09 September 2025
Reference:	2509-0144WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Atmospheric Pressure:	1006 mbar

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P04, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC108P	1189	MP-0218-24	24 Sep 2025

2.This result of calibration was made on requested at the point specified by customer.
3.Scale and conversion factor is 1 kPa = 4.0146293 inH2O
4.This instrument was used clean air as pressure media.
5.This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.
6.This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.
7.The certificate is valid only to the item calibrated on date and place of calibration.
8.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

Calibrated by : Suksan Khankaew
Issue Date : 10 September 2025

Approved Signatory : Attapol P
[ ] Phalinee Prabpaipal
[ ] Sura Suwannasri
[√] Attapol Panurach

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Result of calibration:- Without adjustment Range : 0 inH2O to 36 inH2O
Function:- Pressure Measurement Scale Interval : 0.1 inH2O (The Second Estimate)
Increasing Pressure

Applied Pressure	UUC Indication High-port side	UUC Indication Low-port side	ΔP	Error
0.00	0.00	0.00	0.00	0.00
2.00	0.86	-0.95	1.90	-0.10
4.00	1.95	-1.95	3.90	-0.10
6.00	2.95	-3.00	5.95	-0.05
8.00	3.95	-4.00	7.95	-0.05
10.00	4.95	-5.00	9.95	-0.05
12.00	6.00	-6.00	12.00	0.00
14.00	7.00	-7.00	14.00	0.00
16.00	8.00	-8.00	16.00	0.00
18.00	9.00	-9.00	18.00	0.00
20.00	10.00	-10.05	20.05	0.05
22.00	11.00	-11.05	22.05	0.05
24.00	12.00	-12.05	24.05	0.05
26.00	13.00	-13.05	26.05	0.05
28.00	14.00	-14.10	28.10	0.10
30.00	15.00	-15.10	30.10	0.10
32.00	16.05	-16.10	32.15	0.15
34.00	17.05	-17.10	34.15	0.15
35.90	18.00	-18.00	36.00	0.10

The uncertainty of measurement was ± 0.11 inH2O
* ΔP = High-port side - Low-port side
* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26P1516
Page : 1 of 2

Equipment :	Aneroid Barometer
Manufacturer:	Barigo
Model :	-
Serial No.:	-
ID No.:	UAE.ANV.120/2550
Condition As-Received:	Used Item
Received Date:	10 April 2026
Calibration Date:	22 April 2026
Reference:	2604-0316WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P10, using " DKD-R 6-1 ; Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Indicator	DPI142	1422505046	MP-0150-25	20 May 2026

2.This result of calibration was made on requested at the point specified by customer.
3.The certificate is valid only to the item calibrated on date and place of calibration.
4.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Somchai Chaichan
Issue Date : 24 April 2026

Approved Signatory :
[ ] Phalinee Prabpaipal
[√] Sura Suwannasri
[ ] Attapol Panurach

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Technical information and UUC* settings during calibration:

Result of calibration	: Without adjustment	**Range**	: 960 hPa to 1030 hPa
Pressure type	: Absolute Pressure	**Scale Interval:**	1 hPa (The Fifth Estimate)
Installation	: Vertical Orientation	**Pressure medium**	: Clean air
Atmospheric pressure	: (1004 ± 10) mbar	**Reference level**	: at the center of the dial

Increasing Pressure

Applied Pressure (hPa)	960.73	971.51	982.09	991.61	1000.93	1009.75	1019.03	1028.51
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	-0.73	-1.51	-2.00	-1.61	-0.93	0.25	0.97	1.49

Decreasing Pressure

Applied Pressure (hPa)	1028.45	1018.52	1008.98	999.64	990.31	981.35	970.50	960.47
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	1.55	1.48	1.02	0.36	-0.31	-1.35	-0.50	-0.47

The uncertainty of measurement was ± 0.25 hPa

* UUC = Unit Under Calibration
The 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 %.

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TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26H708
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.016/2547
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 17 April 2026 to 22 April 2026
Reference: 2604-0315WSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Chilled-Mirror Hygrometer	Dew Master	41292	23277	06 May 2026
2) Handheld Thermometer With Sensor	1523	5717086	25I1200	21 Nov 2026

2.The certificate is valid only to the item calibrated on date and place of calibration.
3.This measurement result is traceable to the International System of Unit maintained through:-
-Thunder Scientific Corporation, NVLAB Accreditation No. Calibration 200582-0
-Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Calibrated by : Kraipop Onrat
Issue Date : 23 April 2026
Approved Signatory : Vipom
[ ] Chakrit Waewwanjua
[ ] Pornthippa Tameyakul
[✓] Vipom Tantiyawutti

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Cert. No.: 26H708
Page.: 2 of 2

Result of Calibration:- Before Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	39	1.1	1.6
25.0	60.0	58	2.0	1.7
25.0	80.0	75	5.0	1.9

Result of Calibration:- After Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	40	0.1	1.6
25.0	60.0	60	0.0	1.7
25.0	80.0	77	3.0	1.9

Result of Calibration:- Without Adjustment
Function: Temperature Measurement.

Standard Temperature (°C)	UUC* Reading (°C)	UUC* Correction (°C)	Uncertainty of Measurement (±°C)
20.012	20.0	0.012	0.65
25.028	25.0	0.028	0.65
30.005	30.0	0.005	0.65
35.019	35.0	0.019	0.65
40.040	39.5	0.540	0.65

UUC* : Unit Under Calibration
The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Feb 17,2026

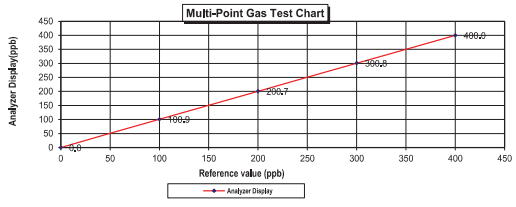
Equipment : Gas Analyzer (NO_2) **Model :** 42i
Manufacturer : Thermo Scientific **Serial Number :** CM08130002

Standard Gas Concentration

			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.30
:Acceptable Limit ± 5%						



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : Feb 24,2026

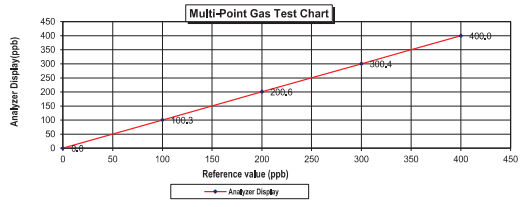
Equipment : Gas Analyzer (NO_2) **Model :** 42i
Manufacturer : Thermo Scientific **Serial Number :** 1200636463

Standard Gas Concentration

			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.3	0.30	0.30	0.30
Level 3	40.00%	200.0	200.6	0.60	0.30	0.30
Level 4	60.00%	300.0	300.4	0.40	0.13	0.13
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.15
:Acceptable Limit ± 5%						



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

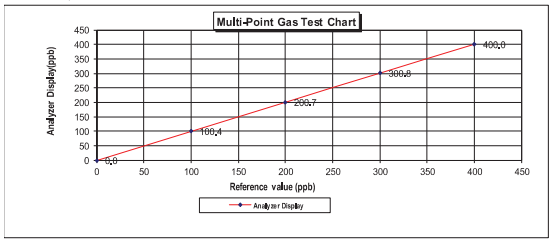
Test Date : Feb 24,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201778106

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.4	0.40	0.40	0.40
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.20
:Acceptable Limit ± 5%						



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

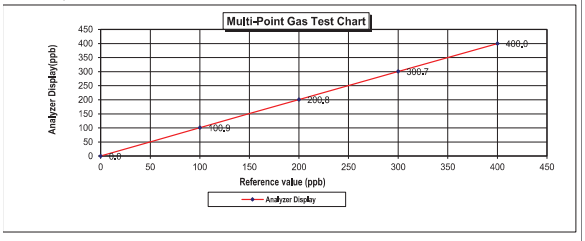
Test Date : Feb 20,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920009

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.8	0.80	0.40	0.40
Level 4	60.00%	300.0	300.7	0.70	0.23	0.23
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.30
:Acceptable Limit ± 5%						



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

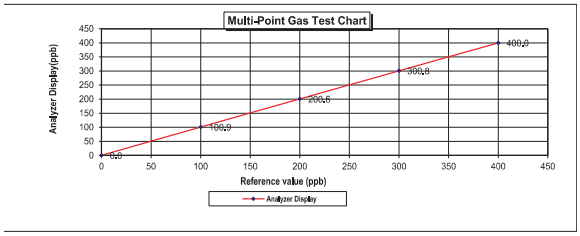
Test Date : Feb 17,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920006

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.6	0.60	0.30	0.30
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.29
:Acceptable Limit ± 5%						



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

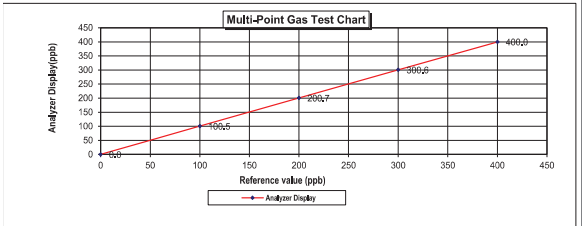
Test Date : Feb 20,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920005

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.5	0.50	0.50	0.50
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.6	0.60	0.20	0.20
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range		500.0 ppb		Average Difference (%)		0.21
:Acceptable Limit ± 5%						



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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD

Part Number: E05NI91E15A0014
Cylinder Number: EB0162121
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: CO,CO2,NO,NOX,SO2,BALN

Reference Number: 160-402772205-1
Cylinder Volume: 144.0 CF
Cylinder Pressure: 2016 PSIG
Valve Outlet: 660
Certification Date: Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	104282308	CC754364	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12408	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	153400202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.358 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-180	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 29, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

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UAE United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

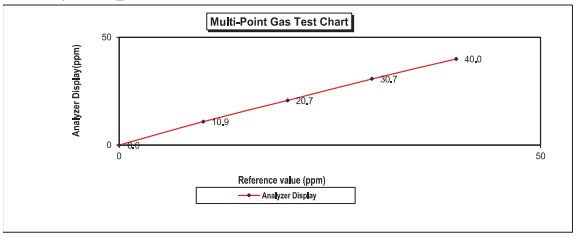
Test Date : July 11,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1180540068

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.9	0.9	8.3	8.3
Level 3	40.00%	20.0	20.7	0.7	3.4	3.4
Level 4	60.00%	30.0	30.7	0.7	2.3	2.3
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range :Acceptable Limit ± 5%		50.0 ppm		Average Difference (%)		2.78



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

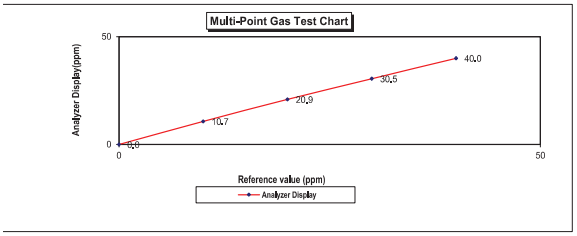
Test Date : July 24,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1201778119

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.9	0.9	4.3	4.3
Level 4	60.00%	30.0	30.5	0.5	1.6	1.6
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range :Acceptable Limit ± 5%		50.0 ppm		Average Difference (%)		2.50



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

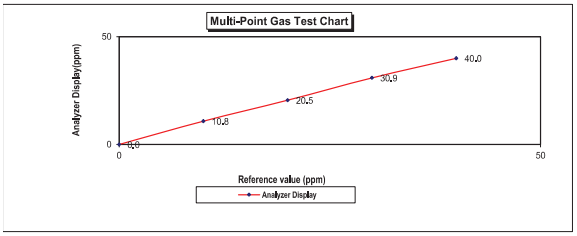
Test Date : July 29,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1201778118

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB01159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.5	0.5	2.4	2.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range :Acceptable Limit ± 5%		50.0 ppm		Average Difference (%)		2.55



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 11,2025

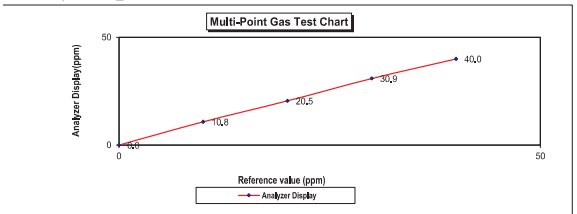
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201778117

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.5	0.5	2.4	2.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.55

:Acceptable Limit ± 5%



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 17,2025

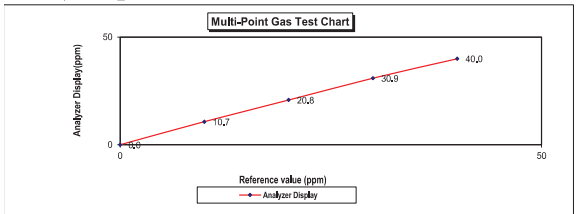
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201497733

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.8	0.8	3.8	3.8
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.66

:Acceptable Limit ± 5%



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Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

Test Date : July 9,2025

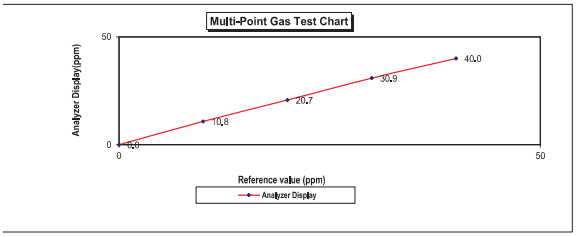
Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201497732

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM	Manufacturer :	Thermo Scientific	
Nitric Oxide (NO)	46.77 PPM	Model :	146i	
Methane (CH_4)	- PPM	Serial Number :	1180540071	
Carbon Monoxide (CO)	965.9 PPM			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

	Reference Value (ppm)		Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.7	0.7	3.4	3.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range		50.0 ppm		Average Difference (%)		2.74

:Acceptable Limit ± 5%



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9 / 07 / 2568 9 / July / 2025

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD		
Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	1042202308	CC754384	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C221910	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12409	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	1534002202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-CB-160	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 28, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

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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 22 August, 2025 Certification No. 395/25

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : LSI

Type : Data Logger E-LOG 305 Wind speed DNA202 Wind direction DNA212
Thermoigrometers DMA672.1 Barometer DQA 240.1

Mfg Code : Data Logger 17037708 Wind speed BQ1705626 Wind direction19020250
Thermoigrometers 24070579 Barometer R1605260

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.9 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. U1220015

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisodd Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 395/25

22 August, 2025

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	2.9	0.12
5.00	-	-	-	5.0	0.00
7.04	-	-	-	6.9	0.14
9.02	-	-	-	9.0	0.02
11.02	-	-	-	10.9	0.12
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 395/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.20	1009.12	0.08
1009.04	1008.98	0.06
1008.82	1008.85	-0.03
1008.65	1008.72	-0.07
1008.46	1008.45	0.01
1008.15	1008.18	-0.03
1007.64	1007.52	0.12
1007.43	1007.38	0.05
1007.27	1007.25	0.02
1007.04	1006.98	0.06
1006.43	1006.45	-0.02
1006.21	1006.32	-0.11
1008.62	1008.58	0.04
1008.41	1008.32	0.09
1008.09	1008.05	0.04
1007.58	1007.52	0.06
1007.32	1007.25	0.07
1007.12	1006.98	0.14
1006.84	1006.85	-0.01
1006.28	1006.32	-0.04
Average		0.03

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 395/25

22 August, 2025

Standard Barometer Pressure	Tested Barometer Pressure	Correction
756.96	756.9	0.06
756.84	756.8	0.04
756.68	756.7	-0.02
756.55	756.6	-0.05
756.41	756.4	0.01
756.17	756.2	-0.03
755.79	755.7	0.09
755.63	755.6	0.03
755.51	755.5	0.01
755.34	755.3	0.04
754.88	754.9	-0.02
754.72	754.8	-0.08
756.53	756.5	0.03
756.37	756.3	0.07
756.13	756.1	0.03
755.75	755.7	0.05
755.55	755.5	0.05
755.40	755.3	0.10
755.19	755.2	-0.01
754.77	754.8	-0.03
Average		0.02

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 5 of 7

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.14	45.24	-0.10
30.25	30.34	-0.09
15.24	15.29	-0.05

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 395/25

22 August, 2025 Page : 6 of 7

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.53	97.1	-1.57
65.24	66.1	-0.86
44.12	44.5	-0.38

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

Date of Issue 22 August, 2025 Certification No. 395/25

Page: 7 of 7

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ LSI LASTEM แบบ TIPPING BUCKET Code. DQA230.1#C Serial No.PC1705209 ทำการสอบเทียบกับแก้วรัดฝนแบบแก้วตวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)

ลงชื่อ.....

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

เอกสารไม่ควบคุม

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

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 17 April, 2026 Certification No. 226/26

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : LSI Lastem ID No. : UAE.EFM.119/2563

Type : Data Logger E-LOG 305 wind speed and wind direction DNA 821

Serial No. : Data Logger 20020305 wind speed and wind direction 20040161

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1006.8 hPa

NATIONAL STANDARD WIND TUNNEL :
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119
: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023
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

Calibrated by :
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisood Promsut
(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 226/26

17 April, 2026 Page : 2 of 2

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	-	-	-	1.0	0.00
3.02	-	-	-	2.9	0.12
5.00	-	-	-	5.0	0.00
7.04	-	-	-	6.9	0.14
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
180	180
270	270

Calibrated by : Watcharapol

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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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 22 April, 2026 Certification No. 232/26

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : LSI Lastem ID No. : UAE.EFM.120/2563

Type : Data Logger E-LOG 305 wind speed and wind direction DNA 821

Serial No. : Data Logger 20040002 wind speed and wind direction 20040162

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.1 hPa

NATIONAL STANDARD WIND TUNNEL :
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119
: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023
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

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisood Promsut

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 232/26

22 April, 2026 Page : 2 of 2

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
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
180	180
270	270

Calibrated by : Watcharapol

Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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 20 January, 2026 Certification No. 034/26

Page : 1 of 5

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2311DR0037
Wind Sensor 2112DT0102

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.1 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
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. U1220015

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Signed :
Mr. Pisood Promsut

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 034/26

20 January, 2026 Page : 2 of 5

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
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
270	270

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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

The Result of Calibration

Certification No. 034/26

20 January, 2026 Page : 3 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1010.35	1010	0.35
1010.05	1010	0.05
1009.76	1009	0.76
1009.43	1009	0.43
1009.14	1009	0.14
1008.84	1009	-0.16
1008.55	1009	-0.45
1008.24	1008	0.24
1008.11	1008	0.11
1007.54	1008	-0.46
1008.16	1008	0.16
1008.52	1008	0.52
1008.91	1009	-0.09
1009.25	1009	0.25
1009.62	1010	-0.38
1009.86	1010	-0.14
1010.05	1010	0.05
1010.53	1010	0.53
1010.94	1011	-0.06
1011.18	1011	0.18

Average

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 034/26

20 January, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
757.82	758	-0.18
757.60	758	-0.40
757.38	757	0.38
757.13	757	0.13
756.92	757	-0.08
756.69	757	-0.31
756.47	756	0.47
756.24	756	0.24
756.14	756	0.14
755.72	756	-0.28
756.18	756	0.18
756.45	756	0.45
756.74	757	-0.26
757.00	757	0.00
757.28	757	0.28
757.46	758	-0.54
757.60	758	-0.40
757.96	758	-0.04
758.27	758	0.27
758.45	758	0.45

Average

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 034/26

20 January, 2026 Page : 5 of 5

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
45.6	45	0.6
30.1	30	0.1
15.7	16	-0.3

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

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 2 March, 2026 Certification No. 130/26

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0008

Wind Sensor 2205DT0008

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1005.1 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: testo, testo 645 Serial No. 02848057 : Thermoschneider No.918802
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015
: Digital Barometer Vaisala Type PTB330 No. K0320001

Calibrated by : Mr. Watcharapol Subwat
Mechanical Engineer

Signed : Mr. Pisood Promsut
Authorised Signatory
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 130/26

2 March, 2026

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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
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
270	270

Calibrated by : Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 130/26

2 March, 2026

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	mbar
1005.83	1006	-0.17
1006.10	1006	0.10
1006.34	1006	0.34
1006.69	1007	-0.31
1007.09	1007	0.09
1007.43	1007	0.43
1007.93	1008	-0.07
1008.57	1008	0.57
1008.05	1008	0.05
1008.94	1009	-0.06
1009.34	1009	0.34
1009.06	1009	0.06
1008.75	1009	-0.25
1008.54	1008	0.54
1007.98	1008	-0.02
1007.62	1007	0.62
1006.87	1007	-0.13
1005.48	1005	0.48
1004.81	1005	-0.19
1003.82	1004	-0.18
Average		0.11

Calibrated by : Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 130/26

2 March, 2026

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	mmHg
754.43	754	0.43
754.64	755	-0.36
754.82	755	-0.18
755.08	755	0.08
755.38	755	0.38
755.63	756	-0.37
756.01	756	0.01
756.49	756	0.49
756.10	756	0.10
756.77	757	-0.23
757.07	757	0.07
756.86	757	-0.14
756.62	757	-0.38
756.47	756	0.47
756.05	756	0.05
755.78	756	-0.22
755.21	755	0.21
754.17	754	0.17
753.67	754	-0.33
752.93	753	-0.07
Average		0.01

Calibrated by : Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 130/26

2 March, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45	0.2
30.2	30	0.2
15.4	15	0.4

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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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 2 March, 2026 Certification No. 133/26

Page : 1 of 5

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0105

Wind Sensor 2205DT0105

Customer : United Analyst and Engineering Consultant Co.,Ltd.

81 Soi Udomsuk 41, Sukhumvit Road,

Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1004.1 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board

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

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

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

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

: testo, testo 645 Serial No. 02648057 : Thermoschneider No.918802

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015

: Digital Barometer Vaisala Type PTB330 No. K4320001

Calibrated by : Signed :

Mr. Watcharapol Subwat

Mechanical Engineer

Mr. Pisoot Promsut

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 2 of 5

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer m/sec	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
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
180	180
270	270

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 3 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1005.83	1006	-0.17
1006.10	1006	0.10
1006.34	1006	0.34
1006.69	1006	0.69
1007.09	1007	0.09
1007.43	1007	0.43
1007.93	1008	-0.07
1008.57	1009	-0.43
1008.05	1008	0.05
1008.94	1009	-0.06
1009.34	1009	0.34
1009.06	1009	0.06
1008.75	1009	-0.25
1008.54	1008	0.54
1007.98	1008	-0.02
1007.62	1008	-0.38
1006.87	1007	-0.13
1005.48	1005	0.48
1004.81	1005	-0.19
1003.82	1004	-0.18
	Average	0.06

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
754.43	754	0.43
754.64	755	-0.36
754.82	755	-0.18
755.06	755	0.06
755.38	755	0.38
755.63	755	0.63
756.01	756	0.01
756.49	756	0.49
756.10	756	0.10
756.77	757	-0.23
757.07	757	0.07
756.86	757	-0.14
756.62	757	-0.38
756.47	756	0.47
756.05	756	0.05
755.78	756	-0.22
755.21	755	0.21
754.17	754	0.17
753.67	754	-0.33
752.93	753	-0.07
	Average	0.00

Calibrated by : Watcharapol Subwat

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45	0.2
30.2	30	0.2
15.4	15	0.4

Calibrated by : Watcharapol Subwat

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.

3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

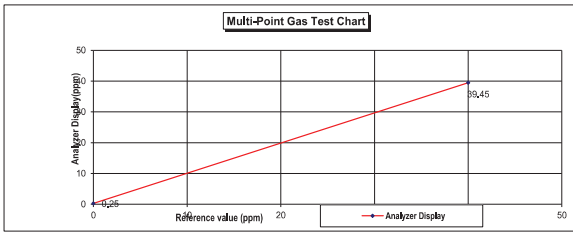
Test Date : July 17,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	93JN1MN9

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.25	0.25	0.25	0.25
Level 2	80.00%	40.00	39.45	-0.55	-1.39	1.39
Remark : Measuring Range :Acceptable Limit ± 5%		50.00 ppm		Average Difference (%)		0.82



Calculate by ..... 17 / 07 / 2568

Approve by ..... 17 / July / 2025

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MULTI-POINT GAS TEST REPORT

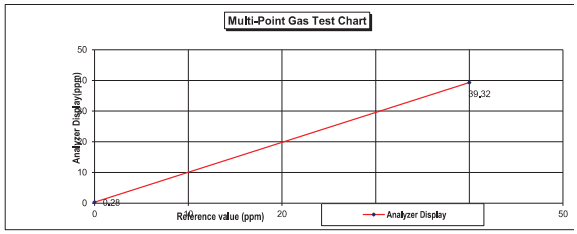
Test Date : Aug 1,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	KWWV1R96

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.28	0.28	0.28	0.28
Level 2	80.00%	40.00	39.32	-0.68	-1.73	1.73
Remark : Measuring Range :Acceptable Limit ± 5%		50.00 ppm		Average Difference (%)		1.00



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MULTI-POINT GAS TEST REPORT

Test Date : Aug 7,2025

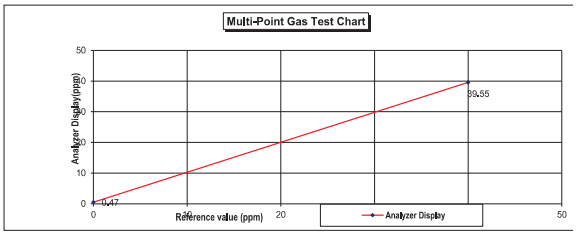
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	RATFJBXS

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.47	0.47	0.47	0.47
Level 2	80.00%	40.00	39.55	-0.45	-1.14	1.14
Remark : Measuring Range		50.00 ppm		Average Difference (%)		0.80

:Acceptable Limit ± 5%



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MULTI-POINT GAS TEST REPORT

Test Date : Aug 7,2025

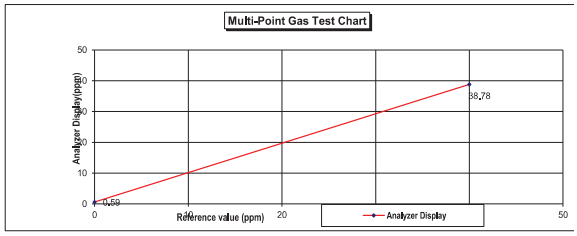
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	GY21PTED

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.59	0.59	0.59	0.59
Level 2	80.00%	40.00	38.78	-1.22	-3.15	3.15
Remark : Measuring Range		50.00 ppm		Average Difference (%)		1.87

:Acceptable Limit ± 5%



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MULTI-POINT GAS TEST REPORT

Test Date : July 17,2025

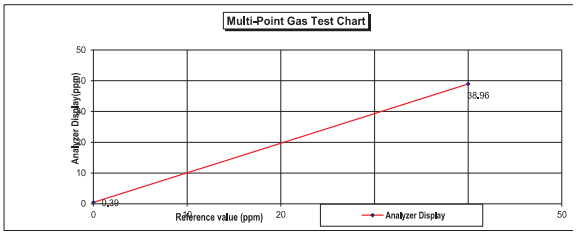
Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	GAL13KSE

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.39	0.39	0.39	0.39
Level 2	80.00%	40.00	38.96	-1.04	-2.67	2.67
Remark : Measuring Range		50.00 ppm		Average Difference (%)		1.53

:Acceptable Limit ± 5%



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MULTI-POINT GAS TEST REPORT

Test Date : July 25,2025

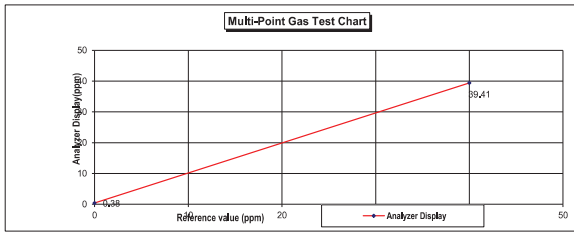
Equipment :	Hydrocarbon Analyzer	**Model :**	55i
Manufacturer :	Thermo SCIENTIFIC	**Serial Number :**	1182920025

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.38	0.38	0.38	0.38
Level 2	80.00%	40.00	39.41	-0.59	-1.50	1.50
Remark : Measuring Range		50.00 ppm		Average Difference (%)		0.94

:Acceptable Limit ± 5%



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THE LINDE GROUP

Linde

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: United Analyst & Engineering Co., Ltd.

Address: 3 Soi Udomsuk 41, Sukhumvit Rd., Bang Chak, Khet Phra Khanong, Bangkok 10260

Customer Tag No.:

Certificate Details

Number:	3384/20	Date of Issue:	4-Aug-2020	Expiry date:	4-Aug-2028
Material Details:					
Production Order:	90161442	Material Code:	400400-AL-34	Cylinder No:	DB24432
Gas content:	6.60 M³	Filling pressure:	137.0 bar	Valve:	CGA 590 BRASS
Cylinder Owner:	LINDE	Cylinder Material:	Aluminum	Cylinder Size:	50 L

Laboratory Report

Analytical Result

Component	Nominal Concentration	Analysis Result[1]	Uncertainty[2]	Method of Analysis[3]	Assay Date
Methane In Air	40.0 ppm	39.8 ppm	± 1% relative	(G) I-PB-152	4-Aug-2020

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date
Methane In Nitrogen	[illegible]	40.29 ± 0.39 ppm	2-Oct-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-CH4	4-Aug-2020

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using [illegible]
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to [illegible] when recognized national metrology institutes.
3. (T) Gas Chromatography, (G) Paramagnetic Oxygen Analyzer, (O) Electrochemical Oxygen Analyzer, (H) Electrochemical Moisture Analyzer, (S) Total Hydrocarbon Analyzer, (X) Other - Specified

Sukanya Parinyasootsom
Signatory for and on Behalf of Linde (Thailand) Co., Ltd.

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Linde (Thailand) Public Company Limited

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INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL : 10640-2116-5860-1 FAX: 10640-2116-7140

innovative instrument

ilac-MRA

ANAB ACCREDITED

Page 1 of 2 .

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-ACT-137
Request No : Req-2025-1828

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : LARSON DAVIS
Model : CAL150
Serial Number : 6855
ID : UAE.EFM.046/2566

Class : 2
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 August 2025
Calibration Date : 9 September 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 provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 September 2025

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

FM-708-ACT-02 Rev.04 Issue date 17/2/25

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Page 2 of 2

Certificate No : 25-ACT-137
Request No : Req-2025-1828

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

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	93.81	-0.19	-	-	0.11
114 dB / 1000 Hz	113.94	-0.06	-	-	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 Measured (%)	Adjustment Measured (%)	Uncertainty (± %)
94 dB / 1000 Hz	1.18	-	0.17
114 dB / 1000 Hz	0.63	-	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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Page : 1/6 .

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-246
Request No : Req-2025-1638

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005403
ID : UAE.EFM.039/2564
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 335074
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071570
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 : 16 July 2025
Calibrated Date : 30 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-1 : 2013 Electroacoustics - Sound level meters - Part 1: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 30 July 2025

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

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.0	0.32	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN. AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.6	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.4	0.10
C	29.0	0.10
Z	33.5	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	1.2	1.3	1.2	0.60
8000 Hz	2.0	2.1	2.1	0.70

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	134.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 0660-2116-5860-1 FAX: 0660-2116-7140

Certificate No : 25-SLM-246
Request No : Req-2025-1638

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	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	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	98.9	-0.1	
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	44.1	0.1	
39.00	39	39.5	0.5	

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

Certificate No : 25-SLM-246
Request No : Req-2025-1638

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	44.70	44.8	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	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	117.8	-0.2	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.6	-0.80	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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Certificate No : 25-SLM-246
Request No : Req-2025-1638

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.4	
Negative one-half cycle	143.5	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-272
Request No : Req-2025-1706

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005286
ID : UAE.EFM.102/2562
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377B02
Microphone S/N : 011740
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056087
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 : 22 July 2025
Calibrated Date : 11 August 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 11 August 2025

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

Certificate No : 25-SLM-272
Request No : Req-2025-1706

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.13	114.9	0.77	114.1	-0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 36, SN. 107224

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	31.5	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	31.2	0.10
C	30.7	0.10
Z	35.1	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
FAST / 37-139	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	1.6	1.7	1.7	0.60
8000 Hz	2.3	2.3	2.3	0.70

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 1660-2116-5860-1 FAX: 1660-2116-7140

Certificate No : 25-SLM-272
Request No : Req-2025-1706

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
FAST / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	0.0	0.0	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Lin	114.00	114.0	0.0	

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Certificate No : 25-SLM-272
Request No : Req-2025-1706

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
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	0.30
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.1	0.1	
44.00	44	44.2	0.2	
43.00	43	43.1	0.3	
42.00	42	42.4	0.4	
41.00	41	41.5	0.5	

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Certificate No : 25-SLM-272
Request No : Req-2025-1706

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	46.60	46.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.8	-0.2	
	0.25	100.0	108.5	-0.5	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	108.9	-0.1	
	0.25	100.0	99.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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Certificate No : 25-SLM-272
Request No : Req-2025-1706

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	145.5	
Negative one-half cycle	145.6	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-241
Request No : Req-2025-1240

Unit Under Calibration Details

Measurement item	: Sound Level Meter	Microphone Class	: 2
Manufacturer	: LARSON DAVIS	Microphone Model	: 375A04
Model	: LxT2	Microphone S/N	: 350427
Serial Number	: 0005287	Preamplifier Model	: PRMLxT2II
ID	: UAE.EFM.103/2562	Preamplifier S/N	: 056074
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 : 16 July 2025
Calibrated Date : 29 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part.3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 29 July 2025

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

Certificate No : 25-SLM-241
Request No : Req-2025-1240

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.2	0.52	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN: AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	27.4	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	27.2	0.10
C	27.9	0.10
Z	34.6	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.4	0.3	0.3	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.1	0.1	0.1	0.60
8000 Hz	-0.3	-0.3	-0.2	0.70

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

Certificate No : 25-SLM-241
Request No : Req-2025-1240

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	0.2	0.2	0.2	0.20
125 Hz	0.1	0.2	0.2	
250 Hz	0.0	0.1	0.1	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	-0.1	-0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	
16000 Hz	-0.2	-0.2	-0.3	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 06640-2116-5860-1 FAX: 06640-2116-7140

Certificate No : 25-SLM-241
Request No : Req-2025-1240

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	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	93.9	-0.1	
89.00	89	88.9	-0.1	
84.00	84	83.9	-0.1	
79.00	79	78.9	-0.1	
74.00	74	73.9	-0.1	
69.00	69	68.9	-0.1	
64.00	64	63.9	-0.1	
59.00	59	58.9	-0.1	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.2	0.2	
38.00	38	38.3	0.3	
37.00	37	37.4	0.4	
36.00	36	36.5	0.5	

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

Certificate No : 25-SLM-241
Request No : Req-2025-1240

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	42.00	42.1	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.9	-0.1	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.1	+0.1	
	0.25	100.0	99.8	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 25-SLM-241
Request No : Req-2025-1240

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	140.8	
Negative one-half cycle	140.6	
Deviated	0.2	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 26-SLM-165
Request No : Req-2026-0976

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005296
ID : UAE.EFM.111/2562
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375B02
Microphone S/N : 011739
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056086
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 : 4 April 2026
Calibrated Date : 23 April 2026
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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Sven401	131	27 September 2026	WK Electric

Note

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

Calibrated By :
Mr. Noppadon Luangsri
Service Calibration Engineer

Approved By :
Mr. Pacit Mathavom
Calibration Engineer Supervisor

Issue Date : 23 April 2026

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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: 06610-2116-5860-1 FAX: 06610-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	114.3	0.55	113.7	-0.05	0.20

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

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	30.1	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.4	0.10
C	29.3	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 / 37-139	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	1.5	1.5	1.5	0.60
8000 Hz	1.7	1.7	1.7	0.70

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Certificate No : 26-SLM-165
Request No : Req-2026-0976

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	
125 Hz	-0.1	0.1	0.0	
250 Hz	0.0	0.0	0.0	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	0.20
2000 Hz	0.1	0.1	0.1	
4000 Hz	0.0	0.1	0.1	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	0.0	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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Certificate No : 26-SLM-165
Request No : Req-2026-0976

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
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	0.30
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	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.2	0.2	
39.00	39	39.6	0.6	

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Calibrate on 17/2/25 Due date 17/2/25
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INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
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TEL: 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	45.10	45.2	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.9	-0.1	
	0.25	109.0	108.8	-0.2	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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Calibrate on 17/2/25 Due date 17/2/25
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TEL: 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.8	
Negative one-half cycle	143.8	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
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 laboratory. Environment Co., Ltd.
Calibrate on 17/2/25 Due date 17/2/25
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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT
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Tel: +66 2709 4860 Fax: +66 2324 0917

Certificate No.: CP20240341EA
Operation No.: CP2024090312

Certificate of Calibration

Equipment:	Sound Level Meter
Manufacturer:	Larson Davis (Meter), PCB (Microphone), PCB (Preamplifier)
Model/Type:	LxT2 (Meter), 375B02 (Microphone), PRMLxT2B (Preamplifier)
Serial No.:	0005298 (Meter), 011741 (Microphone), 056088 (Preamplifier)
ID No.:	UAE.EFM.113/2562
Customer:	United Analyst and Engineering Consultant Co.,Ltd.
Address:	81 Soi Udomsuk 41, Sukhumvit Road, Bangchak Phrakhanong, Bangkok 10260
Received Date:	3 September 2024
Calibrated Date:	23 - 25 September 2024
Issued Date:	26 September 2024
Calibrated by:	Ms. Juntaporn Kunhakorn

Approved by:
(Mr. Sittichai Swaksurlyawong)
Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.
The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor (k) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.

F-CAL-004 Ed.1

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Certificate No.: CP20240341EA

Calibration Report

Equipment: Sound Level Meter
Manufacturer: Larson Davis (Meter), PCB (Microphone), PCB (Preamplifier)
Model/Type: LxT2 (Meter), 375B02 (Microphone), PRMLxT2B (Preamplifier)
Serial No.: 0005298 (Meter), 011741 (Microphone), 056088 (Preamplifier)
ID No.: UAE.EFM.113/2562
Ambient Temperature: (23 ± 2) ºC
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :-
IEC 61672-3:2013.

Condition of this result of calibration
1. Reference standards instrument :-

	Instrument	Model	Serial No.	Cert. No.	Due Date
1)	Standard microphone	4180	2787490	AA-1012-23	12 November 2024
2)	Arbitrary Function Generator	AFG2021	C010063	CK20240048EA	23 June 2025
3)	Programmable Attenuator	PA5	2755	EF-0040-23	1 October 2024
4)	6.5 Digit precision multimeter	8846A	9610014	CB20230200EA	15 November 2024
5)	Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P240022 CD20240180EA	20 March 2025 7 August 2025
6)	Performance Audio Analyzer	UI8903B	MY56510003	CB20240035EB CK20240069EA	13 February 2025 19 September 2025

2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certification is traceable to the international system of unit maintained at :-
Reference standards instrument for Acoustic function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute; NSC Accredited Calibration No.0119
Reference standards instrument for Electrical function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute; NSC Accredited Calibration No.0119

Result of Calibration:-
Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
-	-	-	-

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20240341EA

Calibration Report

Function : 2. Self-generated Noise
2.1 Microphone Installed

Measured value (dB)
31.1

2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	31.1
C-weighting	31.0
Z-weighting	36.5

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)
Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.2	0.1	0.1	±1.5
1000	0.3	0.3	0.3	±1.0
8000	1.3	1.2	1.3	±5.0

Function : 4. Electrical signal tests of frequency weightings
Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	0.0	0.0	0.0	±2.0
125	0.0	0.0	-0.1	±1.5
250	0.0	0.0	0.0	±1.5
500	0.1	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.1	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

Function : 5. Frequency and time weighting at 1 kHz
5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20240341EA

Calibration Report

5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability
Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.5

Function : 7. Level Linearity on the reference level range
7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.0	0.0	±1.1
124.0	124.0	0.0	±1.1
129.0	129.0	0.0	±1.1
134.0	134.1	0.1	±1.1
139.0	139.1	0.1	±1.1
140.0	140.1	0.1	±1.1
141.0	141.1	0.1	±1.1
142.0	142.1	0.1	±1.1
143.0	143.1	0.1	±1.1

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Certificate No.: CP20240341EA

Calibration Report

7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.2	0.2	±1.1
43.0	43.3	0.3	±1.1
42.0	42.4	0.4	±1.1
41.0	41.5	0.5	±1.1
40.0	40.5	0.5	±1.1

Function : 8. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	136.0	0.0	±1.0
	2	118.9	-0.1	+1.0 ; -2.5
	0.25	109.8	-0.2	+1.5 ; -5.0
Slow	200	129.5	-0.1	±1.0
	2	109.9	-0.1	+1.0 ; -5.0
LAE	200	130.0	0.0	±1.0
	2	110.0	0.0	+1.0 ; -2.5
	0.25	101.0	0.0	+1.5 ; -5.0

Function : 9. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	135.4	134.8	-0.6	±3.0
Positive half cycle	134.4	134.1	-0.3	±2.0
Negative half cycle	134.4	134.2	-0.2	±2.0

Function : 10. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
145.0	145.2	0.2	±1.5

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ELECTRICAL AND ELECTRONICS INSTITUTE
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Certificate No.: CP20240341EA

Calibration Report

Function : 11. High-Level Stability
High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	139.0	139.0	0.0	±0.5

Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Tone burst response	0.20	0.30
9) Peak C sound level	0.20	0.35
10) Overload indication	0.24	0.25
11) High-Level Stability	0.10	0.10

Remarks: 1. The acceptance limit is for the deviated value.
2. Acceptance limits was IEC61672-3:2013 Class 2.
3. The coverage factor k = 2.00

-- End of Report --

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TEL. 06610-2116-5860-1 FAX. 06610-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-273
Request No : Req-2025-1711

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0085299
ID : UAE.EFM.114/2562
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 375A04
Microphone S/N : 323471
Preamplifier Model : PRMLxT2C
Preamplifier S/N : 071493
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 : 22 July 2025
Calibrated Date : 11 August 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 Factor k = 2, providing a level of confidence approximately 95 %.

Calibrated By : Mr. Noppadon Luangsrt
Service Calibration Engineer

Approved By : Mr. Pasit Mathuvorn
Calibration Engineer Supervisor

Issue Date : 11 August 2025

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TEL. 06610-2116-5860-1 FAX. 06610-2116-7140

Certificate No : 25-SLM-273
Request No : Req-2025-1711

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.13	113.9	-0.23	114.1	-0.03	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 36, SN. 107224

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	26.6	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	26.3	0.10
C	25.8	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 / 37-139	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	-0.1	-0.1	-0.1	0.60
8000 Hz	-0.6	-0.6	-0.6	0.70

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL. 06610-2116-5860-1 FAX. 06610-2116-7140

Certificate No : 25-SLM-273
Request No : Req-2025-1711

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	-0.1	
125 Hz	-0.1	0.0	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	0.0	-0.1	
1000 Hz	0.0	0.0	-0.1	0.20
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	
C	114.00	114.0	0.0	0.20
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / A	REF	UUC	ERR	
UUC Time Respone	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	0.20
Leq	114.00	114.0	0.0	

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TEL: 16640-2116-5860-1 FAX: 16640-2116-7140

Certificate No : 25-SLM-273
Request No : Req-2025-1711

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.1	0.1	
44.00	44	44.1	0.1	
39.00	39	39.3	0.3	
38.00	38	38.4	0.4	
37.00	37	37.4	0.4	
36.00	36	36.5	0.5	

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9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	41.70	41.8	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respons	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.8	-0.2	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	108.9	-0.1	
	0.25	100.0	99.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.6	-0.80	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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FM-708-SLM-01 Rev.08 Issue date 17/2/25

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Certificate No : 25-SLM-273
Request No : Req-2025-1711

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	140.5	
Negative one-half cycle	140.5	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT
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Tel: +66 2709 4860 Fax: +66 2324 0917

Certificate No.: CP20250040EA
Operation No.: CP2024070258

Certificate of Calibration

Equipment:	Sound Level Meter
Manufacturer:	Larson Davis (Meter), PCB (Microphone), PCB (Preamplifier)
Model/Type:	LxT2 (Meter), 375A04 (Microphone), PRMLxT2C (Preamplifier)
Serial No.:	0005328 (Meter), 32934 (Microphone), 073799 (Preamplifier)
ID No.:	UAE.EFM.034/2563
Customer:	United Analyst and Engineering Consultant Co.,Ltd.
Address:	81 Soi Udomsuk 41, Sukhumvit Road, Bangchak Phrakhanong, Bangkok 10260
Received Date:	24 January 2025
Calibrated Date:	3 - 4 February 2025
Issued Date:	5 February 2025
Calibrated by:	Ms. Juntaporn Kunhakorn

Approved by:
(Mr. Sittichai Swaksuriyawong)
Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.
The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor (k) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.

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Certificate No.: CP20250040EA

Calibration Report

Equipment: Sound Level Meter
Manufacturer: Larson Davis (Meter), PCB (Microphone), PCB (Preamplifier)
Model/Type: LxT2 (Meter), 377A04 (Microphone), PRMLxT2C (Preamplifier)
Serial No.: 0005328 (Meter), 32934 (Microphone), 073799 (Preamplifier)
ID No.: UAE.EFM.034/2563
Ambient Temperature: (23 ± 2) ºC
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :-
IEC 61672-3:2013.

Condition of this result of calibration
1. Reference standards instrument :-

	Instrument	Model	Serial No.	Cert. No.	Due Date
1)	Standard microphone	4180	2661000	AA-1007-24	6 June 2025
2)	Arbitrary Function Generator	AFG2021	C010063	CK20240048EA	23 June 2025
3)	Programmable Attenuator	PA5	2913	EF-0021-24	3 June 2025
4)	6.5 Digit precision multimeter	8846A	9609027	CB20240128EA	31 July 2025
5)	Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P240022 CD20240180EA	20 March 2025 7 August 2025
6)	Performance Audio Analyzer	UB903B	MY56510003	CB20240035EB CK20240069EA	13 February 2025 19 September 2025

2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certification is traceable to the international system of unit maintained at :-
Reference standards instrument for Acoustic function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute; NSC Accredited Calibration No.0119
Reference standards instrument for Electrical function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute; NSC Accredited Calibration No.0119

Result of Calibration:-
Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
-	-	-	-

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250040EA

Calibration Report

Function : 2. Self-generated Noise
2.1 Microphone Installed

Measured value (dB)
25.6

2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	25.2
C-weighting	25.7
Z-weighting	31.6

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)
Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.6	0.5	0.5	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-2.0	-2.1	-2.0	±5.0

Function : 4. Electrical signal tests of frequency weightings
Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	0.0	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	-0.1	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

Function : 5. Frequency and time weighting at 1 kHz
5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250040EA

Calibration Report

5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability
Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.3

Function : 7. Level Linearity on the reference level range
7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.1	0.1	±1.1
124.0	124.1	0.1	±1.1
129.0	129.1	0.1	±1.1
134.0	134.1	0.1	±1.1

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Certificate No.: CP20250040EA

Calibration Report

7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.2	0.2	±1.1

Function : 8. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	136.0	0.0	±1.0
	2	118.8	-0.2	+1.0 ; -2.5
	0.25	109.6	-0.4	+1.5 ; -5.0
Slow	200	129.5	-0.1	±1.0
	2	109.9	-0.1	+1.0 ; -5.0
LAE	200	130.0	0.0	±1.0
	2	110.0	0.0	+1.0 ; -2.5
	0.25	100.8	-0.2	+1.5 ; -5.0

Function : 9. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	135.4	134.8	-0.6	±3.0
Positive half cycle	134.4	134.0	-0.4	±2.0
Negative half cycle	134.4	134.0	-0.4	±2.0

Function : 10. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
139.5	139.5	0.0	±1.5

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FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250040EA

Calibration Report

Function : 11. High-Level Stability
High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	139.0	139.0	0.0	±0.3

Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Tone burst response	0.20	0.30
9) Peak C sound level	0.20	0.35
10) Overload indication	0.24	0.25
11) High-Level Stability	0.10	0.10

Remarks: 1. Indication at the calibration check frequency can not measured because customer does not provide a sound calibrator.
2. The acceptance limit is for the deviated value.
3. Acceptance limits was IEC61672-3:2013 Class 2.
4. The coverage factor k = 2.00

-- End of Report --

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TEL: 06(0)-2116-5860-1 FAX: 06(0)-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-339
Request No : Req-2025-2019

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005341
ID : UAE.EPM.038/2563
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377B02
Microphone S/N : 11793
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056133
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 5 September 2025
Calibrated Date : 9 October 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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 October 2025

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Certificate No : 25-SLM-339
Request No : Req-2025-2019

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	113.9	0.15	113.7	-0.05	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 / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.3	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	28.9	0.10
C	28.6	0.10
Z	32.8	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	1.1	1.2	1.1	0.60
8000 Hz	0.4	0.4	0.4	0.70

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Certificate No : 25-SLM-339
Request No : Req-2025-2019

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 / 37-139				
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	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	0.0	-0.1	
1000 Hz	0.0	0.0	-0.1	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	0.0	
16000 Hz	-0.1	-0.1	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL: 10640-2116-5860-1 FAX: 10640-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
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	0.30
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	49.1	0.1	
44.00	44	44.2	0.2	
39.00	39	39.5	0.5	
38.00	38	38.7	0.7	

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INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 10640-2116-5860-1 FAX: 10640-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	43.70	43.9	0.2	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.6	-0.4	
	0.25	109.0	108.6	-0.4	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 10640-2116-5860-1 FAX: 10640-2116-7140

Certificate No : 25-SLM-339
Request No : Req-2025-2019

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	142.7	
Negative one-half cycle	142.7	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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JNAC
JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd.
63/14-15, 67/35-36
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Tel: +6659383811
Mobile: +66863888453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Flow measurement laboratory
Calibration services department.

ilac-MRA
NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : COF-025-68

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: Graseby GMW
MODEL/TYPE	: G25A
SERIAL NUMBER	: 1SBM
ID NUMBER	: UAE.EMA2.033/2554
CONDITION AS-RECEIVED	: Used item
CUSTOMER	: United Analyst and Engineering Consultant Co., Ltd. 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
RECEIVED DATE	: 08 Jul 2025
MEASUREMENT DATE	: 21 Jul 2025
ISSUE DATE	: 23 Jul 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 24.1 °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/MC/W5-slp. The JAE-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: MM-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'

Calibrated by:
☐ Mr. Sorayut Thadalad
☑ Miss Ittraporn Lertsamphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory: .....
Mr. Parinya Booncharoen
Calibration Department Manager

Jiranatee Associates Co.,Ltd.

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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.

Continuation of Certificate of Calibration Number COF-025-68

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 m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.705	754.349	23.73	22.79	49.056	1.591	1.259	0.659
2	1.001	754.437	24.15	23.35	53.261	3.204	1.786	0.928
3	1.117	754.417	24.28	23.76	35.572	4.198	2.044	1.061
4	1.172	754.507	24.30	23.80	26.997	4.736	2.171	1.127
5	1.409	754.551	24.20	23.66	25.669	6.905	2.622	1.357

Slope (*m*): 1.95153
Intercept (*b*): -0.02703
Correlation coefficient (*r*): 0.99990
Uncertainty (*k*=2): 0.015 m^3/min

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

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.705	754.349	23.73	22.79	49.056	1.591	0.791	0.661
2	1.001	754.437	24.15	23.35	53.261	3.204	1.124	0.933
3	1.117	754.417	24.28	23.76	35.572	4.198	1.287	1.067
4	1.172	754.507	24.30	23.80	26.997	4.736	1.366	1.132
5	1.409	754.551	24.20	23.66	25.669	6.905	1.650	1.363

Slope (*m*): 1.22228
Intercept (*b*): -0.01696
Correlation coefficient (*r*): 0.99990
Uncertainty (*k* = 2): 0.015 m^3/min

End of Certificate of Calibration

JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 25P3507

Equipment : U Tube Manometer
Manufacturer: Dwyer
Model : 1221-36-W/M
Serial No.: -
ID No.: UAE.EFM.179/2561
Condition As-Received: Used Item
Received Date: 03 September 2025
Calibration Date: 09 September 2025

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.

Reference: 2509-0144WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1007 mbar

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P04, using " DKD-R 6-1 : Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MP-0218-24	24 Sep 2025

2.This result of calibration was made on requested at the point specified by customer.
3.Scale and conversion factor is 1 kPa = 4.0146293 inH_2O
4.This instrument was used clean air as pressure media.
5.This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.
6.This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.
7.The certificate is valid only to the item calibrated on date and place of calibration.
8.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

Calibrated by : Suksan Khankaew
Issue Date : 10 September 2025

Approved Signatory : Attapol P.
[ ] Phalinee Prabpaipal
[ ] Sura Suwannasri
[✓] Attapol Panurach

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Cert.No.: 25P3507

Result of calibration:- Without adjustment
Function:- Pressure Measurement
Increasing Pressure

Range : 0 inH_2O to 36 inH_2O
Scale Interval : 0.1 inH_2O (The Second Estimate)

Applied Pressure	UUC Indication High-port side	UUC Indication Low-port side	ΔP	Error
0.00	0.00	0.00	0.00	0.00
2.00	0.95	-1.00	1.95	-0.05
4.00	1.95	-2.00	3.95	-0.05
6.00	2.95	-3.00	5.95	-0.05
8.00	4.00	-4.00	8.00	0.00
10.00	5.00	-5.00	10.00	0.00
12.00	6.00	-6.00	12.00	0.00
14.00	7.00	-7.00	14.00	0.00
16.00	8.00	-8.00	16.00	0.00
18.00	9.00	-9.00	18.00	0.00
20.00	10.05	-10.00	20.05	0.05
22.00	11.05	-11.00	22.05	0.05
24.00	12.05	-11.95	24.00	0.00
26.00	13.10	-12.95	26.05	0.05
28.00	14.10	-13.95	28.05	0.05
30.00	15.10	-14.95	30.05	0.05
32.00	16.15	-15.95	32.10	0.10
34.00	17.15	-16.95	34.10	0.10
35.70	18.00	-17.80	35.80	0.10

The uncertainty of measurement was ± 0.11 inH_2O
* ΔP = High-port side - Low-port side
* UUC = Unit Under Calibration
The 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 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No. : 26P1523

Equipment : Aneroid Barometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.152/2550
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 23 April 2026

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.

Reference: 2604-0316WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to calibration procedure CP-P10, using " DKD-R 6-1 : Calibration of Pressure Gauges " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Indicator	DPI142	1422505046	MP-0150-25	20 May 2026

2.This result of calibration was made on requested at the point specified by customer.
3.The certificate is valid only to the item calibrated on date and place of calibration.
4.This measurement result is traceable to the International System of Unit maintained through:-
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Somchai Chaichan
Issue Date : 24 April 2026

Approved Signatory : S. Sura
[ ] Phalinee Prabpaipal
[✓] Sura Suwannasri
[ ] Attapol Panurach

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Cert.No.: 26P1523
Page: 2 of 2

Technical information and UUC* settings during calibration:

Result of calibration	: Without adjustment	**Range**	: 960 hPa to 1030 hPa
Pressure type	: Absolute Pressure	**Scale Interval**	: 1 hPa (The Fifth Estimate)
Installation	: Vertical Orientation	**Pressure medium**	: Clean air
Atmospheric pressure	: (1004 ± 10) mbar	**Reference level**	: at the center of the dial

Increasing Pressure

Applied Pressure (hPa)	955.29	966.54	977.66	988.18	998.94	1008.96	1019.79	1030.21
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1010.0	1020.0	1030.0
Error (hPa)	4.71	3.46	2.34	1.82	1.06	1.04	0.21	-0.21

Decreasing Pressure

Applied Pressure (hPa)	1030.19	1019.81	1008.97	998.89	988.30	977.58	966.66	955.22
UUC* Indication (hPa)	1030.0	1020.0	1010.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-0.19	0.19	1.03	1.11	1.70	2.32	3.34	4.78

The uncertainty of measurement was ± 0.25 hPa

* UUC = Unit Under Calibration

The 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 %.

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Certificate of Calibration

Certificate No. : 26H712
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.131/2550
Condition As-Received: Used Item
Received Date: 10 April 2026
Calibration Date: 17 April 2026 to 22 April 2026
Reference: 2604-0315WSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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.

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Chilled-Mirror Hygrometer	Dew Master	41292	23277	06 May 2026
2) Handheld Thermometer With Sensor	1523	5717096	2511200	21 Nov 2026

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

3.This measurement result is traceable to the International System of Unit maintained through:-
-Thunder Scientific Corporation, NVLAB Accreditation No. Calibration 200582-0
-Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Calibrated by : Kraipop Onrat
Issue Date : 23 April 2026

Approved Signatory : Vipom
[ ] Chakrit Waewwanjua
[ ] Pornthippa Tameyakul
[✓] Vipom Tantiyawutti

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Cert. No.: 26H712
Page.: 2 of 2

Result of Calibration:- Without Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	UUC* Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	41	-0.9	1.6
25.0	60.0	60	0.0	1.7
25.0	80.0	76	4.0	1.9

Result of Calibration:- Without Adjustment
Function: Temperature Measurement.

Standard Temperature (°C)	UUC* Reading (°C)	UUC* Correction (°C)	Uncertainty of Measurement (±°C)
20.012	20.5	-0.488	0.65
25.028	25.0	0.028	0.65
30.005	30.0	0.005	0.65
35.019	34.5	0.519	0.65
40.040	39.0	1.040	0.65

UUC* : Unit Under Calibration

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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UAE
UNITED ANALYST AND ENGINEERING CONSULTANT COMPANY LIMITED

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

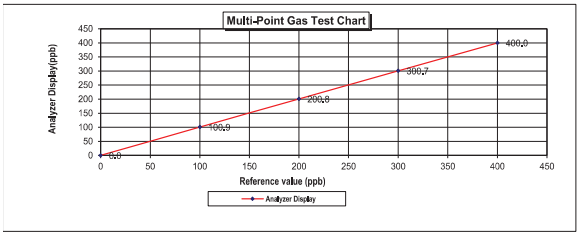
Test Date : Feb 20,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1182920009

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	42.89 PPM		Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77 PPM		Model :	146i
Methane (CH_4)	- PPM		Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

	Reference Value (ppb)		Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.9	0.90	0.89	0.89
Level 3	40.00%	200.0	200.8	0.80	0.40	0.40
Level 4	60.00%	300.0	300.7	0.70	0.23	0.23
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range :Acceptable Limit ± 5%		500.0 ppb		Average Difference (%)		0.30



Calculate by
20 / 02 / 2569

Approve by
20 / Feb / 2026

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

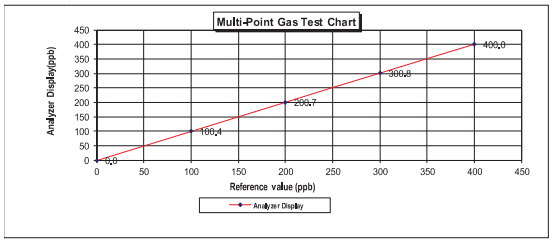
Test Date : Feb 24,2026

Equipment :	Gas Analyzer (NO_2)	**Model :**	42i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201778106

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9			
Cylinder No. :	EB0159156			
Expiration Date :	Nov 6,2026			

Multi-point gas test data

Reference Value (ppb)			Analyzer Display (ppb)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.00	0.00	0.00
Level 2	20.00%	100.0	100.4	0.40	0.40	0.40
Level 3	40.00%	200.0	200.7	0.70	0.35	0.35
Level 4	60.00%	300.0	300.8	0.80	0.27	0.27
Level 5	80.00%	400.0	400.0	0.00	0.00	0.00
Remark : Measuring Range 500.0 ppb				Average Difference (%)		0.20
:Acceptable Limit ± 5%						



Calculate by ..... 24 / 02 / 2569

Approve by ..... 24 / Feb / 2026

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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS
Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD		
Part Number:	E05NI91E15A0014	Reference Number:	160-402772205-1
Cylinder Number:	EB0162121	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
PGVP Number:	A12023	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,SO2,BALN	Certification Date:	Jul 06, 2023
		Expiration Date:	Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	10428230B	CC754364	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	20230425 25	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12408	D813880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	1534002020002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003828	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2026
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-C8-160	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 29, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

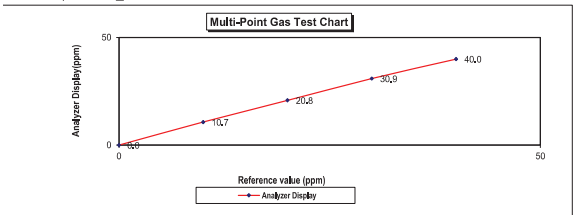
Test Date : July 17,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201497733

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9	PPM		
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.7	0.7	6.5	6.5
Level 3	40.00%	20.0	20.8	0.8	3.8	3.8
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range 50.0 ppm				Average Difference (%)		2.66
:Acceptable Limit ± 5%						



Calculate by ..... 17 / 07 / 2568

Approve by ..... 17 / July / 2025

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

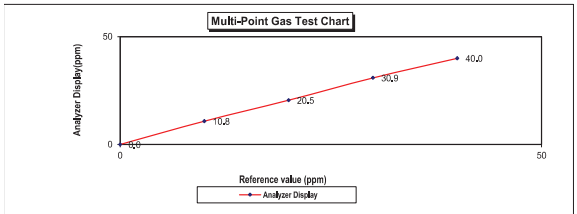
Test Date : July 11,2025

Equipment :	Gas Analyzer (CO)	**Model :**	48i
Manufacturer :	Thermo Scientific	**Serial Number :**	1201778117

Standard Gas Concentration			Dilutor Detail	
Sulphur Dioxide (SO_2)	42.89	PPM	Manufacturer :	Thermo Scientific
Nitric Oxide (NO)	46.77	PPM	Model :	146i
Methane (CH_4)	-	PPM	Serial Number :	1180540071
Carbon Monoxide (CO)	965.9	PPM		
Cylinder No. :	EB0159156			
Expiration Date :	Nov 06,2026			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.0	0.0	0.0	0.0	0.0
Level 2	20.00%	10.0	10.8	0.8	7.4	7.4
Level 3	40.00%	20.0	20.5	0.5	2.4	2.4
Level 4	60.00%	30.0	30.9	0.9	2.9	2.9
Level 5	80.00%	40.0	40.0	0.0	0.0	0.0
Remark : Measuring Range 50.0 ppm				Average Difference (%)		2.55
:Acceptable Limit ± 5%						



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Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD

Part Number: E05NI91E15A0014
Cylinder Number: EB0162121
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: CO,CO2,NO,NOX,SO2,BALN

Reference Number: 160-402772205-1
Cylinder Volume: 144.0 CF
Cylinder Pressure: 2016 PSIG
Valve Outlet: 660
Certification Date: Jul 06, 2023

Expiration Date: Jul 06, 2031

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	100.0 PPM	100.4 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
NITRIC OXIDE	100.0 PPM	100.2 PPM	G1	+/- 0.9% NIST Traceable	06/27/2023, 07/06/2023
SULFUR DIOXIDE	100.0 PPM	100.0 PPM	G1	+/- 1.4% NIST Traceable	06/27/2023, 07/06/2023
CARBON MONOXIDE	200.0 PPM	199.2 PPM	G1	+/- 0.3% NIST Traceable	06/26/2023
CARBON DIOXIDE	8.000 %	7.982 %	G1	+/- 1.2% NIST Traceable	06/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	104282308	CC754364	98.36 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Jan 04, 2031
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	+/- 0.3%	Feb 28, 2025
GMIS	2023042525	CC754381	98.52 PPM NITRIC OXIDE/NITROGEN	+/-0.4%	Apr 25, 2031
PRM	12408	D913880	15.01 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Feb 17, 2023
GMIS	153400202002	EB0130037	9.693 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Sep 29, 2025
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027
CO	230601	CC745902	249.47 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Dec 09, 2028
NTRM	130606-02	CC411730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO2	FTIR	Jun 15, 2023
SIEMENS ULTRAMAT6E N1-C8-180	NDIR	Jun 14, 2023
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Jun 29, 2023
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Jun 15, 2023
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 08, 2023

Approved for Release

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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 2 March, 2026

Certification No. 133/26

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0105
Wind Sensor 2205DT0105

Customer : United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1004.1 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: testo, testo 645 Serial No. 02648057 : Thermoschneider No.918802
STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V1220015
: Digital Barometer Vaisala Type PTB330 No. K4320001

Calibrated by : Watcharapol Signed : Pisoot Promsut
Mr. Watcharapol Subwat
Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 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	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
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
180	180
270	270

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 2026

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1005.83	1006	-0.17
1006.10	1006	0.10
1006.34	1006	0.34
1006.69	1006	0.69
1007.09	1007	0.09
1007.43	1007	0.43
1007.93	1008	-0.07
1008.57	1009	-0.43
1008.05	1008	0.05
1008.94	1009	-0.06
1009.34	1009	0.34
1009.06	1009	0.06
1008.75	1009	-0.25
1008.54	1008	0.54
1007.98	1008	-0.02
1007.62	1008	-0.38
1006.87	1007	-0.13
1005.48	1005	0.48
1004.81	1005	-0.19
1003.82	1004	-0.18
	Average	-0.06

Calibrated by : Watcharapol
Mr. Watcharapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
754.43	754	0.43
754.64	755	-0.36
754.82	755	-0.18
755.06	755	0.06
755.38	755	0.38
755.63	755	0.63
756.01	756	0.01
756.49	756	0.49
756.10	756	0.10
756.77	757	-0.23
757.07	757	0.07
756.86	757	-0.14
756.62	757	-0.38
756.47	756	0.47
756.05	756	0.05
755.78	756	-0.22
755.21	755	0.21
754.17	754	0.17
753.67	754	-0.33
752.93	753	-0.07
Average		0.00

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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

The Result of Calibration

Certification No. 133/26

2 March, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45	0.2
30.2	30	0.2
15.4	15	0.4

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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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 20 January, 2026 Certification No. 033/26

Page : 1 of 5

Object : Wind Speed & Wind Direction Data Logger

Manufacturer : SCARLET/TECH

Type : WL-21

Mfg Code : Wireless Receiver 2205DR0113

Wind Sensor 2205DT0113

Customer : United Analyst and Engineering Consultant Co.,Ltd.

81 Soi Udomsuk 41, Sukhumvit Road,

Bangchak, Prakanong, Bangkok 10260.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.7 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112

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

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

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

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

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

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

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. V2220119

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Signed :

Mr. Pisoed Promsut

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

เอกสารไม่ควบคุม

THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026 Page : 2 of 5

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425 Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	TESTED ANEMOMETER Velocity m/sec	Correction m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.02	-	-	-	11.0	0.02
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.9	0.11
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.9	0.12

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

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026 Page : 3 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mbar
1010.35	1011	-0.65
1010.05	1010	0.05
1009.76	1010	-0.24
1009.43	1009	0.43
1009.14	1009	0.14
1008.84	1009	-0.16
1008.55	1008	0.55
1008.24	1008	0.24
1008.11	1008	0.11
1007.54	1007	0.54
1008.16	1008	0.16
1008.52	1008	0.52
1008.91	1009	-0.09
1009.25	1009	0.25
1009.62	1009	0.62
1009.86	1010	-0.14
1010.05	1010	0.05
1010.53	1011	-0.47
1010.94	1011	-0.06
1011.18	1011	0.18

Average

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026 Page : 4 of 5

Standard Barometer Pressure	Tested Barometer Pressure	Correction mmHg
757.82	758	-0.18
757.60	757	0.60
757.38	757	0.38
757.13	757	0.13
756.92	757	-0.08
756.69	756	0.69
756.47	756	0.47
756.24	756	0.24
756.14	756	0.14
755.72	756	-0.28
756.18	756	0.18
756.45	756	0.45
756.74	757	-0.26
757.00	757	0.00
757.28	757	0.28
757.46	757	0.46
757.60	758	-0.40
757.96	758	-0.04
758.27	758	0.27
758.45	758	0.45

Average

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

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THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Certification No. 033/26

20 January, 2026 Page : 5 of 5

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.6	46	-0.4
30.1	30	0.1
15.7	16	-0.3

Calibrated by : Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.

3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

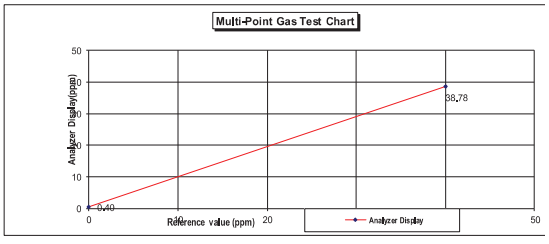
Test Date : July 17,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	VUPVTC21

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	-	PPM	Manufacturer :	
Nitric Oxide (NO)	-	PPM	Model :	
Methane (CH_4)	39.8	PPM	Serial Number :	
Carbon Monoxide (CO)	-	PPM		
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.40	0.40	0.40	0.40
Level 2	80.00%	40.00	38.78	-1.22	-3.15	3.15
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.77



Calculate by ..... 17 / 07 / 2568

Approve by ..... 17 / July / 2025

Page 1 of 1

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

MULTI-POINT GAS TEST REPORT

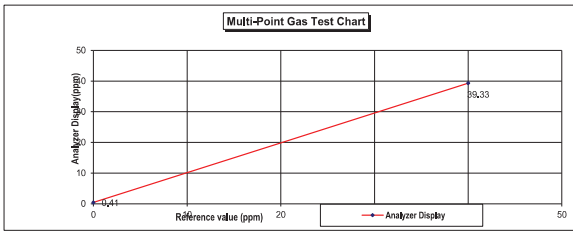
Test Date : Aug 1,2025

Equipment :	Hydrocarbon Analyzer	**Model :**	APHA-370
Manufacturer :	HORIBA	**Serial Number :**	PDXEGXF7

Standard Gas Concentration			**Dilutor Detail**	
Sulphur Dioxide (SO_2)	- PPM		Manufacturer :	
Nitric Oxide (NO)	- PPM		Model :	
Methane (CH_4)	39.8 PPM		Serial Number :	
Carbon Monoxide (CO)	- PPM			
Cylinder No. :	D824432			
Expiration Date :	Aug 4,2028			

Multi-point gas test data

Reference Value (ppm)			Analyzer Display (ppm)	Difference Error	Percent Error	[% Error]
Level 1	Zero	0.00	0.41	0.41	0.41	0.41
Level 2	80.00%	40.00	39.33	-0.67	-1.70	1.70
Remark : Measuring Range 50.00 ppm :Acceptable Limit ± 5%				Average Difference (%)		1.06



Calculate by .....
.....01.../.....08../.....2568

Approve by .....
.....01...../..Aug...../..2025..

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THE LINDE GROUP — Linde

Certificate Of Analysis
Special Gases Mixture

Customer Details
Name: United Analyst & Engineering Co., Ltd.
Address: 3 Soi Udomsuk 41, Sukhumvit Rd., Bang Chak, Khet Phra Khanong, Bangkok 10260
Customer Tag No.

Certificate Details
Number: 3384/20 | Date of Issue: 4-Aug-2020 | Expiry date: 4-Aug-2028
Material Details
Production Order: 9016144 2 | Material Code: 400400-AL-34 | Cylinder No: D824432
Gas Content: 6.60 M³ | Filling pressure: 137.0 bar | Valve: CGA 590 BRASS
Cylinder Owner: LINDE | Cylinder Material: Aluminium | Cylinder Size: 50 L

Laboratory Report

Analytical Result

Component	Nominal Concentration	Analysis Result[1]	Uncertainty[2]	Method of Analysis[3]	Assay Date
Methane In Air	40.0 ppm	39.8 ppm	± 1% relative	(G1) ISO 6142-1:2015	4-Aug-2020

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date
Methane In Nitrogen	[illegible]	40.20 ± 0.39 ppm	4-Oct-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-CH4	4-Aug-2020

Recommend usage condition
Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments
When reordering, please quote the material number

Note:
1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using gas phase GC.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95% the measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard at [illegible] other recognized national metrology institutes.
3. (F) Gas Chromatography, (G1) Paramagnetic Oxygen Analyzer, (G2) Electrochemical Oxygen Analyzer, (G3) Electrochemical Moisture Analyzer, (G4) Total Hydrocarbon Analyzer, (G5) Others - Specified

Page 1 of 1
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Sukanya Parinyasoontorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited

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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.: 1660-2116-5800-1 FAX: 1660-2116-7140

innovative instrument — ilac-MRA — ANAB ACCREDITED

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-ACT-135
Request No : Req-2025-1826

Unit Under Calibration Details

Measurement item : Acoustic Calibrator
Manufacturer : LARSON DAVIS
Model : CAL150
Serial Number : 6695
ID : UAE.EFM.140/2565

Class : 2
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 August 2025
Calibration Date : 9 September 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 %.

Calibrated By : Mr. Noppadon Luangart, Service Calibration Engineer
Approved By : Mr. Pacit Mathavorn, Calibration Engineer Supervisor
Issue Date : 9 September 2025

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innovative instrument — ilac-MRA — ANAB ACCREDITED

Certificate No : 25-ACT-135
Request No : Req-2025-1826

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

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	93.88	-0.12	-	-	0.11
114 dB / 1000 Hz	113.99	-0.01	-	-	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 Measured (%)	Adjustment Measured (%)	Uncertainty (± %)
94 dB / 1000 Hz	1.44	-	0.17
114 dB / 1000 Hz	0.67	-	0.17

Note :

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

End of Calibration

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

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-SLM-242
Request No : Req-2025-1241

Unit Under Calibration Details

Measurement item :	Sound Level Meter	Microphone Class :	2
Manufacturer	: LARSON DAVIS	Microphone Model :	375B02
Model	: LxT2	Microphone S/N :	011731
Serial Number	: 0005288	Preamplifier Model :	PRMLxT2B
ID	: UAE.EFM.104/2562	Preamplifier S/N :	036075
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 : 16 July 2025
Calibrated Date : 29 July 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

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

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pacit Mathavoro
Calibration Engineer Supervisor

Issue Date : 29 July 2025

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

Certificate No : 25-SLM-242
Request No : Req-2025-1241

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	114.68	115.2	0.52	114.7	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand 3M, Model AC-300, SN. AC-300001087

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	30.8	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	30.6	0.10
C	30.2	0.10
Z	34.3	0.10

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

UUC Setting	Deviation from various Frequency Weighting Respone curve			UNCERTAINTY
FAST / 37-139	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	1.6	1.6	1.6	0.60
8000 Hz	2.2	2.2	2.3	0.70

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Certificate No : 25-SLM-242
Request No : Req-2025-1241

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	0.20
125 Hz	-0.1	0.1	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.1	0.1	0.0	
4000 Hz	0.0	0.1	0.1	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	0.0	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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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TEL : 1660-2116-5860-1 FAX : 1660-2116-7140

Certificate No : 25-SLM-242
Request No : Req-2025-1241

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	
Final	114.0	
Deviatnd	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.2	0.2	
40.00	40	40.5	0.5	

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TEL: 0640-2116-5860-1 FAX: 0640-2116-7140

Certificate No : 25-SLM-242
Request No : Req-2025-1241

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	45.20	45.4	0.2	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.8	-0.2	
	0.25	109.0	108.7	-0.3	
Slow	200	128.6	128.4	-0.2	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	108.9	-0.1	
	0.25	100.0	99.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.7	-0.70	0.20
Positive half cycle	136.4	136.1	-0.30	
Negative half cycle	136.4	136.1	-0.30	

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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: 0640-2116-5860-1 FAX: 0640-2116-7140

Certificate No : 25-SLM-242
Request No : Req-2025-1241

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	142.8	
Negative one-half cycle	142.4	
Deviand	0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
Deviated	0.0	0.10

End of Certificate

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TEL: 0640-2116-5860-1 FAX: 0640-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 26-SLM-165
Request No : Req-2026-0976

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : LARSON DAVIS
Model : LxT2
Serial Number : 0005296
ID : UAE.EFM.111/2562
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 377B02
Microphone S/N : 011739
Preamplifier Model : PRMLxT2B
Preamplifier S/N : 056086
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 : 4 April 2026
Calibrated Date : 23 April 2026
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	4226	3412381	7 May 2026	NIMT
Audio Generator	Svantek	Svan401	131	27 September 2026	WK Electric

Note

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

Calibrated By :
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :
Mr. Pacil Mathavom
Calibration Engineer Supervisor

Issue Date : 23 April 2026

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TEL: 0640-2116-5860-1 FAX: 0640-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 37-139	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 114 dB	113.75	114.3	0.55	113.7	-0.05	0.20

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

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	30.1	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 37-139		
UUC Weighting	(dB)	(± dB)
A	29.4	0.10
C	29.3	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 / 37-139	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	1.5	1.5	1.5	0.60
8000 Hz	1.7	1.7	1.7	0.70

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TEL: 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

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 / 37-139				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.1	0.0	0.0	0.20
125 Hz	-0.1	0.1	0.0	
250 Hz	0.0	0.0	0.0	
500 Hz	0.0	0.1	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.1	0.1	0.1	
4000 Hz	0.0	0.1	0.1	
8000 Hz	0.0	0.0	0.1	
16000 Hz	0.0	0.0	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 37-139	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
37-139 / 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	

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the laboratory. Innovative Instrument Co., Ltd.
Calibration Laboratory Issue date 17/2/25
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TEL: 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	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 / 37-139	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
139.00	139	139.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.1	0.1	
49.00	49	49.1	0.1	
44.00	44	44.2	0.2	
39.00	39	39.6	0.6	

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the laboratory. Innovative Instrument Co., Ltd.
Calibration Laboratory Issue date 17/2/25
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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: 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	(± dB)
37-139	45.10	45.2	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY
A / 37-139	Toneburst	Ref	UUC	ERR	
UUC Time Respone	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	135.0	134.9	-0.1	0.20
	2	118.0	117.9	-0.1	
	0.25	109.0	108.8	-0.2	
Slow	200	128.6	128.5	-0.1	
	2	109.0	108.8	-0.2	
SEL	200	129.0	129.0	0.0	
	2	109.0	109.0	0.0	
	0.25	100.0	99.8	-0.2	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY
FAST / C / 95-142	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	137.4	136.8	-0.60	0.20
Positive half cycle	136.4	136.2	-0.20	
Negative half cycle	136.4	136.2	-0.20	

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AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 0669-2116-5860-1 FAX: 0669-2116-7140

Certificate No : 26-SLM-165
Request No : Req-2026-0976

12. Overload indication

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Positive one-half cycle	143.8	
Negative one-half cycle	143.8	
Deviated	0.0	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 37-139	UUC	
STD Setting	(dB)	(± dB)
Initial	138.0	
Final	138.0	
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 laboratory. Innovative Instrument Co., Ltd.
Calibration Laboratory Issue date 17/2/25
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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 :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA0C0025
ID No. :	UAE.EFM.117/2563 (EFM.pH.07/63)
Condition As-Received:	Used Item
Received Date :	02 February 2026
Calibration Date :	04 February 2026
Reference :	2602-0037WSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
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 :	Walalak Sirithean
Approved by :	Approved Signatory

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

Issue Date : 05 February 2026

The Uncertainties are for a confidence probability of approximately 95%

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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 Hach Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
: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 4.008	CPA chem	1150491	30 Oct 2027
pH 7.000	Hach Lenge GmbH	C03319	17 Oct 2027
pH 10.010	CPA chem	1150493	30 Oct 2026

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 (4,7)(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	4.00	177.48	177.5	4.01	0.058	2.00
S/N.: HA0C0025	7.00	0.00	0.0	7.02	0.058	2.00
	7.00	0.00	0.0	7.02	0.058	2.00
	10.00	-177.48	-177.4	10.01	0.058	2.00

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Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(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	4.008	4.01	173.9	0.0079	2.00
S/N. -	7.000	7.00	-2.2	0.0085	2.00
	7.000	6.99	-1.6	0.0085	2.00
	10.010	10.01	-175.2	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : -

Dimension of probe

- Length : 110 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor *k*
15.0	14.999	15.0	0.001	0.13	2.00
30.0	29.998	29.9	-0.098	0.13	2.00
45.0	45.001	44.9	-0.101	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 %.

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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 FAX. 0-2719-9484

Certificate of Testing

Equipment :	DO Meter
Manufacturer :	Horiba
Model :	LAQUA-DO210
Serial No. :	HE9M0048
ID No. :	UAE.EFM.118/2563 (EFM.DO.07/63)
Received Date :	17 March 2026
Test Date :	18 March 2026
Reference :	2603-0556WSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In-house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walalak Sirithean
Approved by :	Approved Signatory

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

Issue Date : 20 March 2026

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Condition of this result of calibration

1. Reference Standard Instruments :
This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 9K2B0030

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.22	0.0089

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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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 : DO Meter with Senser
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE9M0048
ID No. : UAE.EFM.118/2563 (EFM.DO.07/63)
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Location : TPA On Site Calibration Laboratory
Received Order : 17 March 2026
Calibrated Date : 18 March 2026
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Warakorn Lerngagtrakul
Approved by : Kunchit
Approved Signatory
( ) Chakrit Waewwanjua
( ) Suwit Imjai
(✓) Kunchit Promprat
Issue Date : 24 March 2026

The Uncertainties are for a confidence probability of approximately 95%

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Procedure Used :-
Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	25I953	TPA	05 Sep 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This measurement result is traceable to the International System of Unit maintained through :
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function : Temperature measurement.
This instrument was connected with temperature sensor, S/N.: 9K2B0030

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor *k*
15.0	80	15.003	15.0	-0.003	0.16	2.00
30.0	80	30.001	30.0	-0.001	0.16	2.00
45.0	80	45.004	45.0	-0.004	0.16	2.00

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 %.

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