

## เอกสารแนบ 6

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการ  
ตรวจวิเคราะห์



CERTIFICATE No : 24M9746  
REFERENCE No : 74774-1

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : SARTORIUS  
MODEL : BSA224S-CW  
SERIAL No : 3142616377  
ID No : LE-SVP-001  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY :   
CALIBRATION DATE : 27-Sep-24  
  
APPROVED BY :   
ISSUED DATE : 30-Sep-24  
RECEIVED DATE : 27-Sep-24

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



CERTIFICATE No : 24M9746

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : SARTORIUS  
ID No : 3142616377  
AIR PRESSURE : 1009mbar  $\pm$  1mbar  
AMBIENT TEMPERATURE : 25 $^{\circ}$  C  $\pm$  1 $^{\circ}$  C  
RECEIVED DATE : 27-Sep-24  
CALIBRATION DATE : 27-Sep-24  
RELATIVE HUMIDITY : 50 %RH  $\pm$  10 % RH

### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 62019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

2. REFERENCE STANDARD INSTRUMENTS :-

1) STANDARD WEIGHT SET E2  
2) STANDARD WEIGHT E2  
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.  
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.  
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL

2. TARE FUNCTION : NORMAL

3. REPEATABILITY OF READING AT 200 g WAS 0 g

4. DEPARTURE FROM NOMINAL VALUE/LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY ( $\pm$ g)
0.0	0.0000	0.0000	0.000082
0.1	0.1000	0.0000	0.000083
0.2	0.2000	0.0000	0.000083
0.5	0.5000	0.0000	0.000083
1.0	1.0000	0.0000	0.000084
2.0	2.0000	0.0000	0.000084
5.0	5.0000	0.0000	0.000086
10.0	10.0000	0.0000	0.000089
20.0	20.0000	0.0000	0.000094
50.0	50.0000	0.0000	0.00012
100.0	100.0000	0.0000	0.00019
200.0	200.0000	0.0000	0.00019

5. OFF CENTER LOADING ERROR



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

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

END OF CALIBRATION REPORT







CERTIFICATE No : 24M9747  
REFERENCE No : 74774-2

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : SARTORIUS  
MODEL : BSA3202S-CW  
SERIAL No : 3142612617  
ID No : LE-SVP-002  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY : [REDACTED]

CALIBRATION DATE : 27-Sep-24

APPROVED BY : [REDACTED]

ISSUED DATE : 30-Sep-24

RECEIVED DATE : 27-Sep-24

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



CERTIFICATE No : 24M9747

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : SARTORIUS  
MODEL : BSA3202S-CW  
ID No : 3142612617  
AIR PRESSURE : LE-SVP-002  
RECEIVED DATE : 27-Sep-24  
AMBIENT TEMPERATURE : 1009mbar ± 1mbar  
CALIBRATION DATE : 27-Sep-24  
RELATIVE HUMIDITY : 25° C ± 1° C  
50 %RH ± 10 % RH

### CONDITION OF THIS RESULTS OF CALIBRATION

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

### 2. REFERENCE STANDARD INSTRUMENTS :-

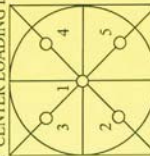
- 1) STANDARD WEIGHT SET  
2) THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.  
3. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.  
4. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-  
- NATIONAL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

### RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL  
2. TARE FUNCTION : NORMAL  
3. REPEATABILITY OF READING AT 2500 g WAS 0 g  
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (±g)
0.0	0.00	0.00	0.0088
5.0	5.00	0.00	0.0088
10.0	10.00	0.00	0.0088
20.0	20.00	0.00	0.0088
50.0	50.00	0.00	0.0088
100.0	100.00	0.00	0.0088
200.0	200.00	0.00	0.0088
500.0	500.00	0.00	0.0088
1000.0	1000.00	0.00	0.0088
2000.0	2000.00	0.00	0.0088
3000.0	3000.00	0.00	0.0088

### 5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	1000.00
2	1000.00
3	1000.00
4	1000.00
5	1000.00
OFF-CENTER LOADING	0.00

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

END OF CALIBRATION REPORT



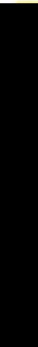


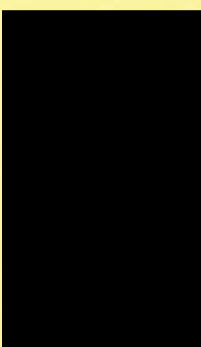
CERTIFICATE No : 24T9748  
REFERENCE No : 74774-3

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : HOT AIR OVEN  
MANUFACTURER : MEMMERT  
MODEL : UF 55  
SERIAL No : B222.032  
ID No : LE-SVP-003  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY :   
CALIBRATION DATE : 27-Sep-24

APPROVED BY :   
ISSUED DATE : 30-Sep-24  
RECEIVED DATE : 27-Sep-24



CERTIFICATE No : 24T9748

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : HOT AIR OVEN  
MANUFACTURER : MEMMERT  
MODEL : UF 55  
ID No : B222.032  
RECEIVED DATE : 27-Sep-24  
AMBIENT TEMPERATURE : 25 °C ± 1 °C  
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

## CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME

## 2. REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER WITH RTD HYDRA 2635A  
2) THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.  
3. THE RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.  
4. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-  
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO., LTD.

## RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

## GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0
Overall Line Voltage (V) variation : 1
Instrument Condition : Normal
Chamber Size (W*L*H): 40*33*40 cm

## CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
104.0	104.0	104.0	0.06	0.55	0.60

## TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
104.0	104.0	104.27	104.13	104.07	104.21	104.42	104.21	103.91	104.12	104.22	
										0.38	

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT






CERTIFICATE No : 24T9749  
REFERENCE No : 74774-4

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : HOT AIR OVEN  
MANUFACTURER : MEMMERT  
MODEL : UF 55  
SERIAL No : B222.033  
ID No : LE-SVP-004  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY :   
CALIBRATION DATE : 27-Sep-24

APPROVED BY :   
ISSUED DATE : 30-Sep-24  
RECEIVED DATE : 27-Sep-24



CERTIFICATE No : 24T9749

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : HOT AIR OVEN  
MANUFACTURER : MEMMERT  
MODEL : UF 55  
ID No : B222.033  
RECEIVED DATE : 27-Sep-24  
AMBIENT TEMPERATURE : 25 °C ± 1 °C  
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

## CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED THERMOCOUPLE TYPE K OR TYPE K UNDER NO LOAD CONDITION. THE THERMOCOUPLES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOCOUPLE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOCOUPLE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

## 2. REFERENCE STANDARD INSTRUMENTS :-

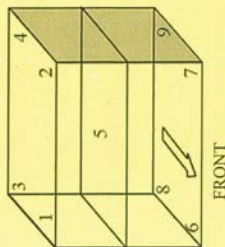
- 1) DATA LOGGER WITH TC TYPE K HYDRA 2635A  
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.  
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.  
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO., LTD.

## RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

## GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0
Overall Line Voltage (V) variation : 2
Instrument Condition : Normal
Chamber Size (W*L*H): 40*33*40 cm



## CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
180	180.0	180.0	0.21	0.99	0.99

## TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations							Uncertainty (±°C)		
		#1	#2	#3	#4	Ref. 5	#6	#7		#8	#9
180.0	180.0	179.75	179.70	179.64	179.42	180.02	179.94	179.46	179.36	179.59	1.1

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT







CERTIFICATE No : 24E9752  
REFERENCE No : 74774-7

PAGE : 1 OF 3

## Certificate of Calibration

EQUIPMENT : pH METER  
MANUFACTURER : WTW  
MODEL : PH 7310  
SERIAL No : 22241035  
ID No : LE-SVP-005  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY :  
CALIBRATION DATE : 27-Sep-24

APPROVED BY :  
ISSUED DATE : 30-Sep-24  
RECEIVED DATE : 27-Sep-24



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



CERTIFICATE No : 24E9752

PAGE : 2 OF 3

## Calibration Report

EQUIPMENT : pH METER  
MANUFACTURER : WTW  
MODEL : PH 7310  
ID No : LE-SVP-005  
SERIAL NUMBER : 22241035  
RECEIVED DATE : 27-Sep-24  
AMBIENT TEMPERATURE : 25° C ± 1° C  
CALIBRATION DATE : 27-Sep-24  
RELATIVE HUMIDITY : 50 %RH ± 10 % RH

### CONDITION OF THIS RESULTS OF CALIBRATION

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

INSTRUMENT	MODEL	SERIAL No/		CERTIFICATE No	DUE DATE
		LOT No			
1) pH STANDARD SOLUTION	00651-06	CC767907	4880-13836406		29-Dec-24
2) pH STANDARD SOLUTION	00651-08	CC765602	4881-13757019		18-Nov-24
3) pH STANDARD SOLUTION	00651-10	CC767180	4882-13813369		14-Dec-24
4) PROCESS CALIBRATOR	CA150	91S6079	24E1251		09-Apr-25
5) BATH	260014	1247 48074	24T9693		12-Sep-25
6) THERMOMETER WITH PROBE	421504	55000379	24T9694		12-Sep-25

- THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
- THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
- THIS CERTIFICATE IS TRACEABLE TO SI UNIT MAINTAINED AT :-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND)

### RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

- DISPLAY UNIT ONLY

SLOPE FACTOR  $k = 2.303 \text{ RT/F} = 59 \text{ mV/pH}$

mV APPLIED	UUC READING (mV)	CORRECTION (mV)	UUC READING (pH)	UNCERTAINTY OF MEASUREMENT (± mV)	COVERAGE FACTOR k
414.11	414.2	-0.09	0.22	0.150	2.00
354.95	355.1	-0.15	1.23	0.150	2.00
295.80	295.9	-0.10	2.24	0.150	2.00
236.64	236.8	-0.16	3.25	0.150	2.00
177.48	177.5	-0.02	4.27	0.150	2.00
118.32	118.5	-0.18	5.27	0.150	2.00
59.16	59.4	-0.24	6.29	0.150	2.00
0.00	0.1	-0.10	7.30	0.150	2.00
-59.16	-59.0	-0.16	8.31	0.150	2.00
-118.32	-118.2	-0.12	9.32	0.150	2.00
-177.48	-177.3	-0.18	10.33	0.150	2.00
-236.64	-236.5	-0.14	11.34	0.150	2.00
-295.80	-295.7	-0.10	12.35	0.150	2.00
-354.95	-354.8	-0.15	13.36	0.150	2.00
-414.11	-413.9	-0.21	14.37	0.150	2.00

END OF CALIBRATION REPORT PAGE 2 OF 3





## Calibration Report

### RESULT OF CALIBRATION (CONTINUE):

#### 2. DISPLAY UNIT WITH pH ELECTRODE S/N: B222607002

STANDARD pH BUFFER SOLUTION (pH)	UUC READING (pH)	CORRECTION (pH)	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT ( $\pm$ pH)	COVERAGE FACTOR k
4.006	4.00	0.004	---	0.012	2.00
7.000	7.00	-0.001	---	0.012	2.00
10.009	10.00	0.006	---	0.014	2.00

#### 3. PERCENT SLOPE 99%

#### 4. DISPLAY UNIT MEASUREMENT TEMPERATURE WITH PROBE

STANDARD READING ( $^{\circ}$ C)	UUC* READING ( $^{\circ}$ C)	IMMERSION DEPTH (mm)	CORRECTION ( $^{\circ}$ C)	UNCERTAINTY OF MEASUREMENT ( $\pm$ $^{\circ}$ C)
25.004	25.1	50	-0.096	0.21
40.003	40.1	50	-0.097	0.21
50.002	50.1	50	-0.098	0.21

#### UUC : UNIT UNDER CALIBRATION

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

END OF CALIBRATION REPORT



## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : pH METER  
MANUFACTURER : HANNA  
MODEL / TYPE : HI98191/HI72911  
SERIAL NO. : 03220019991/094406CN[LE-SVP-006]  
CLID. NO. : 272400529  
JOB CONTROL NO. : 240320029990  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : GLOBAL UTILITIES SERVICES CO., LTD.  
WASTEWATER TREATMENT PLANT, SUVARANBHUMIAIRPORT  
999 MOO 1 NHONGPROB, BANG PHI, SAMUT PRAKARN 10540

DATE OF RECEIVED : 20 March 2024 DATE OF ISSUED : 23 March 2024  
The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Sukgaseem Sechanart  
Pimsiri Hemtanon  
Calibration Engineer



Approved By :

Authorized Signatory  
23 March 2024

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

Certificate No. Q24029990  
F3-011-05/12-23







## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : pH METER  
MANUFACTURER : HANNA  
MODEL / TYPE : HI98191/Hi72911  
SERIAL NO. : 03220019991/094406CN[LE-SVP-006]  
DATE OF CALIBRATION : 21 March 2024

#### ENVIRONMENT CONDITIONS :

Temperature :  $(25 \pm 2.5) ^\circ\text{C}$  Relative Humidity :  $(50 \pm 15) \% \text{ RH}$

#### PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPCH-01 [ pH Meter ]. The calibration was performed by direct measurement with Certified Reference Material (CRM) and Documenting Process Calibrator.

This instrument was calibrated under procedure No. CLC-CPTH-04 [ Temperature ] based on ASTM E 644-04 as calibration guidelines. The calibration was performed by using Calibration Bath, Precision Thermometer and IPT which maintained by the Calibration Laboratory Co., Ltd.

#### REFERENCE STANDARD USED :

1. pH Standard Solution, NIMT TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
2. pH Standard Solution, Control Company Catalog Number 06-664-260,11754256, Lot Number CC757348.
3. Documenting Process Calibrator , Fluke Model 744 S/N. 9226007.
4. Calibration Bath, Kambic Model OB-222 ULT S/N. 17115653.
5. Precision Thermometer, ASL Model F200-A-8 S/N. 01443303.
6. IPT, ASL Model T100-250-1D S/N. L0193A-1-1.

Certificate No. Q24029990

F3-011-05/12-23

page 2 of 5



@cccalibration

#### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Lot Number. 040822 , 230822. Due Date 26 April 2024.
2. The measurements are traceable to International System of Units (SI) , through Control Company. Certificate No. 4281-13507707 , Due Date 14 July 2024.
3. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd. Certificate No. Q23078640, Due Date 19 July 2024.
4. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd. Certificate No. Q23136342, Due Date 20 December 2024.
5. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0203/67, Due Date 07 December 2024.
6. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Certificate No. TT-0136-23, Due Date 12 December 2024.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 % . It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q24029990

F3-011-05/12-23

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@cccalibration





CLC  
Accredited  
ISO/IEC 17025

### CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

#### MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

The table in the following gives the calibration results and associated measurement uncertainties of pH meter.

#### CALIBRATION DATA

##### 1. pH ELECTRODE RESULT @ 25 °C

Standard pH Buffer Solution (pH)	pH Meter Reading (pH)	pH Meter Reading (mV)	Correction (pH)	Uncertainty of Measurement (± pH)	k Factor
4.003	4.00	140.4	+0.003	0.010	2.00
7.000	7.03	-27.5	-0.030	0.013	2.00
10.003	10.02	-189.9	-0.017	0.016	2.05

Technical Note. Setting function CAL 3 point ( 4.7, 10 ).

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##### 2. pH SCALES RESULT @ 25 °C

Standard Voltage Input (mV)	pH Meter Reading		Correction (mV)	Uncertainty of Measurement (± mV)	k Factor
	(mV)	(pH)			
414.11	413.4	0.00	+0.71	0.06	2.00
118.32	117.6	5.01	+0.72	0.06	2.00
0.00	-0.7	7.01	+0.70	0.06	2.00
-177.48	-178.1	10.01	+0.62	0.06	2.00
-414.11	-414.8	14.01	+0.69	0.06	2.00

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 14 of 67

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@cccalibration

#### CALIBRATION DATA

##### 3. TEMPERATURE RESULT

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
40	25.00	25.2	-0.20	0.07
	40.01	39.9	+0.11	
	50.04	49.9	+0.14	

Note. Probe Ø 14 mm

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of  $k = 2.00$ .

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

### End of Certificate ###

Certificate No. Q24029990

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@cccalibration



CERTIFICATE No : 24T9750  
REFERENCE No : 74774-5

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : BOD INCUBATOR  
MANUFACTURER : WST  
MODEL : WST-BOD396L  
SERIAL No : 22091421  
ID No : LE-SVP-023  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY :   
CALIBRATION DATE : 27-Sep-24

APPROVED BY :   
ISSUED DATE : 30-Sep-24  
RECEIVED DATE : 27-Sep-24



CERTIFICATE No : 24T9750

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : BOD INCUBATOR  
MANUFACTURER : WST  
MODEL : WST-BOD396L  
ID No : LE-SVP-023  
RECEIVED DATE : 27-Sep-24  
AMBIENT TEMPERATURE : 25 °C ± 1 °C  
S/N : 22091421  
CALIBRATION DATE : 27-Sep-24  
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD PH100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

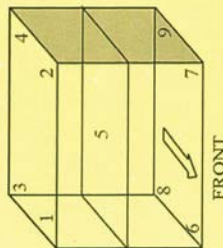
### 2. REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER WITH RTD HYDRA 2635A  
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-  
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO., LTD.

### RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

#### GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0  
Overall Line Voltage (V) variation : 3  
Instrument Condition : Normal  
Chamber Size (W\*L\*H): 50\*45\*135 cm



#### CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20.0	20.0	20.0	0.04	0.25	0.28

#### TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
20.0	20.0	20.27	20.19	20.20	20.11	20.10	20.11	20.14	20.20	20.23	0.25

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT







CERTIFICATE No : 24T9751  
REFERENCE No : 74774-6

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : REFRIGERATOR  
MANUFACTURER : WST  
MODEL : WST-396L  
SERIAL No : 22091420  
ID No : LE-SVP-024  
CONDITION AS RECEIVED : USED ITEM

SUBMITTED BY : GEM ENVIRONMENTAL MANAGEMENT CO., LTD. (SUARNABHUMI) WASTEWATER TREATMENT PLANT, SUARNABUMIAIRPORT, 999 MOO.1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

CALIBRATED BY :   
CALIBRATION DATE : 27-Sep-24

APPROVED BY :   
ISSUED DATE : 30-Sep-24  
RECEIVED DATE : 27-Sep-24



CERTIFICATE No : 24T9751

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : REFRIGERATOR  
MANUFACTURER : WST  
MODEL : WST-396L  
ID No : LE-SVP-024  
RECEIVED DATE : 27-Sep-24  
AMBIENT TEMPERATURE : 25 °C ± 1 °C  
S/N : 22091420  
CALIBRATION DATE : 27-Sep-24  
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

### 2. REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER WITH RTD HYDRA 2635A  
2) REFERENCE TEMPERATURE POINTS : 3.0, 3.15, 3.30, 3.35, 3.50, 3.65, 3.80, 3.95, 4.10, 4.25, 4.40, 4.55, 4.70, 4.85, 5.00, 5.15, 5.30, 5.45, 5.60, 5.75, 5.90, 6.05, 6.20, 6.35, 6.50, 6.65, 6.80, 6.95, 7.10, 7.25, 7.40, 7.55, 7.70, 7.85, 8.00, 8.15, 8.30, 8.45, 8.60, 8.75, 8.90, 9.05, 9.20, 9.35, 9.50, 9.65, 9.80, 9.95, 10.00, 10.15, 10.30, 10.45, 10.60, 10.75, 10.90, 11.05, 11.20, 11.35, 11.50, 11.65, 11.80, 11.95, 12.00, 12.15, 12.30, 12.45, 12.60, 12.75, 12.90, 13.05, 13.20, 13.35, 13.50, 13.65, 13.80, 13.95, 14.10, 14.25, 14.40, 14.55, 14.70, 14.85, 15.00, 15.15, 15.30, 15.45, 15.60, 15.75, 15.90, 16.05, 16.20, 16.35, 16.50, 16.65, 16.80, 16.95, 17.10, 17.25, 17.40, 17.55, 17.70, 17.85, 18.00, 18.15, 18.30, 18.45, 18.60, 18.75, 18.90, 19.05, 19.20, 19.35, 19.50, 19.65, 19.80, 19.95, 20.00, 20.15, 20.30, 20.45, 20.60, 20.75, 20.90, 21.05, 21.20, 21.35, 21.50, 21.65, 21.80, 21.95, 22.00, 22.15, 22.30, 22.45, 22.60, 22.75, 22.90, 23.05, 23.20, 23.35, 23.50, 23.65, 23.80, 23.95, 24.10, 24.25, 24.40, 24.55, 24.70, 24.85, 25.00, 25.15, 25.30, 25.45, 25.60, 25.75, 25.90, 26.05, 26.20, 26.35, 26.50, 26.65, 26.80, 26.95, 27.10, 27.25, 27.40, 27.55, 27.70, 27.85, 28.00, 28.15, 28.30, 28.45, 28.60, 28.75, 28.90, 29.05, 29.20, 29.35, 29.50, 29.65, 29.80, 29.95, 30.00, 30.15, 30.30, 30.45, 30.60, 30.75, 30.90, 31.05, 31.20, 31.35, 31.50, 31.65, 31.80, 31.95, 32.10, 32.25, 32.40, 32.55, 32.70, 32.85, 33.00, 33.15, 33.30, 33.45, 33.60, 33.75, 33.90, 34.05, 34.20, 34.35, 34.50, 34.65, 34.80, 34.95, 35.10, 35.25, 35.40, 35.55, 35.70, 35.85, 36.00, 36.15, 36.30, 36.45, 36.60, 36.75, 36.90, 37.05, 37.20, 37.35, 37.50, 37.65, 37.80, 37.95, 38.10, 38.25, 38.40, 38.55, 38.70, 38.85, 39.00, 39.15, 39.30, 39.45, 39.60, 39.75, 39.90, 40.05, 40.20, 40.35, 40.50, 40.65, 40.80, 40.95, 41.10, 41.25, 41.40, 41.55, 41.70, 41.85, 42.00, 42.15, 42.30, 42.45, 42.60, 42.75, 42.90, 43.05, 43.20, 43.35, 43.50, 43.65, 43.80, 43.95, 44.10, 44.25, 44.40, 44.55, 44.70, 44.85, 45.00, 45.15, 45.30, 45.45, 45.60, 45.75, 45.90, 46.05, 46.20, 46.35, 46.50, 46.65, 46.80, 46.95, 47.10, 47.25, 47.40, 47.55, 47.70, 47.85, 48.00, 48.15, 48.30, 48.45, 48.60, 48.75, 48.90, 49.05, 49.20, 49.35, 49.50, 49.65, 49.80, 49.95, 50.00, 50.15, 50.30, 50.45, 50.60, 50.75, 50.90, 51.05, 51.20, 51.35, 51.50, 51.65, 51.80, 51.95, 52.10, 52.25, 52.40, 52.55, 52.70, 52.85, 53.00, 53.15, 53.30, 53.45, 53.60, 53.75, 53.90, 54.05, 54.20, 54.35, 54.50, 54.65, 54.80, 54.95, 55.10, 55.25, 55.40, 55.55, 55.70, 55.85, 56.00, 56.15, 56.30, 56.45, 56.60, 56.75, 56.90, 57.05, 57.20, 57.35, 57.50, 57.65, 57.80, 57.95, 58.10, 58.25, 58.40, 58.55, 58.70, 58.85, 59.00, 59.15, 59.30, 59.45, 59.60, 59.75, 59.90, 60.05, 60.20, 60.35, 60.50, 60.65, 60.80, 60.95, 61.10, 61.25, 61.40, 61.55, 61.70, 61.85, 62.00, 62.15, 62.30, 62.45, 62.60, 62.75, 62.90, 63.05, 63.20, 63.35, 63.50, 63.65, 63.80, 63.95, 64.10, 64.25, 64.40, 64.55, 64.70, 64.85, 65.00, 65.15, 65.30, 65.45, 65.60, 65.75, 65.90, 66.05, 66.20, 66.35, 66.50, 66.65, 66.80, 66.95, 67.10, 67.25, 67.40, 67.55, 67.70, 67.85, 68.00, 68.15, 68.30, 68.45, 68.60, 68.75, 68.90, 69.05, 69.20, 69.35, 69.50, 69.65, 69.80, 69.95, 70.00, 70.15, 70.30, 70.45, 70.60, 70.75, 70.90, 71.05, 71.20, 71.35, 71.50, 71.65, 71.80, 71.95, 72.10, 72.25, 72.40, 72.55, 72.70, 72.85, 73.00, 73.15, 73.30, 73.45, 73.60, 73.75, 73.90, 74.05, 74.20, 74.35, 74.50, 74.65, 74.80, 74.95, 75.10, 75.25, 75.40, 75.55, 75.70, 75.85, 76.00, 76.15, 76.30, 76.45, 76.60, 76.75, 76.90, 77.05, 77.20, 77.35, 77.50, 77.65, 77.80, 77.95, 78.10, 78.25, 78.40, 78.55, 78.70, 78.85, 79.00, 79.15, 79.30, 79.45, 79.60, 79.75, 79.90, 80.05, 80.20, 80.35, 80.50, 80.65, 80.80, 80.95, 81.10, 81.25, 81.40, 81.55, 81.70, 81.85, 82.00, 82.15, 82.30, 82.45, 82.60, 82.75, 82.90, 83.05, 83.20, 83.35, 83.50, 83.65, 83.80, 83.95, 84.10, 84.25, 84.40, 84.55, 84.70, 84.85, 85.00, 85.15, 85.30, 85.45, 85.60, 85.75, 85.90, 86.05, 86.20, 86.35, 86.50, 86.65, 86.80, 86.95, 87.10, 87.25, 87.40, 87.55, 87.70, 87.85, 88.00, 88.15, 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201.65, 201.80, 201.95, 202.10, 202.25, 202.40, 202.55, 202.70, 202.85, 203.00, 203.15, 203.30, 203.45, 203.60, 203.75, 203.90, 204.05, 204.20, 204.35, 204.50, 204.65, 204.80, 204.95, 205.10, 205.25, 205.40, 205.55, 205.70, 205.85, 206.00, 206.15, 206.30, 206.45, 206.60, 206.75, 206.90, 207.05, 207.20, 207.35, 207.50, 207.65, 207.80, 207.95, 208.10, 208.25, 208.40, 208.55, 208.70, 208.85, 209.00, 209.15, 209.30, 209.45, 209.60, 209.75, 209.90, 210.00, 210.15, 210.30, 210.45, 210.60, 210.75, 210.90, 211.05, 211.20, 211.35, 211.50, 211.65, 211.80, 211.95, 212.10, 212.25, 212.40, 212.55, 212.70, 212.85, 213.00, 213.15, 213.30, 213.45, 213.60, 213.75, 213.90, 214.05, 214.20, 214.35, 214.50, 214.65, 214.80, 214.95, 215.10, 215.25, 215.40, 215.55, 215.70, 215.85, 216.0



# Certificate of Calibration

Equipment: SPECTROPHOTOMETER  
Model: T8DCS  
Serial No. (or ID.): 31-0197-00-0024  
Manufacturer: PERSEE  
Condition: In Condition

Customer: GEM ENVIRONMENTAL MANAGEMENT CO.,LTD (SUARNABHUMI)  
WASTEWATER TREATMENT PLANT, SUARNABHUMIAIRPORT  
999 MOO 1 NONGPRUE, BANGPHLI, SAMUTPRAKAN 10540

Environment Condition: Temperature 27.5 °C ± 0.8 °C  
Humidity 64.3 %RH ± 3.3 %RH

Calibration Place: GEM ENVIRONMENTAL MANAGEMENT CO.,LTD (SUARNABHUMI)  
WASTEWATER TREATMENT PLANT(LABORATORY ROOM),  
SUARNABHUMIAIRPORT 999 MOO 1 NONGPRUE, BANGPHLI,  
SAMUTPRAKAN 10540

Calibration By: Miss.Kaewkan Suradech  
Calibration Date: 02 October 2024  
The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04  
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Siama Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584  
The standard for Photometric Certificate No. 9114984 and 111588  
The standard for Stray light Certificate No. 111586 and 111585  
The standard for Spectral resolution Certificate No. 111587

## Person in charge

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.  
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).  
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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Certificate No.: C06240432

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## Calibration Results: Without Adjustment

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
241.70	241.43	0.27	0.13
279.44	279.25	0.19	0.13
287.71	287.63	0.08	0.13
334.02	333.95	0.07	0.13
360.89	360.73	0.16	0.13
418.53	418.50	0.03	0.13
453.67	453.50	0.17	0.13
459.99	459.83	0.16	0.13
536.52	536.40	0.12	0.13
638.00	638.00	0.00	0.13
585.19	585.23	-0.04	0.13
684.50	684.45	0.05	0.13
741.02	741.03	-0.01	0.13
748.56	748.50	0.06	0.13
807.02	807.03	-0.01	0.13

## Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.292	0.0010	0.0045
	0.5168	0.517	-0.0002	0.0045
440 nm	1.0298	1.029	0.0008	0.0045
	0.0000	0.000	0.0000	0.0045
	0.2867	0.284	0.0027	0.0045
465 nm	0.5073	0.506	0.0013	0.0045
	1.0083	1.003	0.0053	0.0045
	0.0000	0.000	0.0000	0.0045
465 nm	0.2516	0.249	0.0026	0.0045
	0.4595	0.460	-0.0005	0.0045
	0.9334	0.932	0.0014	0.0045

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CAL-FM-C06-16: 11 Mar 2024





Calibration Results:  
Without Adjustment

Photometric Accuracy (Absorbance)			
Wavelength	Standard absorbance	Unit Under Calibration	Uncertainty
546.1 nm	0.0000	0.000	0.0045
	0.2461	0.245	0.0045
	0.4652	0.465	0.0045
	0.9468	0.945	0.0045
590 nm	0.0000	0.000	0.0045
	0.2594	0.257	0.0045
	0.5040	0.503	0.0045
	1.0032	1.000	0.0045
635 nm	0.0000	0.000	0.0045
	0.2579	0.257	0.0045
	0.4971	0.497	0.0045
	0.9720	0.970	0.0045
235 nm	0.0000	0.000	0.0080
	0.7355	0.733	0.0080
257 nm	0.0000	0.000	0.0080
	0.8574	0.854	0.0080
313 nm	0.0000	0.000	0.0080
	0.2864	0.288	0.0080
350 nm	0.0000	0.000	0.0080
	0.6374	0.634	0.0080
Stray light *			
Standard: out-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)
260.62 +/- 0.11 nm	260.63	0.8	2.097
391.44 +/- 0.11 nm	391.45	1.1	1.959
Spectral Resolution *			
Nominal Concentration 0.02 % w/v	Peak	Trough	Ratio
Standard Wavelength ( nm )	268.66	266.69	1.99
UUC: Wavelength (nm)	268.55	266.88	
Std Absorbance ( A )	0.4566	0.2780	
UUC: Absorbance ( A )	0.495	0.249	
			SBW
			1.00

\* Calibration Marked "Not TISI Accredited" in this Certificate have been included for completeness.

The End of Certificate

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ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00044205

หมายเลขเครื่อง: 31-0197-00-0024

รุ่น: T8DCS

ชนิดเครื่องมือ: SPECTROPHOTOMETER

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด ( ช่องใส่ตัวอย่าง, ภายในนอกเครื่อง )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด - เปิด เครื่อง ( On-Off Switch )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด ( Keypad )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ ( Display, Screen Contrast )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า ( Battery Backup ) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น ( Wavelength Control )	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น ( Wavelength Check )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง ( UV < 3,000 hour )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง ( Visible < 5,000 hour )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง ( Carousel Module )	<input type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด ( Electrode and Connection Cable )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode ( Level KCl )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฟาปิดกันปลาย Electrode ( Dust Protection Hood )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาจับอิเล็กโทรด ( Stand )	<input type="checkbox"/>	<input type="checkbox"/>	
		Turbidimeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ต่ำสุด ( No Sample )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง ( >= 2.5 ไม่นเกิน 3.0 )	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเติม/ข้อแนะนำ :

Miss.Kaewkan Suradech  
Service Engineer

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