

ภาคผนวก 3-5

เอกสารสอบเทียบเครื่องมือ



Inctech Metrological Center Co.Ltd.

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MM23-2031

Page : 1 of 3

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 1100

Description : Electronic Balance

Manufacturer : Sartorius

Model : BSA224S-CW

Serial No. : 3141513737

Identification No. : B2021001

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 17, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25+/-10) °C

Humidity : (50+/-30) %RH

Atm. Pressure : (1010+/-10) hPa

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MM-001*
According to comparison with Standard Weight Set.
The calibration methods based on UKAS - LAB 14 : 2019

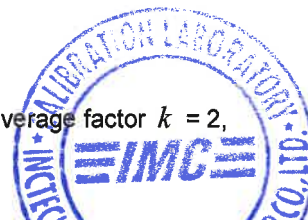
Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Weight Set	NC-001-0.2K-E1-ASS	0022	NC-527	Oct 17, 2024

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology (Thailand)

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor $k = 2$,
providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

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Certificate No. : MM23-2031

Page : 2 of 3

Calibration Result : Without Adjustment

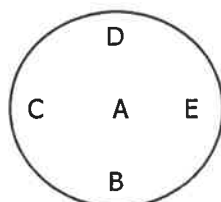
Function : Repeatability

Maximum Capacity : 220 g

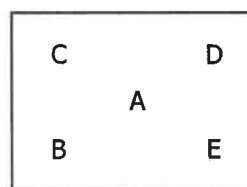
Resolution : 0.0001 g

Nominal Weight Value (g)	Instrument Deviation of Reading (g)
200	0.0000

Calibration Result : Without Adjustment

Function : Effect of Off Center Loading (Test at 50 % of Range)


Front
(X)



Front
()

A Mass of 100 Was Placed to various Position on the pan.

The Weight Machine Reading Obtained is Given in The Tabel

Load (g)	Measuring Positions					Maximum Different (g)
	A (g)	B (g)	C (g)	D (g)	E (g)	
100	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000

Calibration Result : Without Adjustment

Function : Effect of Tare (Test at 50 % of Range)

Nominal Tare Weight (g)	Standard Weight (g)	UUC* Reading (g)	UUC* Deviation (g)
100	Tare	0.0000	0.0000
	At 20 %	20	20.0000
	At 40 %	40	40.0000
	At 60 %	60	60.0000
	At 80 %	80	80.0000
	At 100 %	100	100.0000

UUC* = Unit Under Calibration

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Calibration Cert. # 3884.01

ISO/IEC 17025

Certificate No. : MM23-2031**Page** : 3 of 3**Calibration Result** : Without Adjustment**Function** : Departure of indication from nominal value

Standard Weight	UUC*	UUC*	Uncertainty
Value	Reading	Correction	of Measurement
(g)	(g)	(g)	(+/- g)
0.00	0.0000	0.0000	0.00023
0.01	0.0100	0.0000	0.00023
1	1.0000	0.0000	0.00023
10	10.0001	-0.0001	0.00023
100	100.0000	0.0000	0.00028
200	200.0001	-0.0001	0.00059

UUC* = Unit Under Calibration



Certificate of Calibration

Certificate No. : MC23-1725

Page : 1 of 2

Customer : EVM Laboratory Co., Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : pH Meter

Manufacturer : Apera

Model : PH700

Serial No. : PH700X1020091119

Identification No. : P2021001

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 30, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25 \pm 10) °C

Humidity : (50 \pm 30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MC-001* According to direct with Standard Thermometer and Standard Buffer Solution at 25 °C. The calibration methods based on ISO 10523 Water quality - Determination of pH, NIST : 1994.
Calibration were conducted using In-house calibration procedure *CP-MT-001* According to comparison with Standard Digital Thermometer with 2 PRT.
The calibration methods based on ITS-90.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Digital Thermometer	EFT-4	EFT42020033	MT23-3227	May 01, 2024
Standard Digital Thermometer	UM RTD	2002Z Z38 0073A	MT22-6383	Nov 21, 2023
<u>Instrument</u>	<u>Model</u>	<u>Lot No.</u>	<u>Expired Date.</u>	
Standard Buffer Solution (4 pH)	1040525C	4C22E1	May 28, 2025	
Standard Buffer Solution (7 pH)	1070525C	725C22B1	Feb 28, 2024	
Standard Buffer Solution (10 pH)	1100525C	1125C22B1	Feb 28, 2024	

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$ providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

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Certificate No. : MC23-1725

Page : 2 of 2

Function : pH measurement (Electrode)

Result : Before adjustment

Calibration point : 4, 7, 10 pH

Resolution : 0.01 pH

Standard Buffer (pH)	UUC* reading (pH)	UUC* correction (pH)	Uncertainty of measurement (+/- pH)
4.01	4.07	-0.06	0.017
7.00	7.06	-0.06	0.017
9.99	10.08	-0.09	0.017

Function : pH measurement (Electrode)

Result : After adjustment

Calibration point : 4, 7, 10 pH

Resolution : 0.01 pH

Standard Buffer (pH)	UUC* reading (pH)	UUC* correction (pH)	Uncertainty of measurement (+/- pH)
4.01	4.00	0.01	0.017
7.00	7.01	-0.01	0.017
9.99	10.01	-0.02	0.017

Function : Temperature measurement

Result : Without adjustment

Calibration point : 25 °C

Resolution : 0.1 °C

Calibration point (°C)	Standard reading (°C)	UUC* reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
25	25.01	25.2	-0.19	0.24

UUC* = Unit under calibration



Certificate of Calibration

Certificate No. : WK2305-149-1

Page 1 of 2

Customer : EVM LABORATORY CO.,LTD.
10 SOI PONGSAWATDI 10, THA SAI,
MUEANG NONTABURI, NONTABURI 11000

Instrument	: Dissolved Oxygen Meter	Ambient Temperature	: (25 ± 2) °C
Manufacturer	: YSI	Humidity	: (50 ±15) %RH
Model	: 4010-1W	Received Date	: 17-May-23
Serial No.	: 21081451	Calibrated Date	: 19-May-23
Identity No.	: D2021001	Issued Date	: 26-May-23
Range	: See to Data	Calibrated Location	: In Lab
Resolution	: See to Data		

Calibration Method : CP-WK-C03

Reference standard instruments :

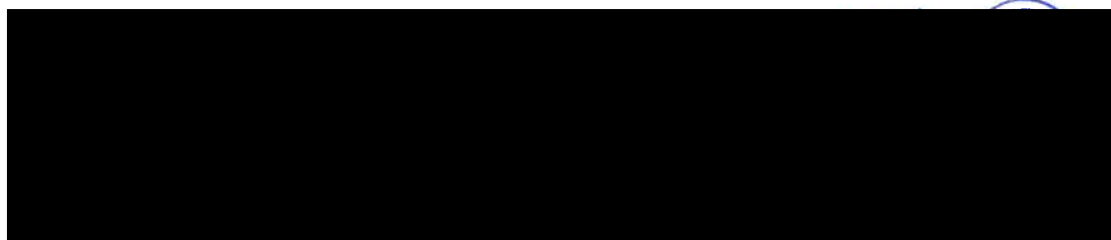
<u>Instrument</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Dissolved Oxygen Solution	QC1549-2ml	LRAD3526	30-Sep-24	Sigma-Aldrich
Digital Thermometer	382081948	WK2210-140-5	24-Oct-23	WK Electric Co.,Ltd.

This result calibrate was found accurate as shown on date place of calibrate only

This certificate is traceability to the International System of Unit (SI)

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

Calibrated by :



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Calibration Results

Certificate No.: WK2305-149-1

Page 2 of 2

Calibration Result of the Accuracy

1. Inspection of Indication Error : At the zero point

Range mg/l	Nominal Value mg/l	UUC Reading mg/l	Error mg/l	(±) Uncertainty mg/l
0	0.00	0.08	0.08	0.15

2. Inspection of Indication Error : Solubility ; Amount of DO that distilled water can hold
at a given temperature refer

Temperature (°C)	Nominal Value mg/l	UUC Reading mg/l	Error mg/l	(±) Uncertainty mg/l
25	8.4	8.48	0.08	0.33
23	8.7	8.79	0.09	0.33
21	9.0	9.10	0.10	0.33

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from the laboratory.

**** End of Certificate****



Certificate of Calibration

Certificate No. : MT23-3773

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : BOD Incubator

Manufacturer : Biobase

Model : BJPX-B250II

Serial No. : 5312026

Identification No. : B2021003

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 30, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25+/-10) °C

Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY57003222	MT22-5466	Oct 06, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : _____

Issue date : _____

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Certificate No. : MT23-3773

Page : 2 of 2

Function : Temperature measurement

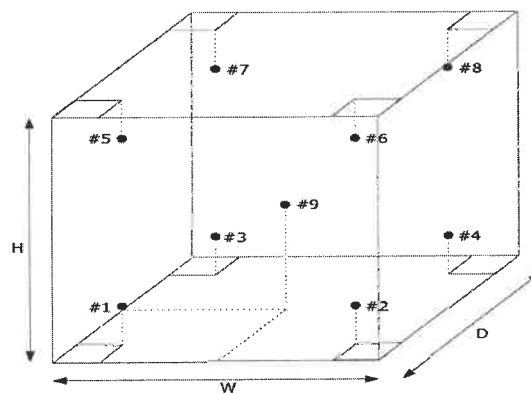
Result : Without adjustment

Calibration point : 20 °C

Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	20.052	20.137	19.805	19.941	20.092	20.078	20.014	20.301	20.160	0.85

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	19.7 to 20.5	0.49	0.82	1.5


Front view

- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.



Certificate of Calibration

Certificate No. : MT23-3774

Page : 1 of 3

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : COD Heater

Manufacturer : Hanna

Model : HI839800-02

Serial No. : 6060034101

Identification No. : C2021001

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 30, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25+/-10) °C

Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-009* According to comparison with LXI Data Acquisition Switch Unit.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with RTD Sensor	34972A	MY49020096	MT22-6392	Dec 06, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : _____

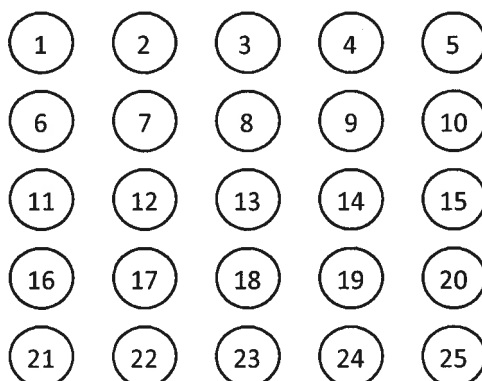
Issue date : _____

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Certificate No. : MT23-3774

Page : 2 of 3

Position



Top view

Function : Temperature measurement (Cont.)

Result : Without adjustment

Calibration point : 150 °C

Immersion depth : 30 mm.

Position No.	UUC* setting (°C)	Standard reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
1	150	150.293	0.293	0.12
2	150	151.564	1.564	0.12
3	150	151.416	1.416	0.12
4	150	150.507	0.507	0.12
5	150	151.503	1.503	0.12
6	150	150.628	0.628	0.12
7	150	151.611	1.611	0.12
8	150	151.555	1.555	0.12
9	150	150.770	0.770	0.12
10	150	151.881	1.881	0.12

UUC* = Unit under calibration

**Certificate No. : MT23-3774****Page : 3 of 3****Function : Temperature measurement****Result : Without adjustment****Calibration point : 150 °C****Immersion depth : 30 mm.**

Position No.	UUC* setting (°C)	Standard reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
11	150	150.700	0.700	0.12
12	150	151.638	1.638	0.12
13	150	151.861	1.861	0.12
14	150	150.706	0.706	0.12
15	150	151.875	1.875	0.12
16	150	150.688	0.688	0.12
17	150	151.606	1.606	0.12
18	150	151.816	1.816	0.12
19	150	150.727	0.727	0.12
20	150	151.810	1.810	0.12
21	150	150.753	0.753	0.12
22	150	151.671	1.671	0.12
23	150	151.761	1.761	0.12
24	150	150.695	0.695	0.12
25	150	151.723	1.723	0.12

UUC* = Unit under calibration



Certificate of Calibration

Certificate No. : MC23-1656

Page : 1 of 2

Customer : Evm Laboratory Co., Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Micro Pipette

Manufacturer : Capp

Model : B5000-1

Serial No. : PD1577071

Identification No. : M2021002

Calibration Place : Chemical Laboratory 2

Order No. : 1439/23

Received date : May 17, 2023

Calibration date : May 19, 2023

Environment Condition :

Temperature : (20+/-2) °C

Humidity : (50+/-15) %RH

Calibration Method : Calibration were conducted using In - house calibration procedure *CP-MC-007*. According to comparison with Analytical Balance. The calibration methods based on ISO 8655-6:2002.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Analytical Balance	AE-FA220	201907106	MM22-2494	Aug 29, 2023
Digital Thermometer	EFT-4	EFT42020033	MT23-3227	May 01, 2024
Humidity / Baro / Temp Data Recorder	MHB-382SD	N/A	MT22-4415	Jul 27, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$ providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

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Calibration Cert. # 3884.01

ISO/IEC 17025

Certificate No. : MC23-1656**Page : 2 of 2****Result** : Without adjustment**Calibration point** : 1, 2.5, 5 ml

Setting value (ml)	Mean volume (ml)	Error (ml)	%Error (ml)	%CV (ml)	Uncertainty of measurement (+/- µl)
1	0.9989	-0.0011	0.11	0.17	0.59
2.5	2.5186	0.0186	0.74	0.08	1.2
5	5.0595	0.0595	1.19	0.32	1.2

Remark : %Error = Systematic error (%).

%CV = Coefficient of variation (%).

-oOo-



Certificate of Calibration

Certificate No. : MT23-3775

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Oven

Manufacturer : Memmert

Model : UF 55

Serial No. : B220.2971

Identification No. : O2021001

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 30, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25+/-10) °C

Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY57003222	MT22-5466	Oct 06, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$,
providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

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Certificate No. : MT23-3775

Page : 2 of 2

Function : Temperature measurement

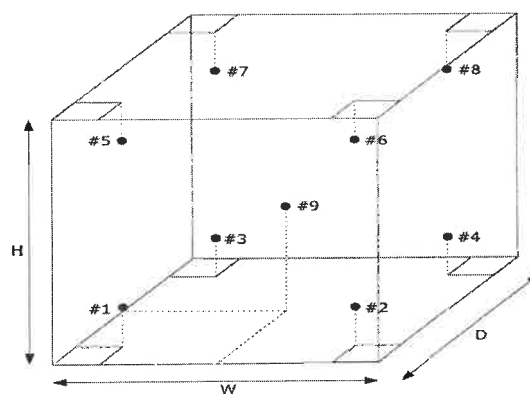
Result : Without adjustment

Calibration point : 85, 104, 180 °C

Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
85	84.137	84.245	84.602	84.247	84.619	84.572	84.605	84.641	84.504	0.44
104	104.064	104.080	103.660	103.895	104.277	104.185	104.154	104.166	104.458	0.44
180	180.116	180.264	179.750	180.038	180.459	180.346	180.302	180.360	180.679	0.45

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
85.0	85.0	0.27	0.81	1.5
104.0	104.0	0.23	1.2	1.5
180.0	180.0	0.27	1.3	1.5



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

Front view

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.



Certificate of Calibration

Certificate No. : MT23-3777

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Water Bath

Manufacturer : Memmert

Model : WNB 29

Serial No. : L620.0438

Identification No. : W2021001

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 30, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25+/-10) °C

Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-005* According to comparison with LXI Data Acquisition Switch Unit. The calibration methods based on ASTM E715-80 (Reapproved 2016) Standard Specification for Water Bath.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY57003222	MT22-5466	Oct 06, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : _____

Issue date : _____

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Certificate No. : MT23-3777

Page : 2 of 2

Function : Temperature measurement

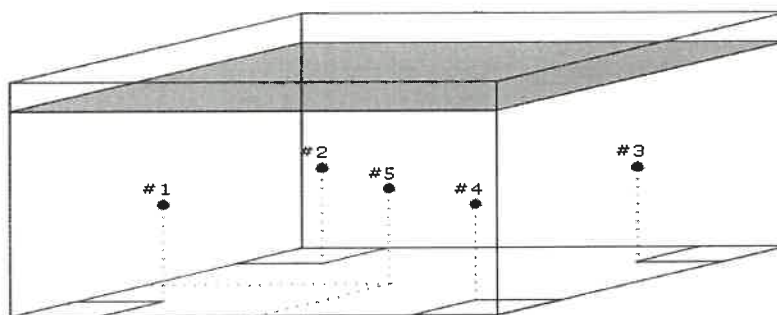
Result : Without adjustment

Calibration point : 85 °C

Resolution : 0.1 °C

Calibration point	Temperature of UUC* at each position					Average Temperature	Temperature		Uncertainty of measurement
(°C)	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	(°C)	Max	Min	(+/- °C)
85	85.033	84.694	84.982	84.724	85.243	84.935	85.243	84.694	0.46

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
85.0	84.9 to 85	0.39	1.3	1.6



Front view

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.



Certificate of Calibration

Certificate No. : MT23-3776

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Refrigerator

Manufacturer : Biobase

Model : BPR-5V588

Serial No. : YC058825210584

Identification No. : R2021001

Calibration Place : Laboratory

Order No. : 1439/23

Received date : May 30, 2023

Calibration date : May 30, 2023

Environment Condition :

Temperature : (25+/-10) °C

Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY57003222	MT22-5466	Oct 06, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : _____

Issue date : _____

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Certificate No. : MT23-3776

Page : 2 of 2

Function : Temperature measurement

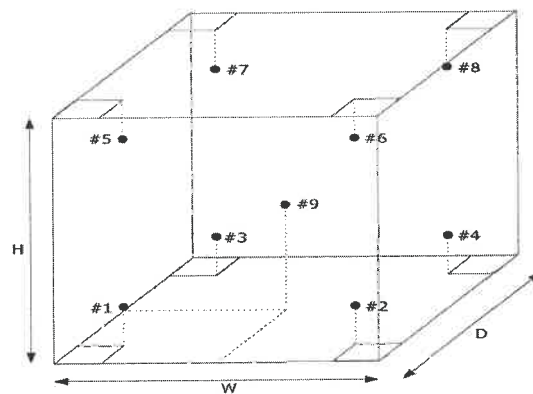
Result : Without adjustment

Calibration point : 4 °C

Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
4	3.823	3.902	3.953	3.821	4.312	4.099	3.394	4.156	3.794	0.70

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
4.0	3.6 to 4.4	0.37	0.62	1.7


Front view

- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.



Inctech Metrological Center Co.Ltd.

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Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MM23-2041

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 1100

Description : Standard Weight Set

Manufacturer : Thai Scale

Model : CLASS F1

Serial No. : 64M1618-1

Identification No. : S2021001

Calibration Place : Mass & Torque Laboratory

Order No. : 1439/23

Received date : May 17, 2023

Calibration date : Jun 05, 2023

Environment Condition :

Temperature : (23+/-3) °C

Humidity : (50+/-15) %RH

Atm. Pressure : (1010+/-10) hPa

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MM-007* According to comparison with the reference Standard Weight Set.
and mass comparator. The calibration methods based on OIML : R111-1 : 2004

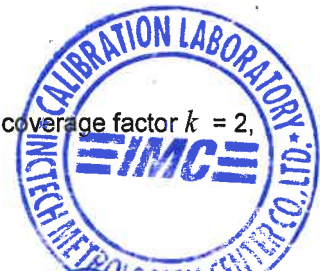
Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Weight Set	NC-001-0.2K-E1-ASS	0022	NC-527	Oct 17, 2024

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology (Thailand)

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

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Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.comCalibration Cert. # 3884.01
ISO/IEC 17025**Certificate No.** : MM23-2041**Page** : 2 of 2**Calibration Result** : Without Adjustment

Identification No.	Nominal Values			Conventionnal Mass					Uncertainty of Measurement	
	Weight			Before Adjustment		After Adjusment			(+/-)	
-	50	mg	50	mg	-0.02	mg	-	-	0.017	mg
-	100	mg	100	mg	-0.01	mg	-	-	0.020	mg
-	2	g	2	g	-0.02	mg	-	-	0.062	mg
-	5	g	5	g	0.01	mg	-	-	0.055	mg
-	100	g	100	g	-0.02	mg	-	-	0.20	mg



Certificate of Calibration

Certificate No. : MT23-3578

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Digital Thermo & Hygrometer

Manufacturer : Digicon

Model : TH-02A

Serial No. : 405003033

Identification No. : D2021002

Calibration Place : Temperature & Humidity Laboratory

Order No. : 1439/23

Received date : May 17, 2023

Calibration date : May 18, 2023

Environment Condition :

Temperature : (23+/-3) °C

Humidity : (50+/-15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-007* According to comparison with Standard Temperature & Humidity into Environmental Stability Chamber.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Digital Hygrometer	One-TH	0x0000158D000E121E	SG-H-00987/65	Nov 10, 2023
Standard Digital Thermometer with Probe	UM RTD	2002Z A21 0181A	MT22-4301	Jul 18, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : _____

Issue date : _____

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Calibration Cert. # 3884.01
ISO/IEC 17025**Certificate No. : MT23-3578****Page : 2 of 2**

Result : Without adjustment
Function : Temperature measurement
Calibration point : 25 °C
Resolution : 0.1 °C
Standard Humidity reading : 50.16 %RH

Test point (°C)	Standard reading (°C)	UUC* reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
25	25.02	25.3	-0.28	0.36

Result : Without adjustment
Function : Humidity measurement
Calibration point : 45 %RH
Resolution : 1 %RH
Standard Temperature reading : 25.05 °C

Test point (%RH)	Standard reading (%RH)	UUC* reading (%RH)	UUC* correction (%RH)	Uncertainty of measurement (+/- %RH)
45	45.14	47	-1.86	2.3

UUC* = Unit under calibration



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Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MT23-3579

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Digital Thermo & Hygrometer

Manufacturer : Digicon

Model : TH-02A

Serial No. : 405003031

Identification No. : D2021006

Calibration Place : Temperature & Humidity Laboratory

Order No. : 1439/23

Received date : May 17, 2023

Calibration date : May 18, 2023

Environment Condition :

Temperature : (23+/-3) °C

Humidity : (50+/-15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-007* According to comparison with Standard Temperature & Humidity into Environmental Stability Chamber.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Digital Hygrometer	One-TH	0x0000158D000E121E	SG-H-00987/65	Nov 10, 2023
Standard Digital Thermometer with Probe	UM RTD	2002Z A21 0181A	MT22-4301	Jul 18, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

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Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.comCalibration Cert. # 3884.01
ISO/IEC 17025**Certificate No. : MT23-3579****Page : 2 of 2**

Result : Without adjustment
Function : Temperature measurement
Calibration point : 25 °C
Resolution : 0.1 °C
Standard Humidity reading : 50.16 %RH

Test point (°C)	Standard reading (°C)	UUC* reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
25	25.02	24.9	0.12	0.36

Result : Without adjustment
Function : Humidity measurement
Calibration point : 45 %RH
Resolution : 1 %RH
Standard Temperature reading : 25.05 °C

Test point (%RH)	Standard reading (%RH)	UUC* reading (%RH)	UUC* correction (%RH)	Uncertainty of measurement (+/- %RH)
45	45.14	47	-1.86	2.3

UUC* = Unit under calibration

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Saimai, Bangkok 10220, ThailandTel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.comCalibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MT23-3580

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.
Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Digital Thermo & Hygrometer
Manufacturer : Digicon
Model : TH-02A
Serial No. : 405003034
Identification No. : D2021007
Calibration Place : Temperature & Humidity Laboratory

Order No. : 1439/23
Received date : May 17, 2023
Calibration date : May 18, 2023
Environment Condition :
Temperature : (23+/-3) °C
Humidity : (50+/-15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-007* According to comparison with Standard Temperature & Humidity into Environmental Stability Chamber.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Digital Hygrometer	One-TH	0x0000158D000E121E	SG-H-00987/65	Nov 10, 2023
Standard Digital Thermometer with Probe	UM RTD	2002Z A21 0181A	MT22-4301	Jul 18, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$,
providing a level of confidence of not less than 95%



Calibrated by : _____
Issue date : _____

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Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

Calibration Cert. # 3884.01

ISO/IEC 17025

Certificate No. : MT23-3580**Page : 2 of 2**

Result : Without adjustment
Function : Temperature measurement
Calibration point : 25 °C
Resolution : 0.1 °C
Standard Humidity reading : 50.16 %RH

Test point (°C)	Standard reading (°C)	UUC* reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
25	25.02	25.1	-0.08	0.36

Result : Without adjustment
Function : Humidity measurement
Calibration point : 45 %RH
Resolution : 1 %RH
Standard Temperature reading : 25.05 °C

Test point (%RH)	Standard reading (%RH)	UUC* reading (%RH)	UUC* correction (%RH)	Uncertainty of measurement (+/- %RH)
45	45.14	46	-0.86	2.3

UUC* = Unit under calibration



Certificate of Calibration

Certificate No. : MT22-6091

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai Sub-district Mueang Nonthaburi District
Nonthaburi Province 11000

Description : Liquid in Glass Thermometer

Manufacturer : Precision

Model : 0 - 100 °C

Serial No. : N/A

Identification No. : T100-21-001/1

Calibration Place : Temperature Laboratory

Order No. : 3252/22

Received date : Nov 04, 2022

Calibration date : Nov 07, 2022

Environment Condition :

Temperature : (23+/-3) °C

Humidity : (50+/-15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-001* According to comparison with Standard Digital Thermometer with 2 PRT.
The calibration methods based on ITS-90.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Digital Thermometer with 2 PRT	1586A/5609/5609	41130006/00543/03713	TE21-0309	Dec 21, 2022

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$,
providing a level of confidence of not less than 95%



Calibrated by : _____

Issue date : _____

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Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.comCalibration Cert. # 3884.01
ISO/IEC 17025

Certificate No. : MT22-6091

Page : 2 of 2

Result : Without Adjustment
Function : Temperature measurement
Resolution : 0.1 °C
Type : Total immersion
Calibration point : 0, 20, 25, 30 °C

Immersion depth (mm)	Calibration point (°C)	Standard reading (°C)	UUC* reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
-	0	0.009	0.0	0.009	0.08
-	20	20.006	20.0	0.006	0.08
-	25	25.008	25.0	0.008	0.08
-	30	30.011	30.0	0.011	0.08
-	0	0.014	0.0	0.014	0.08

UUC* = Unit under calibration

CERTIFICATE OF CALIBRATION

Certificate No.: T1-0609022/22

Page 1 **of total** 3 **pages**

Customer EVM LABORATORY CO., LTD.
10 Soi Pong Sawatdi 10, Tha Sai Sub-District,
Mueang Nonthaburi District, Nonthaburi Province 11000 Thailand

Equipment Block Digestion System

Manufacturer -

Model -

Serial No. 106 1275

ID No. B2021004

Description Resolution of UUC : 1 °C

Environmental Conditions Ambient Temperature: 27.6 °C

Relative Humidity: 53 %

Atmospheric Pressure: -

Calibration Location Chemical 2

Received Date 6 September 2022

Calibration Date 6 September 2022

Date of Issue 7 September 2022

Checked by

Approved by

Act as Technical Manager

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

Certificate No.: T1-0609022/22

Page 2 of total 3 pages

Reference Method :

- The calibration method used was CP-142 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Cert. No.	Due Date	Traceability
Data Logger with Sensors	34972A/ 34901A	MY57010605/ MY59005586	I0-1308002/22	Aug. 12, 2023	THC

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

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Hole No.	UUC Setting (°C)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Stability of UUC (± °C)	Uncertainty (± °C)
# 1	380	377.7	380	-2.3	0.03	0.61
# 2	380	377.6	380	-2.4	0.04	
# 3	380	379.7	380	-0.3	0.05	
# 4	380	377.6	380	-2.4	0.04	
# 5	380	377.4	380	-2.6	0.03	
# 6	380	380.5	380	0.5	0.06	
# 7	380	380.0	380	0.0	0.04	
# 8	380	377.9	380	-2.1	0.03	

UUC : Unit Under Calibration

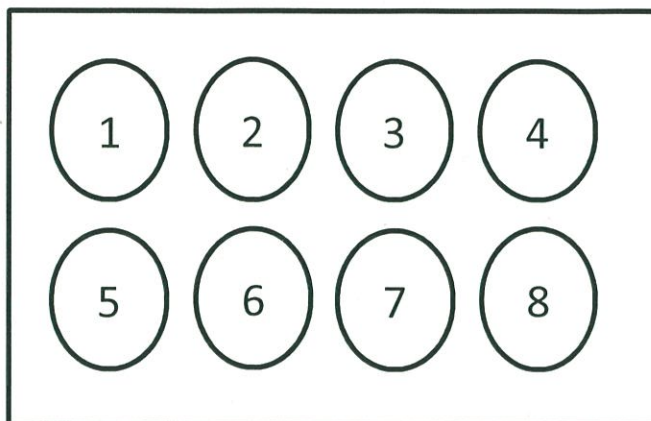
Calibrated by

Pongsak

Certificate No.: T1-0609022/22

Page 3 of total 3 pages

Measurement Results (Cont.):



Front View

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

- End of Certificate -

THAI HEART CALIBRATION CO.,LTD.

22/9/12-13 หมู่ 4 ต.เทพารักษ์ อ.เมือง จ.สมุทรปราการ 10270 โทรศัพท์ 023942162, 027578435, 027578496 แฟกซ์ 027578507
22/9/12-13 Moo4, Thepharak, Muang, Samut Prakan 10270 Tel 0-2394-2162, 0-2757-8435, 0-2757-8496 Fax 0-2757-8507

CSR No.	0609009/22	QR Code
Quotation	86-22080027	Invoice
On-Site Lab	T	amount: 1
		page: 1/1

ใบขอรับบริการสอบเทียบ / CALIBRATION SERVICE REQUEST



1) รายละเอียดลูกค้า

ชื่อผู้ติดต่อ : K.วรรณพ 091-7485917 / อัครนาถ
 ชื่อบริษัท : GRAND SCALES SYSTEM CO.,LTD.
 ที่อยู่ : 90/29 Moo 4, Ban Chang, Muang Pathumthani, Pathumthani, Thailand 12000
 หมายเหตุ :
 ชื่อพนักงานขาย : อัครนาถ เสมอเชื้อ
 วันที่ : 06/09/2022
 Cert สำหรับ : EVM LABORATORY CO., LTD.
 ที่อยู่ : 10 Soi Pong Sawatdi 10, Tha Sai Sub-district, Muang Nonthaburi District, Nonthaburi Province 11000 Thailand
 หมายเหตุ :

2) รายละเอียดเครื่องมือ

No	Cert No.	Description	Manufacturer	Model	Serial No.	ID No.	Calibration Point	Accessories	QRcode
1	T1-0609022/22	Block Digestion System	-	-	106 1275	๒2๐21๐๐4	380 °C (Cal 8 หลม)	No Acc	QR Code

STORE : ขันใหญ่ ภายรัตนตระกูล LAB : ใหญ่ (สจ.) 6/9/22 ACCOUNT : CERT

Accessories from Customer

1.1) Probe, Data link 1.2) Adapter 1.3) Connector 1.4) Manual 1.5) Battery Charger 1.6) Etc.
 Packaging from customer
 2.1) Tools Box/Tools Pouch 2.2) Bubble Pack 2.3) Tool box paper 2.4) Etc.

ลูกค้ารับเครื่องมือ
 ข้าพเจ้าขอยืนยันว่าได้รับการตรวจรับเครื่องมือตามรายการข้างต้น
 ทั้งหมดว่าครบถ้วนและอยู่ในสภาพเรียบร้อย

ลงชื่อ
 ระบุ

F-008

REV.04 08/02/59



Certificate of Calibration

Certificate Number : SPR23050068-5

Page : 1 of 3

Customer : EVM LABORATORY CO.,LTD.

10 Soi Pong Sawatdi 10, Tha Sai Sub-district, Mueang Nonthaburi
District, Nonthaburi Province 11000

Equipment Name : EC/TDS Meter

Manufacturer : HANNA

Model : HI98311

Serial Number : 07010378101

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Relative Humidity : $50\% \pm 15\%$

Location of Calibration : In-Lab

Calibration Procedure : SP-CPC-04-02

Received Date : 05 May 2023

Calibration Date : 08 May 2023

Recommend Due Date : 08 May 2024

Date of Issue : 09 May 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

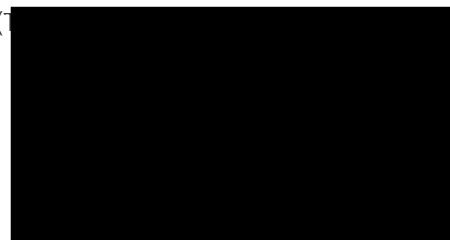
All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (

Calibrated by :



Calibration Officer

Approved by



Authorized Signatory



Calibration Report

Certificate Number : SPR23050068-5

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Conductivity Standard 84 uS/cm	CS84M0S.L5	Lot No.882987	61247444	20 Mar 2024
Conductivity Standard 1413 uS/cm	CS1413M0S.L5	Lot No.882988	61267992	20 Mar 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
C.P.A. Chem - ANAB#AT-1836 (ISO/IEC 17025:2017) and ANAB#AR-1835 (ISO/IEC
17034:2016)



Result of Calibration

Certificate No. : SPR23050068-5

Page : 3 of 3

Range : 0 to 3999 $\mu\text{S/cm}$

Resolution : 1 $\mu\text{S/cm}$

Conductivity Measurement @ 25 °C

Standard Solution	UUC Reading	Error	Uncertainty (\pm)
84 $\mu\text{S/cm}$	85 $\mu\text{S/cm}$	1 $\mu\text{S/cm}$	0.83 $\mu\text{S/cm}$
1413 $\mu\text{S/cm}$	1413 $\mu\text{S/cm}$	0 $\mu\text{S/cm}$	8.2 $\mu\text{S/cm}$

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95 %

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23050068-6

Page : 1 of 3

Customer : EVM LABORATORY CO.,LTD.

10 Soi Pong Sawatdi 10, Tha Sai Sub-district, Mueang Nonthaburi
District, Nonthaburi Province 11000

Equipment Name : Salinity Tester

Manufacturer : HANNA

Model : HI98319

Serial Number : LA05440055

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$

Received Date : 05 May 2023

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 08 May 2023

Location of Calibration : In-Lab

Recommend Due Date : 08 May 2024

Calibration Procedure : In-House Method

Date of Issue : 09 May 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by :



Calibration Officer

Approved by :



Authorized Signatory



Calibration Report

Certificate Number : SPR23050068-6

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Nacl 5 ppt solution	ECNACL5PPT	221/01	221/01	04 Jun 2024
Nacl 25 ppt solution	ECNACL25PPT	371/01	371/01	17 Sep 2024
Nacl 45 ppt solution	ECNACL45PPT	241/01	241/01	18 Jun 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
Thermo Fisher - Thermo Fisher Scientific Inc.



Result of Calibration

Certificate No. : SPR23050068-6

Page : 3 of 3

Range : 0 to 70 ppt

Resolution : 0.1 ppt

Measurement @ 25 °C

Unit : ppt

Standard Solution	UUC Reading	Error	Uncertainty (±)
5.0	4.7	-0.3	0.074
25.0	24.7	-0.3	0.13
45.0	44.6	-0.4	0.21

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23050068-7

Page : 1 of 3

Customer : EVM LABORATORY CO.,LTD.

10 Soi Pong Sawatdi 10, Tha Sai Sub-district, Mueang Nonthaburi
District, Nonthaburi Province 11000

Equipment Name : DO Meter

Manufacturer : AZ

Model : AZ 8403

Serial Number : 1354500

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$

Received Date : 05 May 2023

Relative Humidity : $50\text{ \%} \pm 15\text{ \%}$

Calibration Date : 08 May 2023

Location of Calibration : In-Lab

Recommend Due Date : 08 May 2024

Calibration Procedure : In-House Method

Date of Issue : 09 May 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Tha

Calibrated by :



Calibration Officer

Approved by :



Authorized Signatory





Result of Calibration

Certificate No. : SPR23050068-7

Page : 3 of 3

Dissolved Oxygen Permanance Test

Unit : mg/L

Actual Standard	UUC Reading	Error	Uncertainty (±)
0.3	0.21	-0.09	0.13
8.3	8.20	-0.10	0.13

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.

– End of Certificate –



Certificate of Calibration

Certificate No. : MC22-2085

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Burette

Manufacturer : Witeg

Mode! : 10 ml

Serial No. : N/A

Identification No. : BU10-21-001/1

Calibration Place : Chemical Laboratory 2

Order No. : 2526/22

Received date : Sep 02, 2022

Calibration date : Sep 05, 2022

Environment Condition :

Temperature : (20+/-2) °C

Humidity : (50+/- 15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MC-004* According to comparison with Analytical Balance. The calibration methods based on ASTM E542-01.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Analytical Balance	AE-FA220	201907106	MM22-2494	Aug 29, 2023
Humidity / Baro / Temp. Data Recorder	MH-382SD	N/A	MT22-4415	Jul 27, 2023
Digital Thermometer	EFT-4	EFT42020033	MT22-3124	May 03, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by :
Issue date :

Approved

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

**Inctech Metrological Center Co.Ltd.**

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

Calibration Cert. # 3884.01

ISO/IEC 17025

Certificate No. : MC22-2085**Page** : 2 of 2**Result** : Without adjustment**Calibration Point** : 1, 5, 10 ml**Tolerance** : ± 0.02 ml

	Nominal value (ml)	Standard reading (ml)	UUC* correction (ml)	Uncertainty of measurement (+/- ml)
**	1	1.0017	0.0017	0.0042
	5	5.0128	0.0128	0.0042
	10	10.0121	0.0121	0.0043

UUC* = Unit under calibration

Remark : ** Not accreditation



Certificate of Calibration

Certificate No. : MC22-2086

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Burette

Manufacturer : Witeg

Model : 25 ml

Serial No. : N/A

Identification No. : BU25-21-001/3

Calibration Place : Chemical Laboratory 2

Order No. : 2526/22

Received date : Sep 02, 2022

Calibration date : Sep 06, 2022

Environment Condition :

Temperature : (20+/-2) °C

Humidity : (50+/- 15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MC-004* According to comparison with Analytical Balance. The calibration methods based on ASTM E542-01.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Analytical Balance	AE-FA220	201907106	MM22-2494	Aug 29, 2023
Humidity / Baro / Temp. Data Recorder	MH-382SD	N/A	MT22-4415	Jul 27, 2023
Digital Thermometer	EFT-4	EFT42020033	MT22-3124	May 03, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%

Calibrated by :

Issue date :

Approved

**Inctech Metrological Center Co.Ltd.**

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.comCalibration Cert. # 3884.01
ISO/IEC 17025**Certificate No.** : MC22-2086**Page** : 2 of 2**Result** : Without adjustment**Calibration Point** : 5, 15, 25 ml**Tolerance** : ± 0.03 ml

Nominal value (ml)	Standard reading (ml)	UUC* correction (ml)	Uncertainty of measurement (+/- ml)
5	4.9917	-0.0083	0.0042
15	14.9965	-0.0035	0.0068
25	25.0072	0.0072	0.0068

UUC* = Unit under calibration



Certificate of Calibration

Certificate No. : MC22-2705

Page : 1 of 2

Customer : EVM Laboratory Co.,Ltd.

Address : 10 Soi Pong Sawatdi 10 Tha Sai, Mueang Nonthaburi, Nonthaburi 11000

Description : Burette

Manufacturer : Witeg

Model : 25 ml

Serial No. : N/A

Identification No. : BU25-21-001/1

Calibration Place : Chemical Laboratory 2

Order No. : 3252/22

Received date : Nov 04, 2022

Calibration date : Nov 07, 2022

Environment Condition :

Temperature : (20+/- 2) °C

Humidity : (50+/- 15) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MC-004* According to comparison with Analytical Balance. The calibration methods based on ASTM E542-01.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Analytical Balance	AE-FA220	201907106	MM22-2494	Aug 29, 2023
Humidity / Baro / Temp. Data Recorder	MH-382SD	N/A	MT22-4415	Jul 27, 2023
Digital Thermometer	EFT-4	EFT42020033	MT22-3124	May 03, 2023

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

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by :

Issue date :

Approved by :

**Inctech Metrological Center Co.Ltd.**

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate No. : MC22-2705

Page : 2 of 2

Result : Without adjustment

Calibration Point : 5, 15, 25 ml

Tolerance : ± 0.04 ml

Nominal value (ml)	Standard reading (ml)	UUC* correction (ml)	Uncertainty of measurement (+/- ml)
5	5.0119	0.0119	0.0042
15	15.0176	0.0176	0.0068
25	25.0279	0.0279	0.0068

UUC* = Unit under calibration



Certificate of Calibration

Certificate Number : SPR23050068-1

Page : 1 of 3

Customer : EVM LABORATORY CO.,LTD.

10 Soi Pong Sawatdi 10, Tha Sai Sub-district, Mueang Nonthaburi
District, Nonthaburi Province 11000

Equipment Name : Sound Level Meter

Manufacturer : ACO

Model : 6236

Serial Number : 222090

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 05 May 2023

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 08 May 2023

Location of Calibration : In-Lab

Recommend Due Date : 08 May 2024

Calibration Procedure : SP-CPE-04-01

Date of Issue : 09 May 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by :



Calibration Officer

Approved by



Authorized Signatory



Calibration Report

Certificate Number : SPR23050068-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 114/0166	17 Jan 2024

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate No. : SPR23050068-1

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.1	94.1	0.1	0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

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

- End of Certificate -