

## เอกสารแนบ 6

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์



**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
**CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES**


534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

**Cert.No.:** 23TW41

**Page.:** 1 of 2

## Certificate of Testing

<b>Equipment :</b>	DO Meter
<b>Manufacturer :</b>	Hanna
<b>Model :</b>	HI98193
<b>Serial No. :</b>	03030056991
<b>ID No. :</b>	LB-Eq-014
<b>Received Date :</b>	16 February 2023
<b>Test Date :</b>	17 February 2023
<b>Reference :</b>	2302-0616WN-1
<b>Submitted by :</b>	Special Lab Envi And Consultant Co.,Ltd 47/91 Moo 3 Thambon Tha-it, Pakkret, Nonthaburi 11120
<b>Laboratory Condition :</b>	Temperature ( $25 \pm 5$ ) °C Humidity ( $50 \pm 20$ ) %
<b>Test Procedure :</b>	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
<b>Tested by :</b>	Walalak Sirithean
<b>Approved by :</b>	 Approved Signatory
<input checked="" type="checkbox"/> Malee Butkruea <input type="checkbox"/> Saithip Meangmai <input type="checkbox"/> Warakorn Lergagtrakul	
<b>Issue Date :</b>	20 February 2023

**B 0307483**





Cert.No.: 23TW41

Page.: 2 of 2

**Condition of this result of calibration**

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

<u>Instruments</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Burette	-	130BU10	21CG1389	25 Mar 2023
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

**Result :** Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: KC1N20CDJ

<b>Titration Method (Azide Modification Method) (mg/L)</b>	<b>DO Meter Reading (mg/L)</b>	<b>Standard Deviation (mg/L)</b>
8.12	8.13	0.0045

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency, The environmental impact control and present to organization it may concerned. Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

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**a 1148751**





TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert.No.: 22CH1158

Page.: 1 of 2

## Certificate of Calibration

Equipment : pH Meter  
Manufacturer : Eutech  
Model : pH 700  
Serial No. : 2858459  
ID No. : LB-Eq-027  
Condition As-Received: Used Item  
Received Date : 31 August 2022  
Calibration Date : 01 September 2022  
Reference : 2208-1091WN-1  
Submitted by : Special Lab Envi And Consultant Co.,Ltd  
47/91-93 Moo 3 Thambon Tha-it,  
Pakkret Nonthaburi 11120  
Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In - house method :  
- CP-CH5 by direct measurement with standard  
voltage calibrator and direct measurement  
with certified reference material (CRM)

Calibrated by : Warakorn Lernagtrakul

Approved by :

Approved Signatory

- (✓) Malee Butkruea  
( ) Saithip Meangmai  
( ) Warakorn Lernagtrakul

Issue Date : 6 September 2022

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0044873





Cert. No.: 22CH1158

Page.: 2 of 2

**Condition of this calibration result**

1. Reference Standard Instrument : -

<u>Instrument</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1) Document Process Calibrator	43160066	130RC092	22E1223	13 Apr 2023

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

- Traceable to National Institute of Metrology (Thailand), NIMT

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

<u>Buffer Solution</u>	<u>Manufacturer</u>	<u>Lot No.</u>	<u>Exp. date</u>
pH 4.008	CPA chem	794120	14 Feb 2024
pH 6.985	CPA chem	794122	14 Feb 2023
pH 10.008	CPA chem	823323	20 June 2023

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

**Calibration Results****Function : mV Measurement**

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement ( ±mV )	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: 2858459	4.00	177.48	177.4	4.01	0.058	2.00
	6.86	8.28	8.3	6.86	0.058	2.00
	7.00	0.00	0.1	7.00	0.058	2.00
	9.18	-128.97	-128.9	9.19	0.058	2.00
	10.00	-177.48	-177.4	10.01	0.058	2.00

**Function : pH Measurement**

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading ( mV )	Uncertainty of pH measurement ( ± )	Coverage factor k
pH Electrode S/N.: 3101624	4.008	4.01	177.4	0.0085	2.05
	6.985	6.99	3.0	0.0099	2.00
	10.008	10.01	-169.4	0.0092	2.00

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

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a 1124653





TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 22LM126

Page.: 1 of 2

## Certificate of Calibration

**Equipment :** pH Meter with Sensor  
**Manufacturer :** Eutech  
**Model :** pH 700  
**Serial No. :** 2858459  
**ID No. :** LB-Eq-027  
**Submitted by :** Special Lab Envi And Consultant Co.,Ltd  
47/91-93 Moo 3 Thambon Tha-it,  
Pakkret Nonthaburi 11120  
**Location :** Chemistry Calibration Lab.2  
**Received Order :** 31 August 2022  
**Calibrated Date :** 1 September 2022  
**Ambient Temperature :** (  $26 \pm 10$  ) °C  
**Relative Humidity :** (  $50 \pm 30$  ) %  
**AC Line Voltage :** (  $220 \pm 22$  ) V

**Calibrated by :** Warakorn Lerngagtrakul

**Approved by :**

Approved Signatory

( ) Pornthippa Tameyakul  
(✓) Malee Butkruea  
( ) Suwit Imjai

**Issue Date :** 6 September 2022

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0044921





Equipment : pH Meter with Sensor

Condition As-Received : Used Item

Reference : 2208-1091WN-2

Cert. No.: 22LM126

Page.: 2 of 2

**Procedure Used :-**

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

The temperature scale used was based on ITS-90.

**Condition of this result of calibration**

1. Reference standard instrument:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1) Digital Thermometer	53 II B	20410013	22I555	06 May 2023

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

3. This certification is traceable to the International System of Unit.

**Result of Calibration :-** ( \* ) Without Adjustment

**Function :** Temperature measurement.

This instrument was connected with temperature sensor, S/N.: PH5TEMB01P

<u>Calibration Point</u> ( °C )	<u>Immersion Depth</u> ( mm )	<u>Standard Temperature</u> ( °C )	<u>UUC* Reading</u> ( °C )	<u>Error</u> ( °C )	<u>Uncertainty</u> ( ± °C )	<u>Coverage Factor</u> <i>k</i>
25.0	80	25.004	25.0	-0.004	0.16	2.00

**UUC\* :** Unit Under Calibration

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

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a 1124911



**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
**CALIBRATION LABORATORY**

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1  
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-23-297

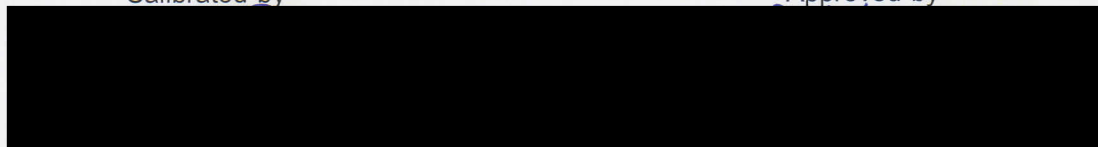
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## CERTIFICATE OF CALIBRATION

Equipment	:	Spectrophotometer
Manufacturer	:	Thermo Scientific
Model	:	Genesys 20
Serial No.	:	3SGT041007
ID No.	:	LB-Eq-029
Customer	:	Special Lab Envi And Consultant Co., Ltd.
	:	47/91-93 Moo 3, Tambol Tait , Amphur Pakrad,
	:	Nonthaburi, 11120.
Location	:	Becthai Laboratory (Bangkok)
Date of Receipt	:	3 May 2023
Date of Calibration	:	3 May 2023
Date of Issue	:	3 May 2023
Ambient Temperature	:	(25±10) °C
Relative Humidity	:	(60±20) %
Condition As-Received	:	Used Item

Calibrated by

Approved by



Calibration Engineer

Calibration Manager

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

This certificate may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Indicated values are valid for the state of the Spectrophotometer at the time of calibration only.





**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
**CALIBRATION LABORATORY**

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1  
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-23-297

Page : 2 of 3

## CALIBRATION REPORT

### Conditions of this result of calibration

#### 1. Reference Standard Material :

<u>Material</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert.No.</u>	<u>Due date</u>
Holmium Glass Filter	RM-HG	12705	98236	12 Feb 24
Didymium Glass Filter	RM-DG	13498	98233	12 Feb 24
Neutral Density Filter	RM-1N2N3N	8323	98259	13 Feb 24

2. Traceability : This certification is traceable to the International System of Unit maintained at;  
The Starna Scientific Ltd. Accredited Calibration Laboratory No. 0659.

#### 3. Method of calibration :

The calibration procedure was carried out according to ASTM E275-08 (2022) and ASTM E925-09 (2014).

#### 4. Result of calibration :

( ☒ ) without adjustment

( ☐ ) after adjustment

#### 5. Equipment Specifications:

Spectral Bandwidth :	5	nm
Data Interval :	1	nm
Scan Speed :	N/A	nm/min



**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
**CALIBRATION LABORATORY**

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1  
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-23-297

Page : 3 of 3

## CALIBRATION REPORT

### Wavelength Calibration

Certified Values of Reference Material (nm)	Nominal Value (nm)	UUC*Reading (nm)	Error (nm)	Uncertainty of Measurement ( $\pm$ nm)
418.40	418	418	-0.40	0.59
537.00	537	537	0.00	0.59
638.00	638	638	0.00	0.59

### Photometric Calibration for Visible

Wavelength (nm)	Certified Values of Reference Material (A)	UUC* Reading (A)	Error (A)	Uncertainty of Measurement ( $\pm$ A)
420.0	Zero	0.000	0.0000	0.0028
	0.5716	0.572	0.0004	0.0044
	0.7358	0.733	-0.0028	0.0040
	1.0713	1.073	0.0017	0.0039
440.0	Zero	0.000	0.0000	0.0028
	0.561	0.560	-0.0010	0.0042
	0.718	0.714	-0.0040	0.0037
	1.0459	1.044	-0.0019	0.0037
465.0	Zero	0.000	0.0000	0.0028
	0.5111	0.513	0.0019	0.0044
	0.6618	0.661	-0.0008	0.0035
	0.9635	0.966	0.0025	0.0034
546.1 (546.0)	Zero	0.000	0.0000	0.0028
	0.5222	0.523	0.0008	0.0036
	0.6687	0.668	-0.0007	0.0031
	0.9768	0.978	0.0012	0.0043
590.0	Zero	0.000	0.0000	0.0028
	0.5541	0.554	-0.0001	0.0035
	0.6975	0.696	-0.0015	0.0031
	1.0206	1.021	0.0004	0.0045
635.0	Zero	0.000	0.0000	0.0028
	0.5398	0.543	0.0032	0.0035
	0.6658	0.667	0.0012	0.0033
	0.9741	0.977	0.0029	0.0045

Remark : Each individual filter is measured against the empty filter holder (blank) used to zero the Spectrophotometer.

Note:

UUC\* : Unit Under Calibration

- End of Report -



## Certificate of Calibration

**Certificate No. :** 66-400220-2

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91 Moo 3 Thambol Tha-it, Pakkret, Nonthaburi 11120

**Equipment :** Air Chamber (Incubator)  
Manufacturer : Lovibond Model : FKU 1800  
Range : N/A °C Resolution : 0.1 °C  
Serial No. : 0914643-01 ID No. : LB-Eq-004

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.  
Ambient Temperature : (29.0 to 29.6) °C  
Relative Humidity : (40 to 45) %  
Line Voltage : (226.0 to 226.5) V

**Date of Received :** 24 April 2023

**Date of Calibration :** 24 April 2023

**Date of Issue :** 26 April 2023

**Calibrated by :** Permpoon Chanpu

**Calibration Method :** CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

**Reference Standard Instruments :** This certification is traceable to the International System of Units  
Standard Digital Thermometer with RTD Probe

ID No.	Cert. No.	Due Date	Traceability
400046 & 400042	66-400066-1	02 Aug 2023	National Institute of Metrology Thailand (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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www.calibratech.co.th



## Certificate of Calibration

Certificate No. : 66-400220-2

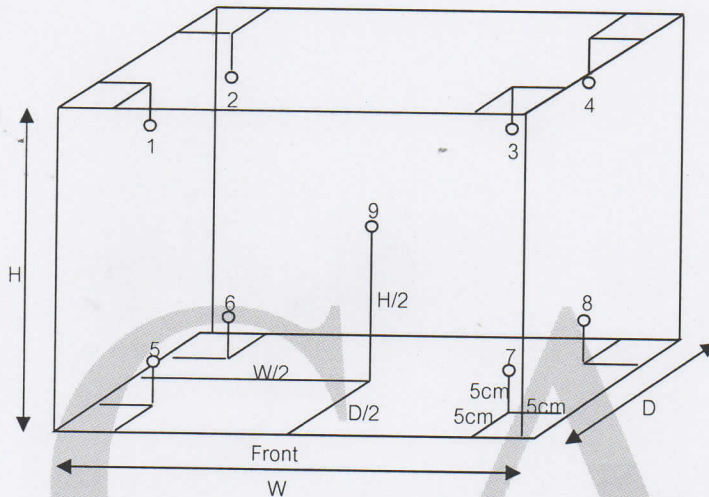
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber  
 $W = 0.55 \text{ m}$   
 $D = 0.73 \text{ m}$   
 $H = 0.50 \text{ m}$   
Capacity =  $0.20 \text{ m}^3$

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
20.0	19.9	19.9	20.35	20.35	20.23	20.25	20.12	20.12	20.14	20.28	20.08	0.42

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
20.0	19.9	19.9	0.37	0.16	0.6

**Remark** The uncertainty is not combine uniformity of the air chamber

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

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

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## Certificate of Calibration

**Certificate No. :** 65-400451-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91 Moo 3 Thambol Tha-it, Pakkret, Nonthaburi 11120

**Equipment :** Water Bath

Manufacturer : Memmert

Model : WNB22

Range : N/A °C

Resolution : 0.1 °C

Serial No. : L520.0201

ID No. : LB-Eq-041

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (31.0 to 33.0) °C

Relative Humidity : (45 to 500) %

Line Voltage : (226.0 to 226.5) V

**Date of Received :** 24 August 2022

**Date of Calibration :** 24 August 2022

**Date of Issue :** 31 August 2022

**Calibrated by :** Permpon Chanpu

**Calibration Method :** This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80  
The temperature scale used was based on ITS-90

**Reference Standard Instruments :** This certification is traceable to the International System of Units  
Standard Digital Thermometer with RTD probe

ID No.	Cert. No.	Due Date	Traceability
400029 & 400031	65-400273-1	23 Nov 2022	National Institute of Metrology Thailand (NIMT)

Approved

Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

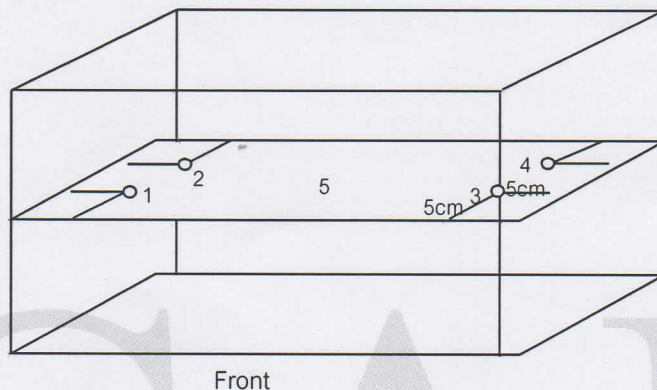
**Certificate No. : 65-400451-1**

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

**Function :** Temperature measurement



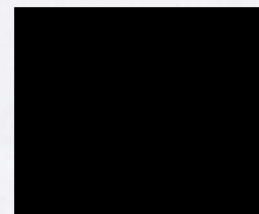
Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			1	2	3	4	5			
62.0	62.0	62.0	61.93	61.92	61.91	61.91	61.91	0.18	0.06	0.03
85.0	85.0	85.0	84.94	84.91	84.89	84.92	84.92	0.18	0.08	0.03
95.0	95.0	95.0	94.81	94.76	94.76	94.77	94.77	0.19	0.09	0.07
100.0	ccc	100.8	100.64	100.74	100.52	100.62	100.56	0.24	0.34	0.13

Remark The uncertainty is not combine uniformity of the water bath

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

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

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## Certificate of Calibration

**Certificate No. :** 65-210421-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi And Consultant Co.,Ltd.  
47/91 Moo 3, Tambol Tha-IT, Pakkret, Nonthaburi 11120

**Equipment :** Weight  
Manufacturer : LS Material : Stainless Steel  
Weight size : 1 g  
ID No. : LB-Eq-034  
Assumed density of weight : 7950 kg / m<sup>3</sup>  
Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) °C  
Relative Humidity : ( 50 ± 10 ) %  
Air Pressure : 1009.8 mbar

**Date of Received :** 01 September 2022

**Date of Calibration :** 05 September 2022

**Date of Issue :** 05 September 2022

**Calibrated by :** Wuttichai Swatphong

**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by

Laboratory Manager

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## Certificate of Calibration

**Certificate No. :** 65-210421-1

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

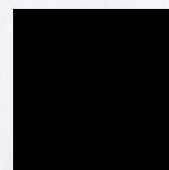
No.	Nominal Value	Id.Mark	Conventional mass Value		Measuring Uncertainty
1	1 g	none	1 g	-0.028 mg	$\pm$ 0.023 mg

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

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

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CAL





## Certificate of Calibration

**Certificate No. :** 65-210421-2

**Page : 1 of 2**

**Submitted by :** Special Lab Envi And Consultant Co.,Ltd.  
47/91 Moo 3, Tambol Tha-IT, Pakkret, Nonthaburi 11120

**Equipment :** Weight  
Manufacturer : LS Material : Stainless Steel  
Weight size : 100 g  
ID No. : LB-Eq-035  
Assumed density of weight : 7950 kg / m<sup>3</sup>  
Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) °C  
Relative Humidity : ( 50 ± 10 ) %  
Air Pressure : 1009.8 mbar

**Date of Received :** 01 September 2022

**Date of Calibration :** 05 September 2022

**Date of Issue :** 05 September 2022

**Calibrated by :** Wuttichai Swatphong

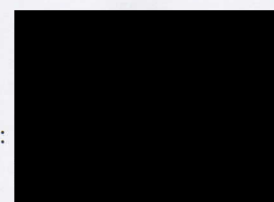
**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by :



Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 65-210421-2

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Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

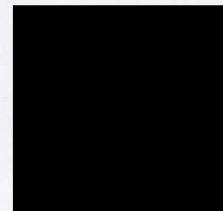
No.	Nominal Value	Id.Mark	Conventional mass Value		Measuring Uncertainty
1	100 g	none	100 g	-0.05 mg	$\pm$ 0.11 mg

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

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

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CAL





## Certificate of Calibration

**Certificate No. :** 65-210421-3

**Page : 1 of 2**

**Submitted by :** Special Lab Envi And Consultant Co.,Ltd.  
47/91 Moo 3, Tambol Tha-IT, Pakkret, Nonthaburi 11120

**Equipment :** Weight  
Manufacturer : LS Material : Stainless Steel  
Weight size : 200 g  
ID No. : LB-Eq-036  
Assumed density of weight : 7950 kg / m<sup>3</sup>  
Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) °C  
Relative Humidity : ( 50 ± 10 ) %  
Air Pressure : 1009.8 mbar

**Date of Received :** 01 September 2022

**Date of Calibration :** 05 September 2022

**Date of Issue :** 05 September 2022

**Calibrated by :** Wuttichai Swatphong

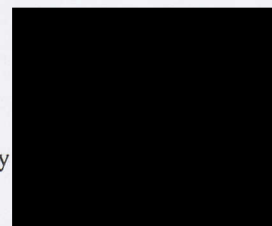
**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by



Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.





## Certificate of Calibration

**Certificate No. :** 65-210421-3

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**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

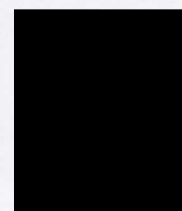
No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	200 g	none	200 g +0.09 mg	$\pm$ 0.17 mg

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

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

- oOo -

CAL





## 1. Heating block (COD)

ผู้ผลิต M-LAB รุ่น DB 1602 Serial No. 0141 รหัสเครื่อง LB-Eg-012  
วันที่ทวนสอบ 11/3/2566 ทวนสอบครั้งต่อไป 11/9/2566

## 2. Digital Thermometer with TC Probe

ผู้ผลิต Thermo Scientific รุ่น Temp 10 K Serial No. 4008958 รหัสเครื่อง LB-Eg-013  
ความละเอียด 0.1 (°C) วันที่ทวนสอบ 3 พฤศจิกายน 66 ทวนสอบครั้งต่อไป 2 พฤศจิกายน 66

## 3. ผลการทวนสอบ (ช่วงเวลา 9.00 น. - 16.30 น.)

อุณหภูมิห้อง 26.3 (°C) ความชื้นสัมพัทธ์ 47.5 %

วัน/เดือน/ปี	Position No.	Set point (°C)	อุณหภูมิที่อ่านได้จากเครื่อง (°C)	อุณหภูมิที่อ่านได้เทอร์โมมิเตอร์ (°C)			เกณฑ์การยอมรับ	สรุปผลการทวนสอบ		ผู้ทวนสอบ
				ครั้งที่ 1 (A)	ครั้งที่ 2 (B)	ค่าเฉลี่ยของอุณหภูมิ		ผ่าน	ไม่ผ่าน	
11/3/2566	1	150.0	150.0	149.8	150.0	149.9	± 2	✓		
	2			149.7	149.7	149.7	± 2	✓		
	3			150.8	150.7	150.8	± 2	✓		
	4			151.1	151.1	151.1	± 2	✓		
	5			150.1	150.4	150.3	± 2	✓		
	6			149.2	148.9	149.1	± 2	✓		
	7			150.0	149.8	149.9	± 2	✓		
	8			149.9	149.9	149.9	± 2	✓		
	9			150.0	149.8	149.9	± 2	✓		
	10			148.9	149.3	149.1	± 2	✓		
	11			148.9	149.5	149.2	± 2	✓		
	12			149.8	150.1	150.0	± 2	✓		
	13			149.9	150.2	150.1	± 2	✓		
	14			148.6	150.1	149.4	± 2	✓		
	15			149.4	149.6	149.5	± 2	✓		
	16			148.5	149.3	148.9	± 2	✓		
	17			150.1	150.1	150.1	± 2	✓		
	18			148.9	150.1	149.5	± 2	✓		
	19			149.5	149.7	149.6	± 2	✓		
	20			148.1	148.6	148.4	± 2	✓		
	21			148.7	148.8	148.8	± 2	✓		
	22			149.1	149.2	149.2	± 2	✓		
	23			148.1	148.2	148.2	± 2	✓		
	24			149.5	148.9	149.2	± 2	✓		
	25			148.3	148.4	148.4	± 2	✓		