

ผลการติดตามตรวจสอบคุณภาพสิ่งแวดล้อม โครงการศุภาลย์ ลอฟท์ สถานีตลาดพลู ระยะดำเนินการ
บริษัท ศุภาลย์ จำกัด (มหาชน)
ระหว่างเดือนมกราคม ถึง มิถุนายน พ.ศ. 2566

รายการใบรับรองสอบเทียบ / ทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการ สำหรับวิเคราะห์คุณภาพน้ำ									
No.	Instrument/ Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
Water									
1	pH Meter	pH Meter	Ecosense	pH100A JC04735	Technology Promotion Association (Thailand-Japan)	23CH531	28 Apr 23	26 Apr 24	-
2	pH Meter	pH Meter	Ecosense	pH100A JC03345	Technology Promotion Association (Thailand-Japan)	23CH806	27 Jun 23	25 Jun 24	-
Laboratory Instrument/Equipment.									
1	pH Meter	ค่าความเป็นกรด-ด่าง (pH)	Mettler-Toledo	Seven Easy pH 1230525212	National Food Institute, Ministry of Industry, Thailand	2302181-001-01	24 Mar 23	22 Mar 24	-
2	pH Meter		Mettler-Toledo	Seven Easy TMS20 pH 1231155210	National Food Institute, Ministry of Industry, Thailand	2301846-001-01	24 Feb 23	23 Feb 24	-
3	BOD Incubator	บีโอดี (Biochemical Oxygen	Arco	UC4-1320 / (UAE.WAO.015/2561)	Technology Promotion Association (Thailand-Japan)	23TM249	15 Feb 23	14 Feb 24	-
4	BOD Incubator	Demand: BOD)	Arco	UC4-1320 / (UAEWAO002/2550)	Technology Promotion Association (Thailand-Japan)	22TM1232	15 Aug 22	14 Aug 23	-
5	COD Reactor (Heating Block)	ซีโอดี (Chemical Oxygen Demand: COD)	Hanna	HI839800-02 / H0185001	Hanna Instruments (Thailand) Ltd.	HIT-2312-0342	10 Mar 23	8 Mar 24	
6	Analytical Balance (Repeatability 0.01 mg)	ของแข็งที่ละลายได้ทั้งหมด (Total Dissolved Solids: TDS)	Mettler-Toledo	AB204-S/ 1129361010	National Food Institute, Ministry of Industry, Thailand	2303074-001-01	26 Apr 23	24 Apr 24	-
7	Hot Air Oven	ของแข็งแขวนลอย (Suspended Solids: SS)	Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	23TM373	12 Apr 23	10 Apr 24	-

ผลการติดตามตรวจสอบคุณภาพสิ่งแวดล้อม โครงการศุภาลย์ ลอฟท์ สถานีตลาดพลู ระยะดำเนินการ
บริษัท ศุภาลย์ จำกัด (มหาชน)
ระหว่างเดือนมกราคม ถึง มิถุนายน พ.ศ. 2566

รายการใบรับรองสอบเทียบ / ทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการ สำหรับวิเคราะห์คุณภาพน้ำ									
Laboratory Instrument/Equipment.									
8	Analytical Balance (Repeatability 0.1 mg)	น้ำมันและไขมัน (Fat, Oil and Grease)	Mettler-Toledo	XPE205 / B748058497	Mettler-Toledo (Thailand) Ltd.	TH2065-067- 092322-ACC-TH	23 Sep 22	22 Sep 23	-
9	Digestor Unit	ไนโตรเจนในรูปทีเคเอ็น (Total Kjeldahl Nitrogen: TKN)	FOSS TECATOR	2520auto / 91794469	National Food Institute, Ministry of Industry, Thailand	2302413-001-01	31 Mar 23	29 Mar 24	-
10	Distillation Unit (Kjeldahl Method)		FOSS TECATOR	KT200 / 91790524	FOSS South East Asia	Foss Customer Service Report	17 Jan 23	16 Jan 24	-
11	Incubator (Cooled Incubator)	โคลิฟอร์มแบคทีเรีย (Total Coliform Bacteria)	Memmert	IPP 260 / V615.0187	Technology Promotion Association (Thailand-Japan)	23TM378	12 Apr 23	10 Apr 24	-
12	Incubator (Cooled Incubator)	ฟิคอลโคลิฟอร์ม (Fecal coliform)	Memmert	IPP 260 / V616.0066	Technology Promotion Association (Thailand-Japan)	23TM728	28 Apr 23	26 Apr 24	-
13	Water Bath		Memmert	WNE 14 / L416.0606	Technology Promotion Association (Thailand-Japan)	23TM139	15 Feb 23	14 Feb 24	-
14	Water Bath		Memmert	WNE 14 / L416.0612	Technology Promotion Association (Thailand-Japan)	23TM194	15 Feb 23	14 Feb 24	-
15	Analytical Balance		Mettler-Toledo	XSR204 / C117635043	National Food Institute, Ministry of Industry, Thailand	2302827-001-01	10 May 23	8 May 24	-
16	Auto Clave		ALP	CL-40L / 808763	Technology Promotion Association (Thailand-Japan)	23TM763	27 Apr 23	25 Apr 24	-

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



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert.No.: 23CH531
Page.: 1 of 3

Certificate of Calibration

Equipment : pH Meter
Manufacturer : EcoSense
Model : pH100A
Serial No. : JC04735
ID No. : UAE.EFM.064/2566(EFM.pH.07/66)
Condition As-Received: Used Item
Received Date : 26 April 2023
Calibration Date : 27-28 April 2023
Reference : 2304-0707WSC-9
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udumsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer

Calibrated by : Warakorn Lerngagtrakul

Approved by :

(/) Malee Butkruea
() Salthip Meangmai
() Warakorn Lerngagtrakul

Issue Date : 9 May 2023

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.

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Cert.No.: 23CH531
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument : -

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	22E2769	24 Aug 2023
2) Ref. Standard Thermometer	4982054	110RC044	22I1306	27 Oct 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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	863832	28 Dec 2024
pH 6.987	CPA chem	826589	09 July 2023
pH 10.010	CPA chem	863835	28 Dec 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)(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.: JC04735	4.00	177.48	177	4.01	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.01	0.58	2.00

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Calibration Results
Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N.: 230308SIA605377	4.008	4.01	175	0.0079	2.00
	6.987	7.00	1	0.011	2.00
	6.987	7.00	1	0.011	2.00
	10.010	10.02	-173	0.0095	2.00

Function : Temperature Measurement
(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model :
- Serial No. : 230308SIA605377
Dimension of probe;
- Length : 110 mm
- Diameter : 12 mm
- Immersion Depth : 100 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.002	25.1	0.098	0.13	2.00
30.0	30.001	30.1	0.099	0.13	2.00
35.0	35.003	35.1	0.097	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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Cert.No.: 23CH806
Page.: 1 of 3

Certificate of Calibration

Equipment : pH Meter
Manufacturer : EcoSense
Model : pH100A
Serial No. : JC03345
ID No. : UAE.EFM.058/2562(ENV.pH.07/61)
Condition As-Received: Used Item
Received Date : 26 June 2023
Calibration Date : 27 June 2023
Reference : 2306-0831WSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udumsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer
Calibrated by : Warakorn Lerngagtrakul
Approved by :
(/) Malee Butkruea
() Salthip Meangmai
() Warakorn Lerngagtrakul
Issue Date : 29 June 2023

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.

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Cert.No.: 23CH806
Page: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	22E2769	24 Aug 2023
2) Ref. Standard Thermometer	4982054	110RC044	2211306	27 Oct 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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	863832	28 Dec 2024
pH 6.986	CPA chem	863833	28 Dec 2023
pH 10.010	CPA chem	863835	28 Dec 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 (\pm mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: JC03345	4.00	177.48	177	4.01	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.01	0.58	2.00



Cert.No.: 23CH806
Page: 3 of 3

Calibration Results

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 (\pm)	Coverage factor k
pH Electrode S/N.:220323SIA605377	4.008	4.01	173	0.0071	2.00
	6.986	6.99	0	0.0099	2.00
	6.986	7.00	1	0.0099	2.00
	10.010	10.01	-176	0.0085	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : YSI Environmental
- Serial No. : 220323SIA605377
Dimension of probe;
- Length : 110 mm
- Diameter : 12 mm
- Immersion Depth : 100 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (\pm °C)	Coverage factor k
25.0	25.002	25.1	0.098	0.13	2.00
30.0	30.003	30.1	0.097	0.13	2.00
35.0	35.003	35.0	-0.003	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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Hanna Instruments (Thailand) Ltd.

410/67-68 Soi Ratchadapisek 24, Ratchadapisek Rd., Samsen-nok,
Huaykwang, Bangkok 10310 Tel: 0-2541-4199 Fax: 0-2541-4198



Certificate No. : HIT-2312-0342

Page : 1 of 2

CERTIFICATE OF CALIBRATION

Equipment : COD Test Tube Heater
Meter Model : HI839800-02
Tube Heater : 25 Vial Capacity
Temperature Range : -10 °C to 160 °C
Ambient Temperature : (25 \pm 2) °C
Manufacturer : Hanna Instruments
Condition As-Received : Used Product
Customer name : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Rd., Bangchak,
Phrakhanong, Bangkok 10260
Received date : 8 March 2023
Calibrate date : 10 March 2023
Issue date : 20 March 2023
Calibrated Location : Hanna Instruments (Thailand) Ltd.
Calibration Procedure : This calibrator was conducted by using in-house: calibration procedure CP-04 by using certified reference material.

Calibrated by : ☒ Mr. Pichit Petthong
☐ Mr. Jakkapob Pentisan
☐ Mr. Channarong Soinak
Approved by : Mr. Anan Suwanchaisakul
Authorized Signatory



This certificate was certified only for the instrument we calibrated.

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

** This certificate may not be reproduced other than in full, except with the prior written **
approval of the head of Hanna Instrument (Thailand).

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Certificate No. : HIT-2312-0342

Page : 2 of 2

Condition of this calibration result

Reference Standard Instruments:

Instruments	Model	Serial No.	Certificate No.	Traceable
Data Acquisition Switch Unit	34970A	MY44065265	WK2207-065-1	WK Electric Co., Ltd.

Calibration Result:

Measurement Temperature Source Accuracy for COD Reactor

Capacity (Vial)	Nominal Value (°C)	Average Value (°C)	\pm Uncertainty (°C)	\pm Tolerance of UUC (°C)	Acceptance Criteria
25 Vial	150.0	150.3	0.59	2	Pass

Figure: Shows the location of the temperature source.

(1A) 149.78°C	(2A) 150.31°C	(3A) 150.63°C	(4A) 149.93°C	(5A) 150.31°C
(1B) 150.35°C	(2B) 150.18°C	(3B) 149.93°C	(4B) 150.18°C	(5B) 150.21°C
(1C) 150.24°C	(2C) 151.10°C	(3C) 150.80°C	(4C) 150.36°C	(5C) 150.86°C
(1D) 150.16°C	(2D) 149.77°C	(3D) 150.22°C	(4D) 150.67°C	(5D) 150.43°C
(1E) 149.94°C	(2E) 150.44°C	(3E) 150.06°C	(4E) 150.63°C	(5E) 149.29°C

Remark: The Acceptance criteria is the error value plus or minus the Measurement Uncertainty, and then Not More than the Tolerance value of UUC, therefore concluded that pass.

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

** End of certificate **

เอกสารไม่ควบคุม

Calibration Certificate

Certificate No.: 2303074-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhnong, Bangkok 10260

Page 1 of 3

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: AB204-S/FACT

Serial No.: 1129361010

ID No.: UAE.WAS.002/2552

Order No.: 2303074

Operation No.: 2303074-001

Date of Receipt: 26 May 2023

Date of Calibration: 26 May 2023

Calibrated by  **Approved by** 
Scientist (Miss Préeyaporn Jäengkarnkit)
Vice President, Department of Laboratory Services
Responsible for the Technical Management Team

The uncertainties are for a confidence probability of approximately 95%

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

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

Calibration Report

Certificate No.: 2303074-001-01
Equipment: Electronic Balance
Model: AB204-S/FACT
Serial No.: 1129361010
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g
ID No.: UAE.WAS.002/2552

Page 2 of 3

Date of Calibration: 26 May 2023
Environment Condition: Ambient Temperature: 23.7 ± 0.1 °C Relative Humidity: 61 ± 2.2 %

Place of Calibration: Room 108 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	850556752	TCS	M23040535	8 April 2024
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	608-H1	NFI.BTH 018/23	Quality Reborn	QR23-0491	21 February 2024

3. This certification is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

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

Calibration Results:




1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
100	0.000048
200	0.000048

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.

		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1	2	3
(g)	(g)	(g)
99.9996	99.9995	99.9995
99.9999	99.9999	99.9997
(Maximum Difference)		
0.0003		

F-CS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2303074-001-01
Equipment: Electronic Balance
Model: AB204-S/FACT
Serial No.: 1129361010
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g
ID No.: UAE.WAS.002/2552

Date of Calibration: 26 May 2023

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Calibration Results: (Continued)

Calibration Range: 0-200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.00000	0.0000	0.0000	0.000088	2.00
0.01	0.01000	0.0100	0.0000	0.000088	2.00
0.05	0.05000	0.0500	0.0000	0.000088	2.00
0.1	0.10001	0.0999	0.0001	0.000088	2.00
0.2	0.20001	0.1999	0.0001	0.000088	2.00
0.5	0.50002	0.5000	0.0000	0.000088	2.00
1	1.00000	1.0000	0.0000	0.000089	2.00
2	2.00002	2.0000	0.0000	0.000089	2.00
5	5.00002	5.0000	0.0000	0.000090	2.00
10	10.00001	9.9999	0.0001	0.000091	2.00
20	20.00003	20.0000	0.0000	0.000095	2.00
50	50.00003	49.9999	0.0001	0.00011	2.00
70	70.00006	69.9999	0.0002	0.00013	2.00
100	100.00006	99.9999	0.0002	0.00016	2.00
150	150.00009	149.9999	0.0002	0.00021	2.00
200	200.00016	199.9998	0.0004	0.00028	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 %.

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65




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TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. No.: 23TM373
Page : 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UF 55
Serial No. : B212.0411
ID No. : UAE.WAO.005/2556
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2
Received Order : 11 April 2023
Calibration Date : 11 - 12 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Krisda Malee
Approved by : 
() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date : 24 April 2023

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2304-0156OC-1
Procedure Used :-
 Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.
 The temperature scale used was based on ITS-90.
Condition of this result of calibration
 1. Reference standard instrument:-
Instrument **Model** **Serial No.** **Cert. No.** **Due Date**
 1) Data Acquisition 34972A MY59003411 22LM165 26 Nov 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 of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration

	Beginning	Finished
Temp. (°C)	27	28
REL Humid. (%)	45	44
AC Supply (Volt)	221	220

Ref. Std. ID No.: @ Calibration Point

Position :	(120 to 180) °C	(104) °C
1	18-20TC-01	20RTD-2/1
2	18-20TC-02	20RTD-2/2
3	18-20TC-03	20RTD-2/3
4	18-20TC-04	20RTD-2/4
5	18-20TC-05	20RTD-2/5
6	18-20TC-06	20RTD-2/6
7	18-20TC-07	20RTD-2/7
8	18-20TC-08	20RTD-2/8
9 (ref.)	18-20TC-09	20RTD-2/9

Probe Installation Details : **Dimension of Chamber :**
 a = 5.0 cm D = 0.50 m
 b = 5.0 cm W = 0.80 m
 c = 5.0 cm H = 0.75 m
 Capacity = 0.30 m³

เอกสารไม่ควบคุม
 a 1158261

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2304-0156OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.054	0.59	0.95	2
120.0	120.0	120.0	0.12	0.89	1.5	2
180.0	180.0	180.0	0.12	1.5	2.5	2

Calibration Point **Measured Temperature (°C)** **Uncertainty (± °C)**

Point (°C)	1	2	3	4	5	6	7	8	9 (ref.)	(± °C)
104.0	104.512	104.016	104.542	104.407	103.704	103.729	104.167	104.158	104.001	0.42
120.0	120.317	119.768	120.524	120.232	119.363	119.209	119.888	119.797	119.735	1.1
180.0	180.878	179.819	181.357	180.871	179.303	179.139	180.230	180.055	179.960	1.1

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
 Note : The reported uncertainty of measurement was included stability and excluded uniformity .
 The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

เอกสารไม่ควบคุม
 a 1158260

Calibration Certificate ID
 TH2065-067-092322-ACC-TH

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
 846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
 Bangna District, Bangkok 10260
 +66 2723 0382
 MT-TH.ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom Suk 41, Sukhumvit Rd., Bang Chak
City: Phra Khanong **Contact:** Suwit Chotnok
Zip / Postal: 10260
State / Province: Bangkok
Order Number:

Weighing Device

Manufacturer: Mettler Toledo **Instrument Type:** Weighing Instrument
Model: XPE205 **Asset Number:** UAE.CAL.004/2561
Serial No.: B748058497 **Terminal Model:** PEAT
Building: N/A **Terminal Serial No.:** B748058497
Floor: 4 **Terminal Asset No.:** N/A
Room: Laboratory Calibrate Glassware

Range	Max. Capacity	Readability (g)
1	220 g	0.00001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20
 This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.
 The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.
 In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature	Humidity
As Found	Start: 22.8 °C End: 22.5 °C	Start: 62.2 % End: 58.6 %

As Found Calibration Date: 23-Sep-2022 **Calibrator:**
As Left Calibration Date: N/A
Issue Date: 26-Sep-2022 **Approved Signatory:**
 Technical Manager / Head of Calibration Center

เอกสารไม่ควบคุม



29 Sep 2022

Calibration Certificate ID:
 TH2065-067-092322-ACC-TH
 Balance
 Mettler Toledo
 Model: XPE205
 S/N : B748 058497
 ID. No.: UAE.CAL.004/2561

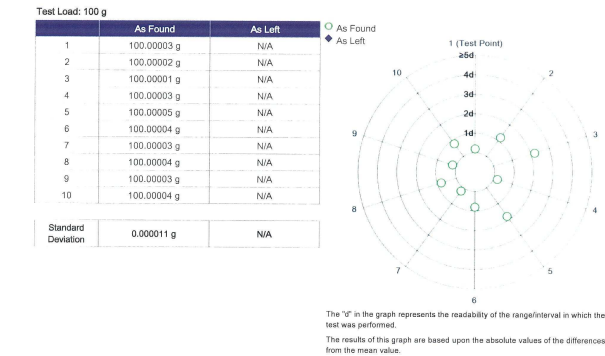
TH2065-067-092322-ACC-TH					Equipment : Electronic Balance				
Brand: Mettler-Toledo					Model: XPE205				
Serial No.: B748058497					ID No.: UAE.CAL.004/2561				
Nominal Value	Standard Value	Average Reading	Error	Correction	Uncertainty (U)	U + Error	Judgement	(Total Error < Judgement)	Result
(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)	(Pass / Fail)
0	0.00000	0.00000	0.00000	0.00000	0.000023	0.000023	0.002	Pass	
10	9.99997	9.99997	0.00000	0.00000	0.000063	0.000063	0.002	Pass	
30	29.99998	29.99999	-0.00001	0.00014	0.00014	0.00015	0.002	Pass	
50	49.99998	50.00000	0.00002	-0.00002	0.00012	0.00014	0.002	Pass	
70	69.99999	70.00000	0.00001	-0.00001	0.000200	0.00021	0.002	Pass	
90	90.00002	90.00002	0.00000	0.00000	0.00027	0.00027	0.002	Pass	
100	100.00002	100.00005	0.00003	-0.00003	0.00028	0.00028	0.002	Pass	
120	120.00003	120.00005	0.00002	-0.00002	0.00031	0.00033	0.002	Pass	
150	150.00001	150.00002	0.00001	-0.00001	0.00031	0.00032	0.002	Pass	
170	170.00001	170.00007	0.00006	-0.00006	0.00038	0.00044	0.002	Pass	
200	200.00002	200.00000	-0.00002	0.00002	0.00035	0.00037	0.002	Pass	

UUC* : Unit Under Calibration
 Remarks:

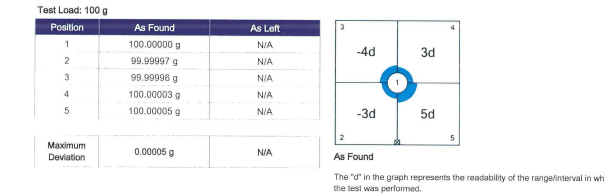
เอกสารไม่ควบคุม

Measurement Results

Repeatability

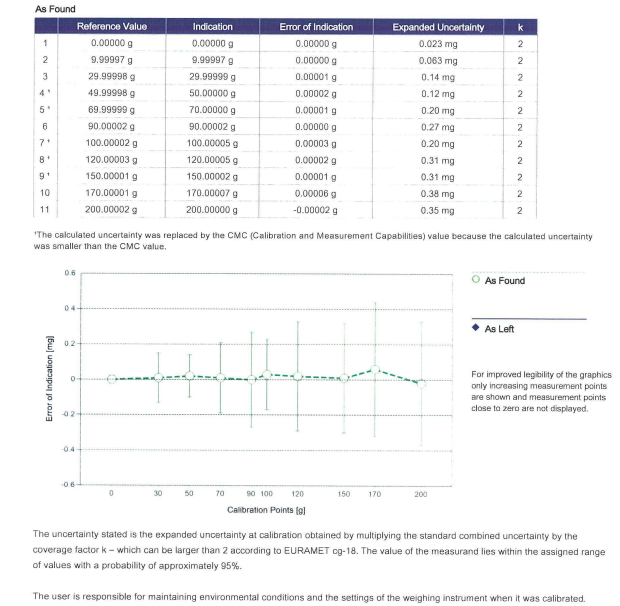


Eccentricity



เอกสารไม่ควบคุม

Error of Indication



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

เอกสารไม่ควบคุม

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2			
Weight Set No.:	WS03	Date of Issue:	21-Sep-2021
Certificate Number:	175498	Calibration Due Date:	14-Mar-2023
Weight Set 2: OIML E2			
Weight Set No.:	WS66	Date of Issue:	21-Oct-2021
Certificate Number:	C142784709	Calibration Due Date:	17-Apr-2023
Weight Set 3: OIML E2			
Weight Set No.:	WS70	Date of Issue:	21-Oct-2021
Certificate Number:	C142784702	Calibration Due Date:	19-Mar-2023
Thermo Hygrometer			
Equipment No.:	IN281	Date of Issue:	23-May-2022
Certificate Number:	22H1057	Calibration Due Date:	15-May-2023

Remarks

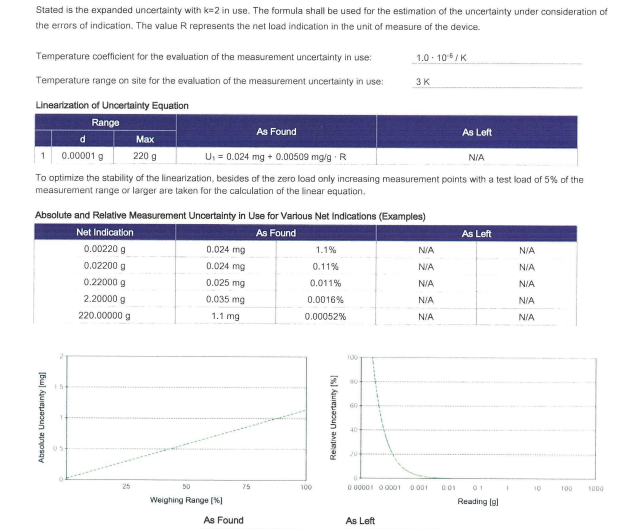
FACT adjustment functionality activated
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory.

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

เอกสารไม่ควบคุม

Measurement Uncertainty of the Weighing Instrument in Use



เอกสารไม่ควบคุม

GWP® Certificate



As
Found



As
Left



The weighing device meets the given
process requirements.

The weighing device meets the given
process requirements.

Tests Performed: ☒ As Found ☐ As Left ☒ No adjustments/modifications made. As Left results
correspond to As Found.

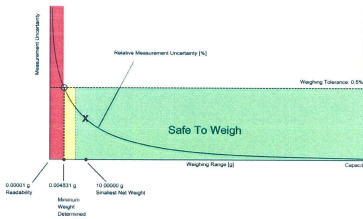
Process Requirements

Weighing Tolerance: 0.5%

Smallest Net Weight: 10.00000 g

Safety Factor: 2

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.024253 g	0.048754 g	0.073509 g	0.123795 g	0.254223 g
0.2%	0.012095 g	0.024253 g	0.036472 g	0.061100 g	0.123795 g
0.5%	0.004831 g	0.009671 g	0.014522 g	0.024253 g	0.048754 g
1%	0.002414 g	0.004831 g	0.007250 g	0.012095 g	0.024253 g
2%	0.001207 g	0.002414 g	0.003622 g	0.006040 g	0.012095 g
5%	0.000483 g	0.000965 g	0.001448 g	0.002414 g	0.004831 g

Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.024253 g	0.048754 g	0.073509 g	0.123795 g	0.254223 g
0.2%	0.012095 g	0.024253 g	0.036472 g	0.061100 g	0.123795 g
0.5%	0.004831 g	0.009671 g	0.014522 g	0.024253 g	0.048754 g
1%	0.002414 g	0.004831 g	0.007250 g	0.012095 g	0.024253 g
2%	0.001207 g	0.002414 g	0.003622 g	0.006040 g	0.012095 g
5%	0.000483 g	0.000965 g	0.001448 g	0.002414 g	0.004831 g

Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with $k = 2$ and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

- If "N/A" is shown above, no appropriate value could be calculated.
- METTLER TOLEDO is not responsible for the definition of the process requirements.

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	0.005000 g	0.000011 g	✓	0.000011 g	✓
0.2%	0.010000 g		✓		✓
0.5%	0.025000 g		✓		✓
1%	0.050000 g		✓		✓
2%	0.100000 g		✓		✓
5%	0.250000 g		✓		✓

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.005000 g	0.00005 g	✓	0.00005 g	✓
0.2%	0.010000 g		✓		✓
0.5%	0.025000 g		✓		✓
1%	0.050000 g		✓		✓
2%	0.100000 g		✓		✓
5%	0.250000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
29.99998 g	0.00001 g	0.01500 g	0.03000 g	0.07500 g	0.15000 g	0.30000 g	0.75000 g
49.99998 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
69.99999 g	0.00001 g	0.03500 g	0.07000 g	0.17500 g	0.35000 g	0.70000 g	1.75000 g
90.00002 g	0.00000 g	0.04500 g	0.09000 g	0.22500 g	0.45000 g	0.90000 g	2.25000 g
100.00002 g	0.00003 g	0.05000 g	0.10000 g	0.25000 g	0.50000 g	1.00000 g	2.50000 g
120.00003 g	0.00002 g	0.06000 g	0.12000 g	0.30000 g	0.60000 g	1.20000 g	3.00000 g
150.00001 g	0.00001 g	0.07500 g	0.15000 g	0.37500 g	0.75000 g	1.50000 g	3.75000 g
170.00001 g	0.00006 g	0.08500 g	0.17000 g	0.42500 g	0.85000 g	1.70000 g	4.25000 g
200.00002 g	-0.00002 g	0.10000 g	0.20000 g	0.50000 g	1.00000 g	2.00000 g	5.00000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
29.99998 g	0.00001 g	0.01500 g	0.03000 g	0.07500 g	0.15000 g	0.30000 g	0.75000 g
49.99998 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
69.99999 g	0.00001 g	0.03500 g	0.07000 g	0.17500 g	0.35000 g	0.70000 g	1.75000 g
90.00002 g	0.00000 g	0.04500 g	0.09000 g	0.22500 g	0.45000 g	0.90000 g	2.25000 g
100.00002 g	0.00003 g	0.05000 g	0.10000 g	0.25000 g	0.50000 g	1.00000 g	2.50000 g
120.00003 g	0.00002 g	0.06000 g	0.12000 g	0.30000 g	0.60000 g	1.20000 g	3.00000 g
150.00001 g	0.00001 g	0.07500 g	0.15000 g	0.37500 g	0.75000 g	1.50000 g	3.75000 g
170.00001 g	0.00006 g	0.08500 g	0.17000 g	0.42500 g	0.85000 g	1.70000 g	4.25000 g
200.00002 g	-0.00002 g	0.10000 g	0.20000 g	0.50000 g	1.00000 g	2.00000 g	5.00000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

FOSS

Customer Service Report

Date: 17/01/2023
Customer: UAE
Instrument: KT200

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

Report No: 7824
Address: Udomsuk, Bangkok
Serial: 91790524

Hours
Start Finish
Travel To Customer
08:30 10:00 1.5hr
Labour
10:00 13:00 3hr
Travel From Customer

Application	Special	Standard
Normal	<input checked="" type="checkbox"/> Courtesy Visit	<input checked="" type="checkbox"/> Installation
Distributor	<input checked="" type="checkbox"/> PMA Onboarding	<input checked="" type="checkbox"/> Quote
Internal	<input checked="" type="checkbox"/> Warranty	<input checked="" type="checkbox"/> Repair
Digital Service	<input checked="" type="checkbox"/> Sales Support	<input checked="" type="checkbox"/> Remote
		<input checked="" type="checkbox"/> Other

PO/Quote Number: If applicable

PMA Type: Foss, changeable Contract No. If applicable

Details of Work / Test	Condition / Status
- Function Test new PM	OK
- ทำความสะอาดและเช็คการทำงานของ System Generator	OK
- ทำความสะอาด splash head → splash head 2ตัว	OK
- เปลี่ยน PM ใหม่ KT200	OK
- ใช้น้ำยา Alkal. 30 ml → 29 ml + 50ml	OK
- Function Test	OK
- ใช้งาน 0.100 Recovery = 99.8%	OK
Instrument Ready for Use	<input checked="" type="checkbox"/> OK <input type="checkbox"/> Not OK

Part No.	Batch	Description	Qty
10009	18.01.2021	Foss PM ใหม่ KT200	1

Signed FOSS: [Signature]
Name: Panchana / Savavit
Signed Customer: [Signature]
Name: [Signature]

Would you be willing to participate in a brief survey in order to tell us how we performed? Email

Splash head 2ตัว และ 1ตัวใหม่ 1ตัวเก่า 1ตัวใหม่ 1ตัวเก่า 25 ml และ 1ตัวเก่า Acetic และ Citric
ทำน้ำส้ม 5-10 นาที และทำน้ำส้มใหม่ 100-125 ml 5 นาที

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9484



Cert. No.: 23TM378
Page: 1 of 3

Certificate of Calibration

Equipment: Incubator
Manufacturer: Memmert
Model: IPP 260
Serial No.: V615.0187
ID No.: UAE.MIC.003/2559
Submitted by: United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location: Microbiology Laboratory
Received Order: 11 April 2023
Calibration Date: 12 April 2023
Ambient Temperature: (26 ± 10) °C
Relative Humidity: (50 ± 30) %
Calibrated by: Preecha Hlahib
Approved by: [Signature]
() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date: 24 April 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม



Equipment: Incubator
Condition As-Received: Used Item
Reference: 2304-0155OC-1
Cert. No.: 23TM378
Page: 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY49001451	23LM27	25 Feb 2024

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

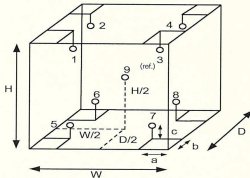
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC*: Temperature Source

Fresh air setting: Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	25	26
REL.Humid. (%)	57	61
AC Supply (Volt)	220	220



Probe Installation Details:

Dimension of Chamber:

a = 5.0 cm	D = 0.50 m
b = 5.0 cm	W = 0.64 m
c = 5.0 cm	H = 0.80 m
	Capacity = 0.26 m³

Position	Ref. Std. ID No.:
1	19RTD-2/1
2	19RTD-2/2
3	19RTD-2/3
4	19RTD-2/4
5	19RTD-2/5
6	19RTD-2/6
7	19RTD-2/7
8	19RTD-2/8
9 (ref.)	19RTD-2/9

เอกสารไม่ควบคุม



Equipment: Incubator
Condition As-Received: Used Item
Reference: 2304-0155OC-1
Cert. No.: 23TM378
Page: 3 of 3

Result of Calibration :-

(*) Without Adjustment

Function of UUC*: Temperature Source

Fresh air setting: Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.052	0.53	0.60	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
35.0	35.092	35.148	34.817	35.149	34.894	35.323	34.773	35.058	34.802	0.30

Average*: The average of 30 values in each position.

Temperature stability: One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity: The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation: The Difference of the maximum and minimum measured temperatures throughout observation.

UUC*: Unit Under Calibration

Note: The reported uncertainty of measurement was included stability and excluded uniformity.

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

-000-

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484



NAC
NAC-TS1-TS17025
CALIBRATION 0005

Cert. No.: 23TM728
Page : 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : IPP 260
Serial No. : V616.0066
ID No. : UAE.MIC.032/2559
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory (302)
Received Order : 27 April 2023
Calibration Date : 27 - 28 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Tawatchai Pama
Approved by :
() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai
Issue Date : 11 May 2023

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.

เอกสารไม่ควบคุม



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2304-0461OC-6
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 23TM728
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
25.0	25.0	25.0	0.020	0.81	1.2	2
36.0	36.0	36.0	0.15	1.1	1.6	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
25.0	25.541	25.354	25.388	25.278	24.341	24.349	24.379	24.455	24.747	0.30
36.0	35.275	35.351	35.768	35.941	36.543	36.590	36.653	36.728	36.232	0.39

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2304-0461OC-6

Cert. No.: 23TM728
Page : 2 of 3

Procedure Used :-

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	22LM93	02 Jul 2023

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

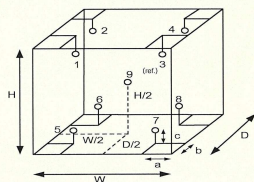
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	25	22
REL.Humid. (%)	76	83
AC Supply (Volt)	231	231



Position :	Ref. Std. ID No.:
1	22-18RTD-2/1
2	18RTD-2/2
3	18RTD-2/3
4	18RTD-2/4
5	18RTD-2/5
6	18RTD-2/6
7	18RTD-2/7
8	18RTD-2/8
9 (ref.)	18RTD-2/9

Probe Installation Details :

Dimension of Chamber :

a =	10	cm	D =	0.50	m
b =	10	cm	W =	0.64	m
c =	10	cm	H =	0.80	m
Capacity =					0.26 m ³

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484



NAC
NAC-TS1-TS17025
CALIBRATION 0005

Cert. No.: 23TM193
Page : 1 of 3

Certificate of Calibration

Equipment : Water Bath
Manufacturer : Memmert
Model : WNE 14
Serial No. : L416.0606
ID No. : UAE.MIC.002/2560
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 15 February 2023
Calibration Date : 15 February 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Suwit Imjai
Approved by :
() Pornthippa Tameyakul
(✓) Malee Butkruea
Issue Date : 24 February 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-0295OC-2
Cert. No.: 23TM193
Page : 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

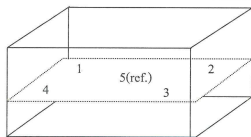
Instrument **Model** **Serial No.** **Cert. No.** **Due Date**
1) Data Acquisition 34972A MY59003411 22LM165 26 Nov 2023

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 of UUC* : Temperature Source

	Environmental (°C) (%R.H.)		AC Voltage Supply (Volt)
Beginning of Calibration	22	65	231
Finished of Calibration	23	61	231



Front

Position :	Ref. Std. ID No.:
1	4804539-001
2	4804539-002
3	4804539-003
4	4804539-004
5(ref.)	4804539-005

เอกสารไม่ครบ



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-0295OC-2
Cert. No.: 23TM193
Page : 3 of 3

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			Position				
			1	2	3	4	5 (ref.)
44.5	44.5	44.5	44.453	44.437	44.428	44.477	44.459

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
44.5	0.079	0.038	0.15	2

Average* : The average of 30 values in each position.

Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.
UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

-oOo-

เอกสารไม่ครบ



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10230
TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. No.: 23TM194
Page : 1 of 3

Certificate of Calibration

Equipment : Water Bath
Manufacturer : Memmert
Model : WNE 14
Serial No. : L416.0612
ID No. : UAE.MIC.003/2560
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 15 February 2023
Calibration Date : 15 February 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Suwit Imjai
Approved by :
() Ponthippa Tameyakul
(✓) Malee Butkruea
Issue Date : 24 February 2023

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

เอกสารไม่ครบ



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-0295OC-3
Cert. No.: 23TM194
Page : 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument **Model** **Serial No.** **Cert. No.** **Due Date**
1) Data Acquisition 34972A MY59003411 22LM165 26 Nov 2023

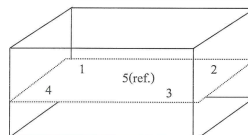
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental (°C) (%R.H.)		AC Voltage Supply (Volt)
Beginning of Calibration	22	65	231
Finished of Calibration	22	63	230



Front

Position :	Ref. Std. ID No.:
1	4804539-001
2	4804539-002
3	4804539-003
4	4804539-004
5(ref.)	4804539-005

เอกสารไม่ครบ



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-02950C-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 23TM194
Page : 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			1	2	3	4	5 (ref.)
44.5	44.5	44.6	44.520	44.509	44.498	44.552	44.530

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
44.5	0.077	0.037	0.15	2

Average* : The average of 30 values in each position.

Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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เอกสารไม่ควบคุม



มูลนิธิสถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Certificate

Certificate No.: 2302827-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udumuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 4

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR204
Serial No.: C117635043
ID No.: UAE.WAS.012/2564
Order No.: 2302827
Operation No.: 2302827-001
Date of Receipt: 10 May 2023
Date of Calibration: 10 May 2023

Calibrated by Specialist

Approved by Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 18 May 2023

The uncertainties are for a confidence probability of approximately 95%

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

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



มูลนิธิสถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Report

Certificate No.: 2302827-001-01

Equipment: Electronic Balance
Model: XSR204
Serial No.: C117635043
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g
ID No.: UAE.WAS.012/2564

Date of Calibration: 10 May 2023 Page 2 of 4

Environment Condition: Ambient Temperature: 21.4 ± 0.2 °C Relative Humidity: 43.4 ± 0.9 %

Place of Calibration: Balance room (Water Analysis Unit), UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Method:

Reference Standard Model Serial No. Calibrated By Certificate No. Due Date

Standard Weight Class E2 1mg to 200g B50567572 TCS M23040535 8 April 2024

Instrument Model Serial No. Calibrated By Certificate No. Due Date

Thermo-Hygro Meter 608-H1 NFI.BTH 016/23 Quality Reborn QR23-0489 21 February 2024

3. This certification is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

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

Calibration Results:

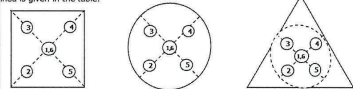
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
100	0.000032
200	0.000032

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0002	100.0002	100.0002	100.0002	100.0003	100.0002	0.0001

F-CS-012 Revision: 01 Date: 20-04-65



มูลนิธิสถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Report

Certificate No.: 2302827-001-01

Equipment: Electronic Balance
Model: XSR204
Serial No.: C117635043
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g
ID No.: UAE.WAS.012/2564

Date of Calibration: 10 May 2023 Page 3 of 4

Calibration Results: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.00000	0.0000	0.0000	0.000085	2.00
0.01	0.01000	0.0100	0.0000	0.000085	2.00
0.02	0.02001	0.0200	0.0000	0.000085	2.00
0.05	0.05000	0.0500	0.0000	0.000085	2.00
0.1	0.10001	0.1000	0.0000	0.000085	2.00
0.2	0.20001	0.2000	0.0000	0.000085	2.00
0.5	0.50002	0.5000	0.0000	0.000085	2.00
1	1.00000	1.0000	0.0000	0.000086	2.00
2	2.00002	2.0000	0.0000	0.000086	2.00
3	3.00003	3.0000	0.0000	0.000087	2.00
5	5.00002	5.0000	0.0000	0.000087	2.00
10	10.00001	10.0000	0.0000	0.000088	2.00
20	20.00003	20.0000	0.0000	0.000092	2.00
30	30.00004	30.0000	0.0000	0.000098	2.00
40	40.00007	40.0000	0.0000	0.00011	2.00
45	45.00009	45.0001	0.0000	0.00013	2.00

F-CS-012 Revision: 01 Date: 20-04-65



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nfi.com

Calibration Report

Certificate No.: 2302827-001-01

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: XSR204

Resolution: 0.0001 g

Serial No.: C117635043

ID No.: UAE.WAS.012/2564

Capacity: 220 g

Date of Calibration: 10 May 2023

Page 4 of 4

Calibration Results: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (±g)	Coverage Factor k
50	50.00003	50.0000	0.0000	0.00011	2.00
55	55.00005	55.0000	0.0000	0.00012	2.00
60	60.00004	60.0000	0.0000	0.00012	2.00
65	65.00005	65.0000	0.0000	0.00013	2.00
70	70.00006	70.0001	-0.0001	0.00013	2.00
75	75.00008	75.0002	-0.0001	0.00013	2.00
80	80.00007	80.0002	-0.0001	0.00014	2.00
85	85.00009	85.0002	-0.0001	0.00014	2.00
90	90.00010	90.0002	-0.0001	0.00015	2.00
100	100.00006	100.0002	-0.0001	0.00016	2.00
120	120.00009	120.0002	-0.0001	0.00018	2.00
150	150.00009	150.0002	-0.0001	0.00021	2.00
200	200.00016	200.0003	-0.0001	0.00028	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 %.

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

2008 Baanrak Road, 36 Baanrak Road, Bangkok 10700, Thailand
2008 Baanrak Road, 36 Baanrak Road, Bangkok 10700, Thailand
Tel: +66(0) 2422 8555 Fax: +66(0) 2422 8545



Cert. No.: 23TM763
Page : 1 of 3

Certificate of Calibration

Equipment : Autoclave

Manufacturer : ALP

Model : CL-40L

Serial No. : 808763

ID No. : UAE.MIC.026/2563

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

Location : Microbiology Laboratory (301)

Received Order : 27 April 2023

Calibration Date : 27 April 2023

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Preecha Hlaib

Approved by : 
Approved Signatory

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

Issue Date : 11 May 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

A 0053944



Equipment : Autoclave

Cert. No.: 23TM763

Condition As-Received : Used Item

Page : 2 of 3

Reference : 2304-0461OC-2

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT03 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY59003411	22LM165	26 Nov 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.

4. This result of calibration covers laboratory autoclaves for the sterilization of goods and material which

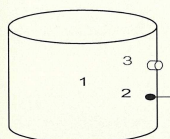
could be infected with organisms categorized as Hazard Group 1, 2 and 3**

(** = Categorization of pathogens according to hazard and categories of containment, second edition, 1990)
It does not cover autoclaves for use with material infect with organisms in Hazard Group 4, for which complete containment and sterilization of infected condensate is considered to be essential.

This result of calibration does not apply to sterilizers or disinfectors used for medical, dental, pharmaceutical or veterinary purposes which are directly concerned with patient care, or those used for fabrics subjected to sterilization which are required to be dry at the end of cycle.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source



	Environmental		
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	27	60	220
Finished of Calibration	27	58	220

Position	Description	Ref. Std. ID No.:
1 =	Center of chamber	18-20TC-04
2 =	Temperature sensor	18-20TC-05
3 =	Exhaust port	18-20TC-06

เอกสารไม่ควบคุม

a 1159968



Equipment : Autoclave

Cert. No.: 23TM763

Condition As-Received : Used Item

Page : 3 of 3

Reference : 2304-0461OC-2

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Operating parameter Set : Temperature = 115.0 °C
Sterilization period = 15 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
115.0	115.0	1	115.213	0.22	0.08	0.75	2
		2	115.166				
		3	115.260				

Operating parameter Set : Temperature = 121.0 °C
Sterilization period = 30 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
121.0	121.0	1	121.260	0.29	1.1	0.75	2
		2	121.224				
		3	121.284				

Average* : The average of 30 values in each position.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม

a 1159967

Calibration Certificate

Certificate No.: 2302181-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udumuk 41, Sukhumvit Road,
Bangchack, Prakanong, Bangkok 10260

Page 1 of 5

Equipment: pH Meter
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1230525212
ID No.: UAE.WAS.003/2553

Order No.: 2302181

Operation No.: 2302181-001

Date of Receipt: 14 March 2023

Date of Calibration: 24 March 2023

Calibrated by: [Signature]
Scientist
Approved by: [Signature]
Specialist, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 24 March 2023

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

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

FCS-009 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2302181-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 1 mV
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1230525212
Type: Bench top
ID No.: UAE.WAS.003/2553

Date of Calibration: 24 March 2023 Page 2 of 5

Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature: (23.4 ± 1.5) °C Relative Humidity: (52 ± 3) %
Condition of Equipment: Good Condition

Condition of this Results of Calibration

1. Calibration Method In house method : W-CO-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fluke	22E1959	17 June 2023
2.2 Digital Thermometer	2709007	Fluke	CC-650557-01	30 October 2023
2.3 Thermo-Hygro Meter	NFLBT-H003/17	PONPE	TE 650555-01	21 September 2023
Certified Reference Material	Lot No.	Manufacturer	Ref N	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	873608	CPAchem	PH216.L5	16 February 2025
2.5 pH buffer 6.865 (Primary pH buffer Solution)	873609	CPAchem	PH217.L5	16 February 2025
2.6 pH buffer 10.01 (Primary pH buffer Solution)	873611	CPAchem	PH220.L5	16 February 2024
2.7 pH buffer 7.00 (Standard pH buffer Solution)	873612	CPAchem	PH107.L5	16 February 2024

3. This certification is traceable to The International System of Unit (SI Unit)

- 3.1 Instruments No.2.1 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.008
- 3.2 Instruments No.2.2 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.001
- 3.3 Instruments No.2.3 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0061
- 3.4 Certified Reference Material No. 2.4 to 2.6 traceable to Primary measurement method- Harned cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
- 3.5 Certified Reference Material No.2.7 traceable to BIM RefN HI-13 LotN 25.05.2022; BIM RefN HI-16 LotN 02.06.2022; BIM RefN HI-13 LotN 25.05.2022; BIM RefN HI-16 LotN 02.06.2022, the Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

4. This certificate was certified only for the instrument we calibrated.

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

FCS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2302181-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 1 mV
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1230525212
Type: Bench top
ID No.: UAE.WAS.003/2553

Date of Calibration: 24 March 2023 Page 3 of 5

Calibration Results:

1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (±mV)	Coverage Factor (k)
		mV	pH		
0	414.120	414	0.00	0.58	2.00
2	295.614	296	2.00	0.58	2.00
4	177.464	178	4.00	0.58	2.00
6	59.160	59	6.00	0.58	2.00
7	0.000	0	7.00	0.58	2.00
8	-59.156	-59	8.00	0.58	2.00
10	-177.460	-177	10.00	0.58	2.00
12	-295.611	-296	12.00	0.58	2.00
14	-414.117	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment: pH Electrode Type: Combined Electrode
Manufacturer: METTLER TOLEDO Model: InLab Solids
Serial No.: 1156883 ID No.: N/A

Performance of Electrode system (Three-Point Calibration at pH 4, pH 7 and pH 10)

Certified Value (25 °C (pH))	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.008	4.01	187	-	0.0071	2.00
6.865	6.86	22	97.86	0.0075	2.00
10.010	10.01	-160	97.86	0.0086	2.00
6.985	6.99	14	-	0.0093	2.00

FCS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2302181-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1230525212 ID No.: UAE.WAS.003/2553
Manufacturer: METTLER TOLEDO

Date of Calibration: 24 March 2023 Page 4 of 5

Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature 25 °C ± 1 °C
Relative Humidity 55 % ± 5 %

Condition of this results of Calibration:

1. Calibration Method : - In house method: W-TE-025 by comparison with standard thermometer.
- The Calibration is determined by comparing with a known temperature from a standard resistance thermometer.
- The temperature scale in use at this laboratory is the International Temperature scale of 1990 (ITS-90).
2. Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1521	A85997	TE 660039-01	10-Dec-23	NATIONAL FOOD INSTITUTE
Platinum Resistance Thermometer (PRT)	385	509201			

Support Equipment : - Low Temperature Bath (ISOCAL-6), Model: Europa-6 Plus Basic, S/N: 341592/2

3. This certificate is traceable to International System of Units (SI Units).
4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of Calibrated Item : Good
7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

FCS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2302181-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1230525212 ID No.: UAE.WAS.003/2553
Manufacturer: METTLER TOLEDO
Date of Calibration: 24 March 2023

Page 5 of 5

Calibration point: 15.0, 25.0 and 30.0 °C

Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 120 mm.
- Description of probe, model : N/A S/N : N/A
Dimension of probe : Diameter 3 mm., Length 120 mm.,
Sheath material : N/A

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.2	14.999	- 0.2	0.12
25.2	24.999	- 0.2	0.12
30.2	29.999	- 0.2	0.12

Note

- UUC* : Unit Under Calibration

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

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

Calibration Certificate

Certificate No.: 2301846-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhonong, Bangkok 10260

Page 1 of 5

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenEasy TM S20 pH
Serial No.: 1231155210
ID No.: UAE.WAT.010/2553
Order No.: 2301846
Operation No.: 2301846-001
Date of Receipt: 17 February 2023
Date of Calibration: 24 February 2023

Calibrated by

Scientist

Approved by

Specialist, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 24 February 2023

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

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

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

Calibration Report

Certificate No.: 2301846-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 1 mV
Manufacturer: Mettler Toledo
Model: SevenEasy TM S20 pH
Serial No.: 1231155210
Type: Bench top
ID No.: UAE.WAT.010/2553
Date of Calibration: 24 February 2023

Page 2 of 5

Location: Chemical Calibration Laboratory, National Food Institute

Environment Condition: Ambient Temperature: (25.1 ± 1.5) °C Relative Humidity: (50 ± 5) %

Condition of Equipment: Good Condition

Condition of this Results of Calibration

1. Calibration Method In house method : W-CO-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fluke	22E1959	17 June 2023
2.2 Digital Thermometer	2709007	Fluke	CC 650577-01	30 October 2023
2.3 Thermo-Hygro Meter	NFI.BTH 007/18	PONPE 480	QR22-0886	26 April 2023
Certified Reference Material	Lot. No.	Manufacturer	Ref. No.	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	832606	CPAchem	PH216.L5	8 August 2024
2.5 pH buffer 6.865 (Primary pH buffer Solution)	832607	CPAchem	PH217.L5	8 August 2024
2.6 pH buffer 10.01 (Primary pH buffer Solution)	832609	CPAchem	PH220.L5	8 August 2023
2.7 pH buffer 7.00 (Standard pH buffer Solution)	832610	CPAchem	PH107.L5	8 August 2023

3. This certification is traceable to The International System of Unit (SI Unit)

- 3.1 Instruments No.2.1 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0006
- 3.2 Instruments No.2.2 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0061
- 3.3 Instruments No.2.3 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0292
- 3.4 Certified Reference Material No. 2.4 to 2.6 traceable to Primary measurement method- Hamed cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
- 3.5 Certified Reference Material No.2.7 traceable to BIM ReN Hi-27 LotN 04.06.2021; BIM ReN Hi-28 LotN 28.05.2021; BIM ReN Hi-27 LotN 04.06.2021; BIM ReN Hi-28 LotN 28.05.2021, the Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

4. This certificate was certified only for the instrument we calibrated.

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

F-CS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2301846-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 1 mV
Manufacturer: Mettler Toledo
Model: SevenEasy TM S20 pH
Serial No.: 1231155210
Type: Bench top
ID No.: UAE.WAT.010/2553
Date of Calibration: 24 February 2023

Page 3 of 5

Calibration Results:

1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (± mV)	Coverage Factor (k)
		mV	pH		
0	414.120	414	0.00	0.58	2.00
2	285.814	296	2.00	0.58	2.00
4	177.464	178	4.00	0.58	2.00
6	59.180	59	6.00	0.58	2.00
7	0.000	0	7.00	0.58	2.00
8	-59.158	-59	8.00	0.58	2.00
10	-177.460	-177	10.00	0.58	2.00
12	-295.811	-296	12.00	0.58	2.00
14	-414.117	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment: pH Electrode Type: Combined Electrode
Manufacturer: Mettler Toledo Model: InLab Solids
Serial No.: 8018311 ID No.: N/A
Performance of Electrode system (Three-Point Calibration at pH 4, pH 7 and pH 10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.008	4.01	186	-	0.0071	2.00
6.865	6.90	19	97.68	0.0075	2.00
10.008	10.01	-160	97.29	0.0095	2.00
6.985	6.99	15	-	0.0092	2.00

F-CS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2301846-001-01
Equipment: Digital Thermometer with RTD
Resolution: 0.1 °C Model: SevenEasy TM S20 pH
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553
Manufacturer: Mettler Toledo
Date of Calibration: 24 February 2023 Page 4 of 5

Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature 25 °C ± 1 °C
Relative Humidity 48 % ± 3 %

Condition of this results of Calibration:

- Calibration Method : - In house method: W-TE-025 by comparison with standard thermometer.
- The Calibration is determined by comparing with a known temperature from a standard resistance thermometer.
- The temperature scale in use at this laboratory is the International Temperature scale of 1990 (ITS-90).

2. Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1523	2118154	PSL-T 0673/65	07-Jun-23	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

Support Equipment : - Low Temperature Bath (Micro Bath), Model: 7103, S/N: A39538,AN65 A85181.

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good
- Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 01 Date: 20-04-65

2008 ๒๕๕๑ ถนนสุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร เอกสารไม่ควบคุม
2008 Soi 36, Asoke Asoke Road, Bang Yi Khan Subdistrict, Bang Phra District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545

Calibration Report

Certificate No.: 2301846-001-01
Equipment: Digital Thermometer with RTD
Resolution: 0.1 °C Model: SevenEasy TM S20 pH
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553
Manufacturer: Mettler Toledo
Date of Calibration: 24 February 2023 Page 5 of 5

Calibration point: 15.0, 25.0 and 35.0 °C
Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 120 mm.
- Description of probe, model : - S/N : -
Dimension of probe : Diameter 9 mm, Length 120 mm,
Sheath material : Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.1	15.015	- 0.1	0.11
25.0	25.014	0.0	0.11
35.1	35.016	- 0.1	0.11

Note

- UUC* : Unit Under Calibration

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

----- End -----


F-CS-012 Revision: 01 Date: 20-04-65

2008 ๒๕๕๑ ถนนสุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร เอกสารไม่ควบคุม
2008 Soi 36, Asoke Asoke Road, Bang Yi Khan Subdistrict, Bang Phra District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9484

Cert. No.: 23TM249
Page : 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : Arco
Model : UC4-1320
Serial No. : 13URC4S013201
ID No. : UAE.WAO.015/2561
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2
Received Order : 15 February 2023
Calibration Date : 15 February 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Preecha Hlahib
Approved by : 
() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date : 24 February 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

A 0051476



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2302-0297OC-1
Cert. No.: 23TM249
Page : 2 of 3

Procedure Used :-

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	22LM93	02 Jul 2023

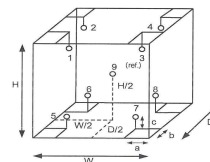
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :-

Function of UUC* : (*) Without Adjustment

Fresh air setting : Temperature Source Not Available



Probe Installation Details :

a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :

D = 0.62 m
W = 1.2 m
H = 1.2 m
Capacity = 0.89 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	29	31
REL.Humid. (%)	63	67
AC Supply (Volt)	220	220

Position :	Ref. Std. ID No.:
1	22-18RTD-2/1
2	18RTD-2/2
3	18RTD-2/3
4	18RTD-2/4
5	18RTD-2/5
6	18RTD-2/6
7	18RTD-2/7
8	18RTD-2/8
9 (ref.)	18RTD-2/9

เอกสารไม่ควบคุม

A 1410547



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2302-0297OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 23TM249
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	20.0	19.3	0.32	0.57	1.0	0.60	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.086	19.916	20.386	19.976	19.973	19.838	19.837	19.821	19.949

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-00-

เอกสารไม่ควม

a 1149512



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.: 22TM1232
Page.: 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : Arco
Model : UC4-1320
Serial No. : -
ID No. : UAE.WAO.002/2550
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2
Received Order : 15 August 2022
Calibration Date : 15 August 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Kunchit Promprat
Approved by :
Approved Signatory
() Pornthippa Tameyakul
(/) Malee Bulkruea
() Suwit Imjai

Issue Date : 16 August 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.

เอกสารไม่ควม

A 0044201



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2208-0186OC-1
Procedure Used :-

Cert. No.: 22TM1232
Page.: 2 of 3

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44035217	21LM30	23 Dec 2022

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

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

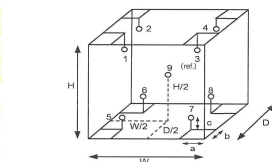
Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	61	63
AC Supply (Volt)	227	227

Position :	Ref. Std. ID No.:
1	18-10RTD-01
2	18-10RTD-02
3	18-10RTD-03
4	18-10RTD-04
5	18-10RTD-05
6	18-10RTD-06
7	18-10RTD-07
8	18-10RTD-08
9 (ref.)	18-10RTD-09



Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm
Dimension of Chamber :
D = 0.53 m
W = 1.2 m
H = 1.2 m
Capacity = 0.76 m³

เอกสารไม่ควม

a 1121247



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2208-0186OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 22TM1232
Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	19.6	19.5	0.38	0.39	1.1	0.70	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.050	20.264	19.851	19.771	19.928	20.169	19.886	19.829	20.001

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-00-

เอกสารไม่ควม

a 1121246