

รายการใบรับรองสอบเทียบทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือสำหรับวิเคราะห์คุณภาพน้ำ									
1	pH Meter	pH	Hanna Instrument	HI2020-02 / C0051107	National Food Institute, Ministry of Industry, Thailand	2203135-001-01	8 Jun 22	7 Jun 23	-
2	pH Meter		Mettler-Toledo	SevenEasy TM S20 pH / 1231155210	National Food Institute, Ministry of Industry, Thailand	2301846-001-01	24 Feb 23	23 Feb 24	-
3	BOD Incubator	Biochemical Oxygen demand (BOD)	Arco	UR-1320 / (UAE.LAB.006/2553)	Technology Promotion Association (Thailand-Japan)	23TM372	11 Apr 23	9 Apr 24	-
4	Analytical Balance (Readability 0.01 mg)	Suspended Solids Total Dissolved Solids	Mettler-Toledo	XSR205 / C009071872	Technology Promotion Association (Thailand-Japan)	23MM112	26 Apr 23	24 Apr 24	-
5	Hot Air Oven		Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	23TM373	12 Apr 23	10 Apr 24	-
6	Digester Unit	Total Kjeldahl Nitrogen (TKN)	FOSS	2520 / 91794469	National Food Institute,	2302413-001-01	31 Mar 23	29 Mar 24	-
7	Distillation Unit (Kjeldahl Method)		FOSS TECATOR	KT200 / 91790524	Foss South East Asia	Foss Customer Service Report	17 Jan 23	16 Jan 24	-
8	Analytical Balance (Repeatability 0.1 mg)	Fat, Oil And Grease	Mettler-Toledo	XSR204 / C117635043	National Food Institute, Ministry of Industry, Thailand	2302827-001-01	10 Apr 23	8 Apr 24	-
9	Incubator	Escherichia coli (E. Coli) Total Coliform Bacteria	Binder	KB400 E6 / 20200000015535	Technology Promotion Association (Thailand-Japan)	23TM726	27 Apr 23	25 Apr 24	-
10	Incubator		Memmert	IPP 260 / V615.0187	Technology Promotion Association (Thailand-Japan)	23TM378	12 Apr 23	10 Apr 24	-

รายการไปรับรองสอบเทียบทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือสำหรับวิเคราะห์คุณภาพน้ำ									
11	Incubator	Escherichia coli (E. Coli)  Total Coliform Bacteria	Binder	BD 53 E2/  13-07343	Technology Promotion Association  (Thailand-Japan)	23TM192	15 Feb 23	14 Feb 24	-
12	Incubator		Memmert	IN 75 /  D317.0307	Technology Promotion Association  (Thailand-Japan)	23TM765	27 Apr 23	25 Apr 24	-
13	Water Bath		Memmert	WNE 14 /  L416.0612	Technology Promotion Association  (Thailand-Japan)	23TM194	15 Feb 23	14 Feb 24	-
14	Water Bath		Memmert	WNE 14 /  L414.1407	Technology Promotion Association  (Thailand-Japan)	23TM374	11 Apr 23	9 Apr 24	-
15	Autoclave		ALP	CL-40L /  807298	Technology Promotion Association  (Thailand-Japan)	22TM1121	11 Jul 22	10 Jul 23	-
16	Autoclave		ALP	CL-40L /  808763	Technology Promotion Association  (Thailand-Japan)	23TM763	27 Apr 23	25 Apr 24	

Due Date of Calibration\* : Schedule the program once a year at least once a year.

Calibration Certificate

Certificate No.: 2203135-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhong, Bangkok 10260

Page 1 of 5

Equipment: pH Meter
Manufacturer: HANNA INSTRUMENTS
Model: HI2020-02
Serial No.: C0051107
ID No.: UAE.WAO.005/2557
Order No.: 2203135
Operation No.: 2203135-001
Date of Receipt: 7 June 2022
Date of Calibration: 8 June 2022

Calibrated by: [Signature]
Manager, Division of Calibration Laboratory
Date of Issue: 13 June 2022
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...

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

Calibration Report

Certificate No.: 2203135-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 0.1 mV
Manufacturer: HANNA INSTRUMENTS
Model: HI2020-02
Serial No.: C0051107
Type: Bench top
ID No.: UAE.WAO.005/2557

Page 2 of 5

Date of Calibration: 8 June 2022
Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature: ( 23.5 ± 1.5 ) °C
Condition of Equipment: Good Condition
Condition of this Results of Calibration

- 1. Calibration Method: In house method: W-CC-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)
2. Reference Standards / Certified Reference Material: Table with columns: Instruments, Serial / ID No., Manufacturer, Certificate No., Due Date
3. This certification is traceable to The International System of Unit (SI Unit): Table with columns: Certified Reference Material, Lot No., Manufacturer, Ref No., Expire Date
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.: 2203135-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 0.1 mV
Manufacturer: HANNA INSTRUMENTS
Model: HI2020-02
Serial No.: C0051107
Type: Bench top
ID No.: UAE.WAO.005/2557

Page 3 of 5

Date of Calibration: 8 June 2022
Calibration Results: 1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Table with 5 columns: Nominal pH, DC Voltage Standard (mV), Average Indicator Reading (mV), Uncertainty (±mV), Coverage Factor (k). Rows show data for pH 0, 2, 4, 6, 7, 8, 10, 12, 14.

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)
Equipment: pH Electrode
Type: Combined Electrode
Manufacturer: HANNA INSTRUMENTS
Model: HI11310
Serial No.: 078743
ID No.: N/A
Performance of Electrode system (Three-Point Calibration at pH4, pH7 and pH10)

Table with 5 columns: Certified Value (25 °C (pH)), Average Indicator Reading (pH, mV), Relative Slope (%), Uncertainty (± pH), Coverage Factor (k). Rows show data for pH 4.008, 6.865, 10.008, 6.985.

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

Calibration Report

Certificate No.: 2203135-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C
Model: HI2020-02
Serial No.: C0051107
ID No.: UAE.WAO.005/2557
Manufacturer: HANNA INSTRUMENTS

Page 4 of 5

Date of Calibration: 8 June 2022
Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature: ( 23.5 ± 1.0 ) °C
Relative Humidity: ( 53 ± 3 ) %

- Condition of this results of Calibration: 1. Calibration Method: In house method: W-TE-025 by comparison with standard thermometer.
2. Reference Standard Instrument: Table with columns: Instrument, Model, Serial No., Certificate No., Due Date, Through

Support Equipment: - Low Temperature Bath (ISOCAL-6), Model: Europa-6 Plus Basic, SIN: 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: [X] Without adjustment [ ] After adjustment

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

## Calibration Report

Certificate No.: 2203135-001-01  
Equipment: Digital Thermometer with RTD (pH Meter)  
Resolution: 0.1 °C Model: H2020-02  
Serial No.: C0051107 ID No.: UAE.WAO.005/2557  
Manufacturer: HANNA INSTRUMENTS  
Date of Calibration: 8 June 2022 Page 5 of 5

Calibration point: 15.0, 20.0 and 25.0 °C  
Calibration result:  
- The probe was immersed in liquid bath or dry bath to a minimum depth of 120 mm.  
- Description of probe, model: HI11310 S/N: 78743  
Dimension of probe: Diameter 12 mm, Length 120 mm.  
Sheath material: Glass

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.1	15.001	-0.1	0.099
20.1	20.002	-0.1	0.099
25.2	25.002	-0.2	0.099

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 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-CC-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 490	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 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

Specialist, Division of Calibration Laboratory  
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.: 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	-285.811	-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 ต.เกษตรนิคม 36 หมู่ 8 ต.เกษตรนิคม อ.เกษตรนิคม จ.เกษตรนิคม  
2008 Soi 36, Aroi Amn Road, Bang Yi Khan Subdistr., Bang Phli Distr., Bangkok 10700, Thailand  
Tel +66(0) 2422 8568 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 %.

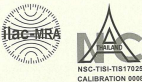
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F-CS-012 Revision: 01 Date: 20-04-65

2008 ต.เกษตรนิคม 36 หมู่ 8 ต.เกษตรนิคม อ.เกษตรนิคม จ.เกษตรนิคม  
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**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
5344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000-29 FAX. 0-2719-9484



**Cert. No.:** 23TM372  
**Page :** 1 of 3

## Certificate of Calibration

**Equipment :** BOD Incubator  
**Manufacturer :** ARCO  
**Model :** UR-1320  
**Serial No. :** -  
**ID No. :** UAE.WAO.006/2553  
**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 April 2023  
**Ambient Temperature :** ( 26 ± 10 ) °C  
**Relative Humidity :** ( 50 ± 30 ) %  
**Calibrated by :**   
**Approved by :**   
( ) 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

A 0053361



**Equipment :** BOD Incubator  
**Condition As-Received :** Used Item  
**Reference :** 2304-0156OC-3

**Cert. No.:** 23TM372  
**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

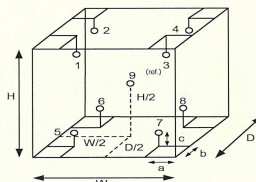
- Reference standard instrument:  

Instrument	Model	Serial No.	Cert. No.	Due Date
1 ) Data Acquisition	34972A	MY59003411	22LM165	26 Nov 2023
- This certificate is valid only to the item calibrated on date and place of calibration.
- This certification is traceable to the International System of Unit.

### Result of Calibration :-

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

Environment during calibration		
	Beginning	Finished
Temp. ( °C )	27	28
REL.Humid. ( % )	44	41
AC Supply ( Volt )	221	220



### 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 m<sup>3</sup>

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

เอกสารไม่ควบคุม

a 1158257





Equipment : BOD Incubator  
Condition As-Received : Used Item  
Reference : 2304-0156OC-3  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Not Available


Cert. No.: 23TM372  
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
20.0	20.0	19.9	0.40	0.72	0.97	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	20.236	20.278	19.949	19.981	20.313	20.369	19.887	19.828	19.755	0.59

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 %.

-o0o-

  
**เอกสารไม่ควบคุม**  
a 1151821



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.: 23MM112  
Page: 1 of 3


## Certificate of Calibration

Equipment : Electronic Balance  
Manufacturer : Mettler Toledo  
Model : XSR205  
Serial No. : C009071872  
ID No. : UAE.WAO.012/2563  
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.  
3 Soi Udomsuk 41, Sukhumvit Road, Bangkok, Phakhanong, Bangkok 10260  
Location : Balance Room  
Received order : 26 April 2023  
Calibration Date : 26 April 2023  
Ambient Temperature : 15 °C to 40 °C  
Relative Humidity : 30 % to 90 %  
Calibrated by :   
Approved by :   
( ) Pornthippa Tameyakul  
( ) Malee Butkruea  
(✓) Suwit Imjai  
Issue Date : 2 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 0077304



Equipment : Electronic Balance  
Condition As-Received : Used Item  
Reference : 2304-0459OC-1  
Procedure used :- Calibration were conducted using in-house calibration procedure CP-OB01 according to direct measurement method against standard weight.  
Condition of this result of calibration  
1. Reference standard instruments:-  
Instruments Model Serial No. ID No. Test report No. Due date  
1) Standard Weight Set (E2) 15884 24053 70RC007 MM-0010-22 20 Jan 2024  
2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This result of calibration was made on requested at the point specified by customer.  
4. This certificate is not certified for any commercial transaction.  
5. This certification is traceable to the International System of Unit.  
Result of calibration ( ) Without Adjustment ( \* ) After Adjustment by Internal Calibration  
Range capacity : 0 g to 81 g Resolution 0.00001 g  
81 g to 220 g Resolution 0.0001 g  
Before Adjustment :  
Applied Weight Balance Reading Correction Measurement Uncertainty Coverage Factor (g) (g) (g) (± mg) (k)  
80 80.00005 -0.00005 0.15 2.00  
200 199.9999 +0.0001 0.29 2.00  
After Adjustment :  
1. Determination of the standard deviation of weighing machine ( n = 10 )  
Applied Weight Standard Deviation of Reading (g)  
80 0.000007  
200 0.00000


Cert.No.: 23MM112  
Page: 2 of 3

  
**เอกสาร**  
a 1151821



Equipment : Electronic Balance  
Condition As-Received : Used Item  
Reference : 2304-0459OC-1  
Result of calibration  
2. Effect of off center loading  
A mass of 100 g was placed to various position on the pan.  
The weighing machine reading error obtained is given in the table  
Position 1 Position 2 Position 3 Position 4 Position 5  
(g) (g) (g) (g) (g)  
-0.0001 -0.0001 0.0000 -0.0001 -0.0001  
3. Departure from nominal value  
Applied Weight Balance Reading Correction Measurement Uncertainty Coverage Factor (g) (g) (g) (± mg) (k)  
Unload 0.00000 0.00000 0.014 2.13  
0.05 0.05001 -0.00001 0.015 2.09  
0.1 0.10001 -0.00001 0.015 2.09  
1 1.00001 -0.00001 0.018 2.04  
5 5.00003 -0.00003 0.026 2.00  
20 20.00006 -0.00006 0.045 2.00  
50 50.00006 -0.00006 0.080 2.00  
80 80.00004 -0.00004 0.15 2.00  
100 100.0000 0.0000 0.16 2.00  
150 150.0000 0.0000 0.29 2.00  
200 200.0000 0.0000 0.29 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 %.

Cert.No.: 23MM112  
Page: 3 of 3

  
**เอกสารไม่**  
a 4450000





TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES & 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.: 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 :** [Signature]  
**Approved by :** [Signature]  
( ) Pornthippa Tameyakul  
(✓) Malee Butkrua  
( ) Suwit Imjai

**Issue Date :** 24 April 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

A 0053359



**Equipment :** Hot Air Oven  
**Condition As-Received :** Used Item  
**Reference :** 2304-0156OC-1

**Cert. No.:** 23TM373  
**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) 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.

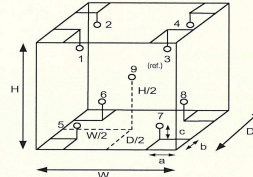
3. This certification is traceable to the International System of Unit.

**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



#### Probe Installation Details :

a = 5.0 cm  
b = 5.0 cm  
c = 5.0 cm

#### Dimension of Chamber :

D = 0.50 m  
W = 0.80 m  
H = 0.75 m  
Capacity = 0.30 m³

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

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

**Cert. No.:** 23TM373  
**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
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 ( °C )	Measured Temperature ( °C )									Uncertainty ( ± °C )
	1	2	3	4	5	6	7	8	9 (ref.)	
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 %.

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เอกสารไม่ควบคุม

a 1158260



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

## Verification Certificate

**Certificate No.:** 2302413-001-01  
**Client name:** UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.  
**Address:** 3 Soi Udomsuk 41, Sukhumvit Road,  
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 4

**Equipment:** HEATING BLOCK DIGESTION  
**Manufacturer:** FOSS  
**Model:** 2520  
**Serial No.:** 91794469  
**ID No.:** UAE.WAS.011/2560  
**Order No.:** 2302413  
**Operation No.:** 2302413-001  
**Date of Receipt:** 28 March 2023  
**Date of Calibration:** 30-31 March 2023

**Calibrated by** [Signature]

**Date of Issue:** 10 April 2023 **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

2008 ต.สาธิตบางนา 36 (ต.สาธิตบางนา) แขวงบางนา เขตบางนา กรุงเทพมหานคร 107 เอกสารไม่ควบคุม  
2008 Soi 36, Aun Amarn Road, Bang Yi Khan Subdistrict, Bang Yi Khan District, Bangkok 10700, Thailand  
Tel +66(0) 2422 8588 Fax +66(0) 2422 8545







## Calibration Certificate

Certificate No.: 2302827-001-01  
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.  
Address: 3 Soi Udomsuk 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

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

## 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 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 Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	BS05567572	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:

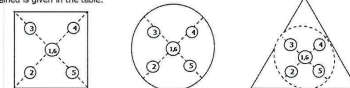
1. Repeatability of Reading:

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

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

## 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 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

## 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	0.00013	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	100.00005	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



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
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534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. No.: 23TM726  
Page : 1 of 3

## Certificate of Calibration

Equipment : Cooled Incubator  
Manufacturer : Binder  
Model : KB 400 E6  
Serial No. : 2020000015535  
ID No. : UAE.MIC.018/2564  
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.  
3 Soi Udonsuk 41, Sukhumvit Road,  
Bangchak, Phrakhanong,  
Bangkok 10260  
Location : Microbiology Laboratory (302)  
Received Order : 27 April 2023  
Calibration Date : 27 April 2023  
Ambient Temperature : (26 ± 10) °C  
Relative Humidity : (50 ± 30) %  
Calibrated by :  
Approved by :  
( ) Pornthippa Tameyakul  
(✓) Malee Butkruea  
( ) Suwit Imjai  
Issue Date : 12 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 : Cooled Incubator  
Condition As-Received : Used Item  
Reference : 2304-0461OC-1  
Procedure Used :-

Cert. No.: 23TM726  
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	34972A	MY57013711	22LM93	02 Jul 2023

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

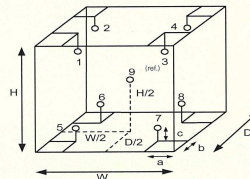
3. This certification is traceable to the International System of Unit.

Result of Calibration :- ( \* ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. ( °C )	20	19
REL.Humid. ( % )	72	82
AC Supply ( Volt )	230	231



#### Probe Installation Details :

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

#### Dimension of Chamber :

D = 0.48 m  
W = 0.65 m  
H = 1.2 m  
Capacity = 0.37 m<sup>3</sup>

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



Equipment : Cooled Incubator  
Condition As-Received : Used Item  
Reference : 2304-0461OC-1  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Close

Cert. No.: 23TM726  
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
35.0	35.0	35.0	0.0090	0.16	0.21	2

Calibration Point ( °C )	Measured Temperature ( °C )								Uncertainty ( ± °C )	
	Position									
	1	2	3	4	5	6	7	8		9 (ref.)
35.0	34.913	34.997	34.834	34.893	35.034	35.027	35.025	35.035	34.980	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 %.

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เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
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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 Udonsuk 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 :  
Approved by :  
( ) Pornthippa Tameyakul  
(✓) Malee Butkruea  
( ) Suwit Imjai

Approved by :  
Approved Signatory

Issue Date : 24 April 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 : 2304-0155OC-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.

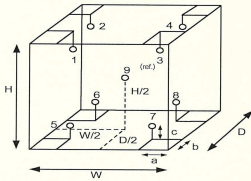
3. This certification is traceable to the International System of Unit.

**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 m <sup>3</sup>

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

เอกสารไม่



Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2304-0155OC-1  
**Result of Calibration :-** ( \* ) Without Adjustment  
**Function of UUC\* :** Temperature Source  
**Fresh air setting :** Not Available

Cert. No.: 23TM378  
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
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 %.

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เอกสารไม่



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.: 23TM192  
Page : 1 of 3

## Certificate of Calibration

**Equipment :** Incubator  
**Manufacturer :** Binder  
**Model :** BD 53 E2  
**Serial No. :** 13-07343  
**ID No. :** UAE.MIC.005/2558  
**Submitted by :** United Adomus 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 :**   
**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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Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2302-0295OC-1

Cert. No.: 23TM192  
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	MY59003411	22LM165	26 Nov 2023

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

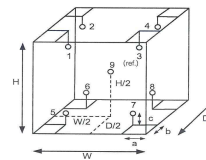
3. This certification is traceable to the International System of Unit.

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

**Function of UUC\* :** Temperature Source

**Fresh air setting :** Close

Environment during calibration		
	Beginning	Finished
Temp. ( °C )	22	23
REL.Humid. ( % )	65	61
AC Supply ( Volt )	231	231



#### Probe Installation Details :

#### Dimension of Chamber :

a = 5.0 cm	D = 0.33 m
b = 5.0 cm	W = 0.40 m
c = 5.0 cm	H = 0.40 m
	Capacity = 0.053 m <sup>3</sup>

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

เอกสารไม่ควบคุม



Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2302-02950C-1  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Close

Cert. No.: 23TM192  
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 <i>k</i>
35.0	35.4	35.4	0.037	0.56	0.86	0.30	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
35.0	35.256	35.308	35.116	35.453	34.700	34.798	34.718	34.657	34.938

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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เอกสารไม่



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Cert. No.: 23TM765  
Page : 1 of 3

## Certificate of Calibration

Equipment : Incubator  
Manufacturer : Memmert  
Model : IN 75  
Serial No. : D317.0307  
ID No. : UAE.MIC.023/2561  
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 April 2023  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %

Calibrated by :  
Approved by :  
( ) Pornthippa Tameyakul  
( / ) Malee Butkrua  
( ) Suwit Imjai

Issue Date : 11 May 2023

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม



Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2304-04610C-5  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Close

Cert. No.: 23TM765  
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
37.0	37.0	37.0	0.070	0.28	0.39	2

Calibration Point ( °C )	Measured Temperature ( °C )									Uncertainty  ( ± °C )
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
37.0	37.164	37.118	37.079	37.121	36.852	37.039	36.822	36.923	36.905	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 %.

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เอกสารไม่



Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2304-04610C-5

Cert. No.: 23TM765  
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.

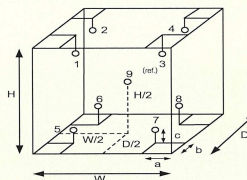
### Condition of this result of calibration

- Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1 ) Data Acquisition	34972A	MY59003411	22LM165	26 Nov 2023
- This certificate is valid only to the item calibrated on date and place of calibration.
- 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 )	23	22
REL Humid. ( % )	69	73
AC Supply ( Volt )	220	221



Probe Installation Details :  
a = 5.0 cm  
b = 5.0 cm  
c = 5.0 cm  
Dimension of Chamber :  
D = 0.32 m  
W = 0.42 m  
H = 0.56 m  
Capacity = 0.075 m<sup>3</sup>

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

เอกสารไม่






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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 :**   
**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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**Equipment :** Water Bath  
**Condition As-Received :** Used Item  
**Reference :** 2302-0295OC-3  
**Procedure Used :-**

Cert. No.: 23TM194  
Page : 2 of 3

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:-

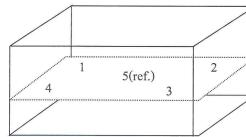
Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY59003411	22LM165	26 Nov 2023

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		AC Voltage Supply
	( °C )	( %R.H. )	( 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

เอกสารไม่ควบคุม



**Equipment :** Water Bath  
**Condition As-Received :** Used Item  
**Reference :** 2302-0295OC-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 )				
			Position				
			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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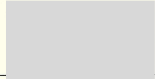
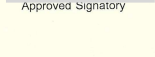


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Cert. No.: 23TM374  
Page : 1 of 3

## Certificate of Calibration

**Equipment :** Water Bath  
**Manufacturer :** Memmert  
**Model :** WNE 14  
**Serial No. :** L414.1407  
**ID No. :** UAE.MIC.006/2558  
**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 :** 11 April 2023  
**Ambient Temperature :** (26 ± 10) °C  
**Relative Humidity :** (50 ± 30) %  
**Calibrated by :**   
**Approved by :**   
( ) Ponthippa 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 : Water Bath  
Condition As-Received : Used Item  
Reference : 2304-0155OC-3  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source

Cert. No.: 23TM374  
Page : 3 of 3

Calibration point ( °C )	UUC* Setting ( °C )	UUC* Reading ( °C )	Average* Standard Reading ( °C )					Uncertainty ( ± °C )
			1	2	3	4	5 (ref.)	
44.5	44.5	44.5	44.508	44.466	44.456	44.478	44.483	0.15

Calibration point ( °C )	Uniformity ( °C )	Stability ( ± °C )	Coverage Factor k
44.5	0.065	0.031	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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เอกสารไม่

๑ 1158268



Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2304-0155OC-3

Cert. No.: 23TM374  
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.

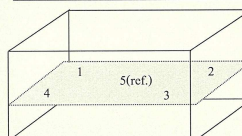
3. This certification is traceable to the International System of Unit.

Result of Calibration :- ( \* ) Without Adjustment

Function of UUC\* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	( °C )	( %R.H. )	( Volt )
Beginning of Calibration	26	55	220
Finished of Calibration	25	56	221



Front

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

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๑ 1158268



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Cert. No.: 22TM1121  
Page: 1 of 3

## Certificate of Calibration

Equipment : Autoclave  
Manufacturer : ALP  
Model : CL-40L  
Serial No. : 807298  
ID No. : UAE.MIC.019/2560  
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.  
3 Soi Udomsuk 41, Sukhumvit Road,  
Bangchak, Phrakhanong,  
Bangkok 10260  
Location : 301 Room  
Received Order : 11 July 2022  
Calibration Date : 11 July 2022  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %

Calibrated by :

Approved by :

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

Issue Date : 18 July 2022

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Autoclave  
Condition As-Received : Used Item  
Reference : 2207-0245OC-7

Cert. No.: 22TM1121  
Page: 2 of 3

#### 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	34970A	MY44060450	22LM46	28 Mar 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.

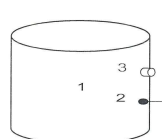
4. This result of calibration covers laboratory autoclaves for the sterilization of goods and material which could be infected with organisms categorized as Hazard Group 1, 2 and 3\*\*

(\*\* = 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	29	49	220
Finished of Calibration	32	48	220

Position	Description	Ref. Std. ID No.:
1 =	Center of chamber	22-14TC-01
2 =	Temperature sensor	22-14TC-02
3 =	Exhaust port	22-14TC-03

เอกสารไม่





**Equipment :** Autoclave

**Condition As-Received :** Used Item

**Reference :** 2207-0245OC-7

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

**Cert. No.:** 22TM1121

**Page:** 3 of 3

**Operating parameter Set :** Temperature = 115 °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
116	116	1	116.523	0.14	0.08	0.90	2
		2	116.566				
		3	116.440				


**Operating parameter Set :** Temperature = 121 °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
122	122	1	122.503	0.19	0.12	0.91	2
		2	122.637				
		3	122.558				

**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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**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 Udumsuk 41, Sukhumvit Road, Bangchak, Phrahanong, 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 :**   
**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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A 0053944



**Equipment :** Autoclave

**Condition As-Received :** Used Item

**Reference :** 2304-0461OC-2

**Cert. No.:** 23TM763

**Page :** 2 of 3

**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.

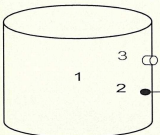
**Condition of this result of calibration**

- Reference standard instrument:-

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

- This certificate is valid only to the item calibrated on date and place of calibration.
- This certification is traceable to the International System of Unit.
- 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





**Equipment :** Autoclave

**Condition As-Received :** Used Item

**Reference :** 2304-0461OC-2

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

**Function of UUC\* :** Temperature Source

**Cert. No.:** 23TM763

**Page :** 3 of 3

**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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