

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Water									
1	pH Meter	pH	Horiba	LAQUA-PH210 HA1F0002	Technology Promotion Association (Thailand-Japan)	21CH1607	19 Nov 21	18 Nov 22	-

## List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
เครื่องมือสำหรับวิเคราะห์คุณภาพน้ำ									
1	pH Meter	pH Temperature	Hanna Instrument	HI2211 / 8165345	National Food Institute, Ministry of Industry, Thailand	2202097-001-01	16 Mar 22	15 Mar 23	-
2	pH Meter		Mettler-Toledo	Seven Easy S20 / 1231155210	National Food Institute, Ministry of Industry, Thailand	2201793-001-01	1 Mar 22	28 Feb 23	-
3	Analytical Balance (Repeatability 0.01 mg)	Suspended Solid (SS)	Mettler-Toledo	XSR205DU / C009071872	Technology Promotion Association (Thailand-Japan)	22MM210	26 Apr 22	25 Apr 23	-
4	Hot Air Oven		Mettler-Toledo	XSR205DU / C210685394	Mettler-Toledo (Thailand) Ltd.	TH2058-043-050622-ACC-TH	9 May 22	8 May 23	-
5	Analytical Balance (Readability 0.1 mg)	Oil & Grease	Mettler-Toledo	AB-204S/FACT / 1129361010	National Food Institute, Ministry of Industry, Thailand	2203120-001-01	1 Jun 22	31 May 23	-
6	BOD Incubator	BOD	Arco	UC4-1320 / (UAE.WAO.015/2561)	Technology Promotion Association (Thailand-Japan)	22TM90	17 Feb 22	16 Feb 23	-
7	BOD Incubator		Arco	UR-1320 / (UAE.WAO.018/2551)	Technology Promotion Association (Thailand-Japan)	22TM305	7 Apr 22	6 Apr 23	-
8	BOD Incubator		Arco	UR-1320 / (UAE.WAO.006/2553)	Technology Promotion Association (Thailand-Japan)	22TM306	7 Apr 22	6 Apr 23	-
9	Incubator	Total Coliform Bacteria	Binder	KB400 / 20200000015535	Technology Promotion Association (Thailand-Japan)	22TM347	27 May 22	26 May 23	-
10	Incubator		Memmert	IPP 260 / V616.0066	Technology Promotion Association (Thailand-Japan)	22TM672	5 May 22	4 May 23	
11	Water Bath		Memmert	WNE 14 / L416.0606	Technology Promotion Association (Thailand-Japan)	22TM333	17 Feb 22	16 Feb 23	-

## List of Instruments Certification for Water Quality Analysis

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เครื่องมือสำหรับวิเคราะห์คุณภาพน้ำ									
12	Water Bath	Total Coliform Bacteria	Memmert	WNE 14 / L416.0612	Technology Promotion Association (Thailand-Japan)	22TM334	17 Feb 22	16 Feb 23	-
13	Analytical Balance		Mettler-Toledo	MS603S / B0070110311	Mettler-Toledo (Thailand) Ltd.	TH2058-096-040722-ACC-TH	7 Apr 22	6 Apr 23	-
14	Auto Clave		ALP	CL-40L / 802664	Technology Promotion Association (Thailand-Japan)	22TM89	17 Feb 22	16 Feb 23	-
15	Digestor Unit	TKN	FOSS TECATOR	2520auto / 91794469	National Food Institute, Ministry of Industry, Thailand	2202361-001-01	4 Apr 22	3 Apr 23	-
16	Distillation Unit (Kjeldahl Method)		FOSS TECATOR	KT200 / 91790524	FOSS South East Asia	5874	30 Nov 21	29 Nov 22	-



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.: 21CH1607

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## Certificate of Calibration

**Equipment :** pH Meter  
**Manufacturer :** Horiba  
**Model :** LAQUA-PH210  
**Serial No. :** HA1F0002  
**ID No. :** UAE.EFM.200/2564(EFM.pH.08/64)  
**Condition As-Received:** Used Item  
**Received Date :** 18 November 2021  
**Calibration Date :** 19 November 2021  
**Reference :** 2111-0736WSC-1  
**Submitted by :** United Analyst and Engineering Consultant Co.,Ltd.  
3 Soi Udomsuk 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 Lernagtrakul

**Approved by :**

Approved Signatory

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

**Issue Date :** 25 November 2021

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.

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Cert.No.: 21CH1607

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**Condition of this calibration result**

1. Reference Standard Instrument : -

<u>Instrument</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1) Document Process Calibrator	54030049	130RC116	21E2682	25 Aug 2022
2) Ref. Standard Thermometer	4982054	110RC044	21I1201	26 Oct 2022

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

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

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

<u>Buffer Solution</u>	<u>Manufacturer</u>	<u>Lot No.</u>	<u>Exp. date</u>
pH 4.008	CPA chem	761016	02 Aug 2023
pH 6.982	CPA chem	761017	02 Aug 2022
pH 10.015	CPA chem	761018	02 Aug 2022

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 <i>k</i>
	pH	mV	mV	pH		
pH Meter S/N.: HA1F0002	4.00	177.48	177.4	4.01	0.058	2.00
	7.00	0.00	-0.2	7.02	0.058	2.00
	7.00	0.00	-0.2	7.02	0.058	2.00
	10.00	-177.48	-177.6	10.01	0.058	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 ( $\pm$ )	Coverage factor $k$
pH Electrode S/N.: 991E0471	4.008	4.01	172	0.0071	2.00
	6.982	6.98	-4	0.011	2.00
	6.982	6.98	-4	0.011	2.00
	10.015	10.01	-181	0.011	2.05

**Function : Temperature Measurement****( \* ) Without adjustment**

This equipment was connected with Temperature Probe;

- Model : 9652

- Serial No. : 991E0471

Dimension of probe;

- Length : 103 mm.

- Diameter : 16 mm.

- Immersion Depth : 90 mm.

Calibration Point ( $^{\circ}\text{C}$ )	Standard Temperature ( $^{\circ}\text{C}$ )	UUC* Reading ( $^{\circ}\text{C}$ )	Error ( $^{\circ}\text{C}$ )	Uncertainty of measurement ( $\pm$ $^{\circ}\text{C}$ )	Coverage factor $k$
25.0	25.002	25.0	-0.002	0.13	2.00
30.0	30.004	30.0	-0.004	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 %.

-o0o-



## Calibration Certificate

**Certificate No.:** 2202097-001-01  
**Client name:** UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.  
**Address:** 3 Soi Udomsuk 41, Sukhumvit Road,  
Bangchack, Prakhnong, Bangkok 10260

Page 1 of 5

**Equipment:** pH Meter  
**Manufacturer:** HANNA INSTRUMENTS  
**Model:** HI 2211  
**Serial No.:** 08165345  
**ID No.:** UAE.WAT.004/2556  
**Order No.:** 2202097  
**Operation No.:** 2202097-001  
**Date of Receipt:** 11 March 2022  
**Date of Calibration:** 16 March 2022

**Calibrated by** Mr.Manas Somsak  
Specialist

**Approved by**

Manager, Division of Calibration Laboratory

**Date of Issue:** 21 March 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 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.

## Calibration Report

**Certificate No.:** 2202097-001-01

**Equipment:** pH Meter **Resolution:** 0.01 pH ; 0.1/1 mV  
**Manufacturer:** HANNA INSTRUMENTS **Model:** HI 2211  
**Serial No.:** 08165345 **Type:** Bench top  
**ID No.:** UAE.WAT.004/2556

**Date of Calibration:** 16 March 2022

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**Location:** Chemical Calibration Laboratory, National Food Institute.

**Environment Condition:** **Ambient Temperature:** ( 23.0 ± 1.5 ) °C **Relative Humidity:** ( 49.5 ± 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	SCL-21F-0687	24 June 2022
2.2 Digital Thermometer	2709007	Fluke	CC-640599-01	30 October 2022
2.3 Thermo-Hygro Meter	สถ.พล. BTH 005/58	PONPE	QR21-2787	15 November 2022

Certified Reference Material	Lot. No.	Manufacturer	Ref N	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	780012	CPAchem	PH216.L5	21 November 2023
2.5 pH buffer 6.865 (Primary pH buffer Solution)	780013	CPAchem	PH217.L5	21 November 2023
2.6 pH buffer 10.01 (Primary pH buffer Solution)	780015	CPAchem	PH220.L5	21 November 2022
2.7 pH buffer 7.00 (Standard pH buffer Solution)	776840	CPAchem	PH107.L5	8 November 2022

### 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.0075
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- 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-7 LotN 30.04.2020; BIM RefN HI-9 LotN 28.05.2020; BIM RefN HI-8 LotN 30.04.2020; BIM RefN HI-10 LotN 28.05.2020. 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.



## Calibration Report

Certificate No.: 2202097-001-01

Equipment: pH Meter Resolution: 0.01 pH ; 0.1/1 mV  
Manufacturer: HANNA INSTRUMENTS Model: HI 2211  
Serial No.: 08165345 Type: Bench top  
ID No.: UAE.WAT.004/2556

Date of Calibration: 16 March 2022

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### 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	414.117	414	0.00	0.58	2.00
2	295.811	295.7	2.00	0.063	2.00
4	177.462	177.4	4.00	0.063	2.00
6	59.159	59.2	6.00	0.063	2.00
7	-0.001	0.1	7.00	0.063	2.00
8	-59.159	-59.1	8.00	0.063	2.00
10	-177.463	-177.3	10.00	0.063	2.00
12	-295.812	-295.6	12.00	0.063	2.00
14	-414.119	-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: LE420  
Serial No.: 1142602 ID.No. N/A

#### Performance of Electrode system (Three-Point Calibration at pH4, pH7 and pH10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty ( ± pH )	Coverage Factor ( k )
	pH	mV			
4.008	4.01	180.5	99.3	0.0071	2.00
6.866	6.87	12.5	-	0.0074	2.00
10.015	10.01	-171.5	99.1	0.0090	2.00
6.983	6.98	5.2	-	0.0092	2.00

## Calibration Report

**Certificate No.:** 2202097-001-01

**Equipment:** Digital Thermometer with RTD (pH Meter)

Resolution: 0.1 °C Model: HI 2211

Serial No.: 08165345 ID No.: UAE.WAT.004/2556

Manufacturer: HANNA INSTRUMENTS

**Date of Calibration:** 16 March 2022

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**Location:** Chemical Calibration Laboratory, National Food Institute.

**Environment Condition:**

Ambient Temperature ( 23.0 ± 1.0 ) °C

Relative Humidity ( 50 ± 4 ) %

### 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	1523	2118154	PSL-T 0851/64	24-Jun-22	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

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

## Calibration Report

**Certificate No.:** 2202097-001-01

**Equipment:** Digital Thermometer with RTD (pH Meter)

Resolution: 0.1 °C Model: HI 2211

Serial No.: 08165345 ID No.: UAE.WAT.004/2556

Manufacturer: HANNA INSTRUMENTS

**Date of Calibration:** 16 March 2022

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**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 100 mm.

- Description of probe, model : N/A S/N : N/A

Dimension of probe : Diameter 3.5 mm., Length 100 mm.,

Sheath material : Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.0	15.001	0.0	0.099
25.0	25.002	0.0	0.099
35.0	35.002	0.0	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 -----


## Calibration Certificate

**Certificate No.:** 2201793-001-01  
**Client name:** UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.  
**Address:** 3 Soi Udomsuk 41, Sukhumvit Road,  
Bangchack, Prakhnong, Bangkok 10260

Page 1 of 5

**Equipment:** pH Meter  
**Manufacturer:** METTLER TOLEDO  
**Model:** SevenEasy pH  
**Serial No.:** 1231155210  
**ID No.:** UAE.WAT.010/2553  
**Order No.:** 2201793  
**Operation No.:** 2201793-001  
**Date of Receipt:** 21 February 2022  
**Date of Calibration:** 1 March 2022

**Calibrated by** Mr.Pheraphat Tuanjit  
Scientist

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

**Date of Issue:** 1 March 2022

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.



## Calibration Report

**Certificate No.:** 2201793-001-01

**Equipment:** pH Meter **Resolution:** 0.01 pH ; 1 mV  
**Manufacturer:** METTLER TOLEDO **Model:** SevenEasy pH  
**Serial No.:** 1231155210 **Type:** Bench top  
**ID No.:** UAE.WAT.010/2553

**Date of Calibration:** 1 March 2022

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**Location:** Chemical Calibration Laboratory, NATIONAL FOOD INSTITUTE

**Environment Condition:** **Ambient Temperature:** ( 23.5 ± 1.5 ) °C **Relative Humidity:** ( 53 ± 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

<u>Instruments</u>	<u>Serial / ID No.</u>	<u>Manufacturer</u>	<u>Certificate No.</u>	<u>Due Date</u>
2.1 DC Voltage Calibrator	2709007	Fluke	SCL-21F-0687	24 June 2022
2.2 Digital Thermometer	2709007	Fluke	CC-640599-01	30 October 2022
2.3 Thermo-Hygro Meter	NFI.BTH004/18	PONPE	QR22-0195	27 January 2023

<u>Certified Reference Material</u>	<u>Lot. No.</u>	<u>Manufacturer</u>	<u>Ref N</u>	<u>Expire Date</u>
2.4 pH buffer 4.008 (Primary pH buffer Solution)	741339	CPAchem	PH216.L5	19 April 2023
2.5 pH buffer 6.865 (Primary pH buffer Solution)	741340	CPAchem	PH217.L5	19 April 2023
2.6 pH buffer 10.01 (Primary pH buffer Solution)	741342	CPAchem	PH220.L5	19 April 2022
2.7 pH buffer 7.00 (Standard pH buffer Solution)	735836	CPAchem	PH107.L5	16 March 2022

### 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.0075
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- 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-7 LotN 30.04.2020; BIM RefN HI-9 LotN 28.05.2020; BIM RefN HI-8 LotN 30.04.2020; BIM RefN HI-10 LotN 28.05.2020. 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.

## Calibration Report

Certificate No.: 2201793-001-01

Equipment:

pH Meter

Resolution: 0.01 pH ; 1 mV

Manufacturer: METTLER TOLEDO

Model: SevenEasy pH

Serial No.: 1231155210

Type: Bench top

ID No.: UAE.WAT.010/2553

Date of Calibration: 1 March 2022

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### 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		
0.00	414.117	414	0.00	0.58	2.00
2.00	295.811	296	2.00	0.58	2.00
4.00	177.462	178	4.00	0.58	2.00
6.00	59.159	59	6.00	0.58	2.00
7.00	-0.001	0	7.00	0.58	2.00
8.00	-59.159	-59	8.00	0.58	2.00
10.00	-177.463	-177	10.00	0.58	2.00
12.00	-295.812	-296	12.00	0.58	2.00
14.00	-414.119	-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: InLabSolids

Serial No.: 1156882

ID.No. N/A

#### Performance of Electrode system

(Three-Point Calibration at pH4, pH7 and pH10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty ( ± pH )	Coverage Factor ( k )
	pH	mV			
4.008	4.00	180	96.25	0.0076	2.00
6.866	6.88	16	-	0.0079	2.00
10.012	10.01	-162	96.13	0.0094	2.00
6.985	7.00	9	-	0.0097	2.00



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## Calibration Report

**Certificate No.:** 2201793-001-01

**Equipment:** Digital Thermometer with RTD (pH Meter)

Resolution: 0.1 °C Model: SevenEasy pH  
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553  
Manufacturer: METTLER TOLEDO

**Date of Calibration:** 1 March 2022

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**Location:** Chemical Calibration Laboratory, NATIONAL FOOD INSTITUTE

**Environment Condition:**  
Ambient Temperature 24 °C ± 1 °C  
Relative Humidity 53 % ± 2 %

### 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	1523	2118154	PSL-T 0851/64	03-Jun-22	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

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

## Calibration Report

**Certificate No.:** 2201793-001-01

**Equipment:** Digital Thermometer with RTD (pH Meter)

Resolution: 0.1 °C Model: SevenEasy pH  
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553  
Manufacturer: METTLER TOLEDO

**Date of Calibration:** 1 March 2022

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**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 100 mm.
- Description of probe, model : N/A S/N : N/A
- Dimension of probe : Diameter 4 mm., Length 100 mm.,
- Sheath material : Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.1	15.006	-0.1	0.099
25.1	25.004	-0.1	0.099
35.1	35.003	-0.1	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 -----






TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
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## 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, Bangchak, Phakhanong, Bangkok 10260
Location :	Balance Room
Received order :	26 April 2022
Calibration Date :	26 April 2022
Ambient Temperature :	15 °C to 40 °C
Relative Humidity :	30 % to 90 %
Calibrated by :	Kunchit Promprat
Approved by :	<div style="text-align: center;"> Approved Signatory</div>
<input type="checkbox"/> Pornthippa Tameyakul <input checked="" type="checkbox"/> Malee Butkruea <input type="checkbox"/> Suwit Imjai	
Issue Date :	29 April 2022

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 : Electronic Balance  
Condition As-Received : Used Item  
Reference : 2204-0542OC-1

Cert.No.: 22MM210  
Page: 2 of 3

**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:-**

<u>Instruments</u>	<u>Model</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Test report No.</u>	<u>Due date</u>
1) Standard Weight Set (E2)	15884	-	70RC138	MM-0009-21	3 Feb 2023

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

<b>Range capacity :</b>	0 g to 81 g	<b>Resolution</b>	0.00001 g
	81 g to 220 g	<b>Resolution</b>	0.0001 g

**Before Adjustment :**

<u>Applied Weight</u>	<u>Balance Reading</u>	<u>Correction</u>	<u>Measurement Uncertainty</u>	<u>Coverage Factor</u>
( g )	( g )	( g )	( $\pm$ mg )	( k )
80	80.00004	-0.00004	0.15	2.00
200	199.9999	+0.0001	0.35	2.00

**After Adjustment :**

**1. Determination of the standard deviation of weighing machine** ( n = 10 )

<u>Applied Weight</u>	<u>Standard Deviation of Reading ( g )</u>
( g )	
80	0.000008
200	0.00005



Equipment : Electronic Balance  
Condition As-Received : Used Item  
Reference : 2204-0542OC-1

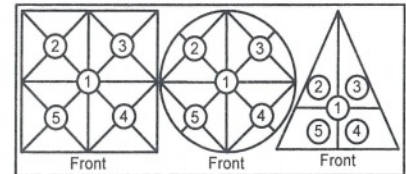
Cert.No.: 22MM210

Page: 3 of 3

### 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



Maximum difference between  
off-center and central loading  
( g )  
0.0002

Position 1 ( g )	Position 2 ( g )	Position 3 ( g )	Position 4 ( g )	Position 5 ( g )
-0.0002	-0.0001	0.0000	-0.0002	-0.0002

#### 3. Departure from nominal value

Applied Weight ( g )	Balance Reading ( g )	Correction ( g )	Measurement Uncertainty ( ± mg )	Coverage Factor ( k )
Unload	0.00000	0.00000	0.016	2.13
0.05	0.05001	-0.00001	0.016	2.13
0.1	0.10001	-0.00001	0.017	2.11
1	1.00002	-0.00002	0.019	2.05
5	5.00003	-0.00003	0.026	2.00
20	20.00008	-0.00008	0.049	2.00
50	50.00010	-0.00010	0.080	2.00
80	80.00014	-0.00014	0.15	2.00
100	100.0001	-0.0001	0.21	2.00
150	150.0001	-0.0001	0.29	2.00
200	200.0001	-0.0001	0.35	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 %.

-o0o-



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:   
\* 0 3 7 0 1 9 2 7 6 6 \*

### Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument  
Model: XSR205DU Asset Number: UAE.WAO.010/2565  
Serial No.: C210685394 Terminal Model: SRAT  
Building: N/A Terminal Serial No.: C210685394  
Floor: 2 Terminal Asset No.: N/A  
Room: Balance Room

Range	Max. Capacity	Readability (d)
1	81 g	0.00001 g
2	220 g	0.0001 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: 22.4 °C End: 22.4 °C	Start: 47.5 % End: 46.2 %

As Found Calibration Date: 06-May-2022 Calibrator:   
As Left Calibration Date: N/A  
Issue Date: 09-May-2022  
Approved Signatory:   
Technical Manager / Head of Calibration Center



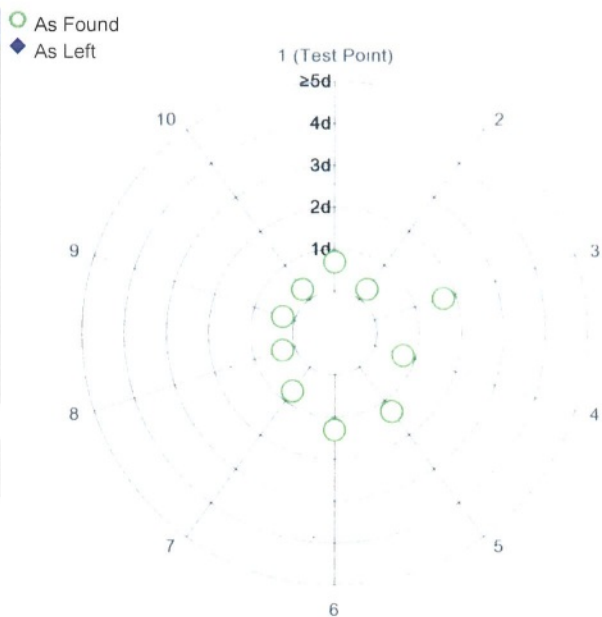
## Measurement Results

### Repeatability

Test Load: 70 g

	As Found	As Left
1	70.00005 g	N/A
2	70.00006 g	N/A
3	70.00004 g	N/A
4	70.00005 g	N/A
5	70.00007 g	N/A
6	70.00007 g	N/A
7	70.00005 g	N/A
8	70.00006 g	N/A
9	70.00006 g	N/A
10	70.00006 g	N/A

Standard Deviation	0.000009 g	N/A
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The "d" in the graph represents the readability of the range/interval in which the test was performed.

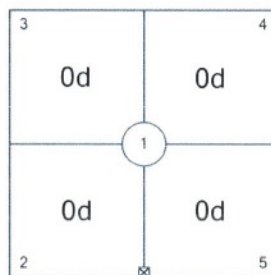
The results of this graph are based upon the absolute values of the differences from the mean value.

### Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	100.0000 g	N/A
4	100.0000 g	N/A
5	100.0000 g	N/A

Maximum Deviation	0.0000 g	N/A
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As Found

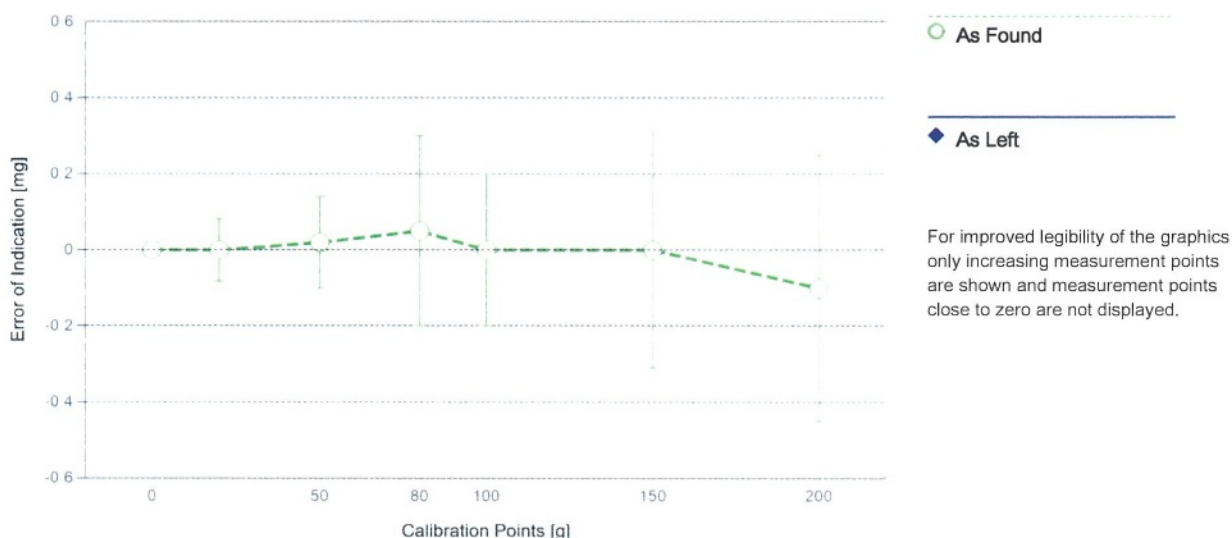
The "d" in the graph represents the readability of the range/interval in which the test was performed.

## Error of Indication

### As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.020 mg	2
2	0.05000 g	0.05001 g	0.00001 g	0.023 mg	2
3	0.10001 g	0.10001 g	0.00000 g	0.025 mg	2
4	1.00000 g	1.00001 g	0.00001 g	0.034 mg	2
5	5.00001 g	5.00001 g	0.00000 g	0.049 mg	2
6	20.00002 g	20.00002 g	0.00000 g	0.082 mg	2
7 *	50.00000 g	50.00002 g	0.00002 g	0.12 mg	2
8	80.00004 g	80.00009 g	0.00005 g	0.25 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.20 mg	2
10 *	150.0000 g	150.0000 g	0.0000 g	0.31 mg	2
11	200.0000 g	199.9999 g	-0.0001 g	0.35 mg	2

\*The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capabilities) value because the calculated uncertainty was smaller than the CMC value.



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.

## 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.:	WS54	Date of Issue:	17-Nov-2020
Certificate Number:	170240	Calibration Due Date:	15-May-2022

### Thermo Hygrometer

Equipment No.:	IN161	Date of Issue:	14-Jun-2021
Certificate Number:	21H1220	Calibration Due Date:	01-Jun-2022

---

**Remarks**

---

FACT adjustment functionality activated  
Equipment condition: Good  
Calibration after installation  
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.

## Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with  $k=2$  in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value  $R$  represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use:  $1.5 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

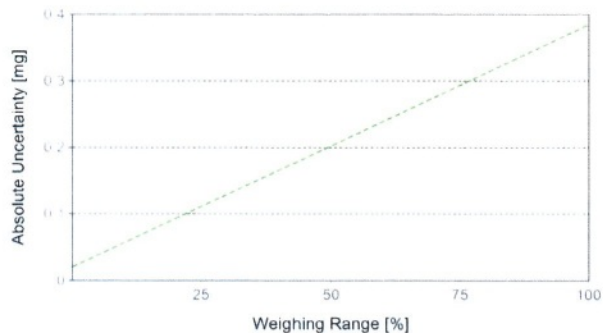
### Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.00001 g	81 g	$U_1 = 0.021 \text{ mg} + 0.00450 \text{ mg/g} \cdot R$	N/A
2	0.0001 g	220 g	$U_2 = 0.06 \text{ mg} + 0.00448 \text{ mg/g} \cdot R$	N/A

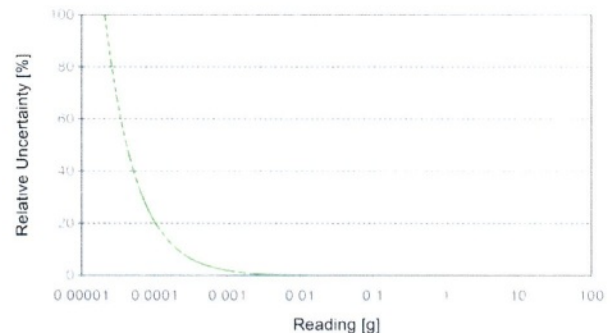
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

### Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.00220 g	0.021 mg	0.95%	N/A	N/A
0.02200 g	0.021 mg	0.096%	N/A	N/A
0.22000 g	0.022 mg	0.0100%	N/A	N/A
2.20000 g	0.031 mg	0.0014%	N/A	N/A
220.0000 g	1.0 mg	0.00048%	N/A	N/A



As Found



As Left

The weighing range shown in the absolute uncertainty graph refers to the first interval/range of the device.



# 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.

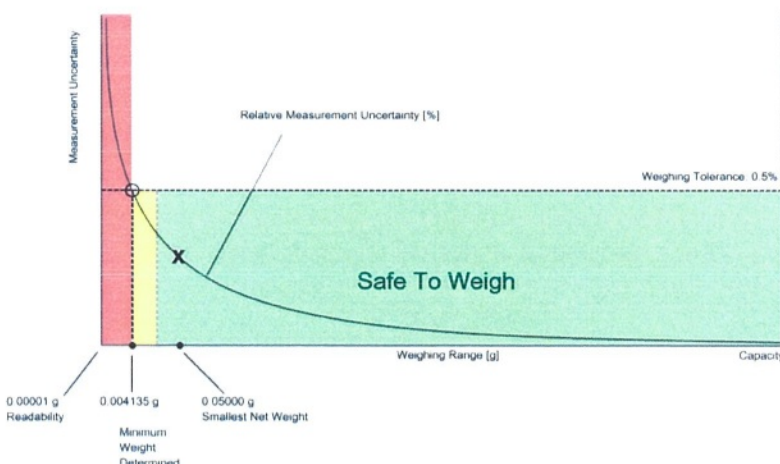
## Process Requirements

Weighing Tolerance: 0.5%

Smallest Net Weight: 0.05000 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

#### Range 1

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.020749 g	0.041687 g	0.062816 g	0.105659 g	0.216300 g
0.2%	0.010351 g	0.020749 g	0.031195 g	0.052228 g	0.105659 g
0.5%	0.004135 g	0.008277 g	0.012427 g	0.020749 g	0.041687 g
1%	0.002067 g	0.004135 g	0.006205 g	0.010351 g	0.020749 g
2%	0.001033 g	0.002067 g	0.003100 g	0.005170 g	0.010351 g
5%	0.000413 g	0.000826 g	0.001240 g	0.002067 g	0.004135 g

The minimum weight table applies to the fine range of the weighing device.



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

### As Left Minimum Weight Table

#### Range 1

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.020749 g	0.041687 g	0.062816 g	0.105659 g	0.216300 g
0.2%	0.010351 g	0.020749 g	0.031195 g	0.052228 g	0.105659 g
0.5%	0.004135 g	0.008277 g	0.012427 g	0.020749 g	0.041687 g
1%	0.002067 g	0.004135 g	0.006205 g	0.010351 g	0.020749 g
2%	0.001033 g	0.002067 g	0.003100 g	0.005170 g	0.010351 g
5%	0.000413 g	0.000826 g	0.001240 g	0.002067 g	0.004135 g

The minimum weight table applies to the fine range of the weighing device.



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:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. 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: 70 g

Tolerance	Control Limit	As Found		As Left	
		Std. Deviation	Result	Std. Deviation	Result
0.1%	0.000025 g	0.000009 g	✓	0.000009 g	✓
0.2%	0.000050 g		✓		✓
0.5%	0.000125 g		✓		✓
1%	0.000250 g		✓		✓
2%	0.000500 g		✓		✓
5%	0.001250 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

Tolerance	Control Limit	As Found		As Left	
		Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0000 g	✓	0.0000 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

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



## Error of Indication

## As Found

Reference Value	Error	Control limits for various weighing tolerances					
		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
20.00002 g	0.00000 g	0.01000 g	0.02000 g	0.05000 g	0.10000 g	0.20000 g	0.50000 g
50.00000 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
80.00004 g	0.00005 g	0.04000 g	0.08000 g	0.20000 g	0.40000 g	0.80000 g	2.00000 g
100.0000 g	0.0000 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	-0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

## As Left

Reference Value	Error	Control limits for various weighing tolerances					
		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
20.00002 g	0.00000 g	0.01000 g	0.02000 g	0.05000 g	0.10000 g	0.20000 g	0.50000 g
50.00000 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
80.00004 g	0.00005 g	0.04000 g	0.08000 g	0.20000 g	0.40000 g	0.80000 g	2.00000 g
100.0000 g	0.0000 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	-0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 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.



## Calibration Certificate

**Certificate No.:** 2203120-001-01  
**Client name:** UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.  
**Address:** 3 Soi Udomsuk 41, Sukhumvit Road,  
Bangchack, Prakanong, 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.:** 2203120

**Operation No.:** 2203120-001

**Date of Receipt:** 1 June 2022

**Date of Calibration:** 1 June 2022

**Calibrated by** Mr.Taveesak Seilee  
Scientist

**Approved by**

Manager, Division of Calibration Laboratory

**Date of Issue:** 7 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 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.:** 2203120-001-01

**Equipment:**

Electronic Balance

**Manufacturer:** METTLER TOLEDO

**Model:** AB204-S/FACT

**Resolution:** 0.0001 g

**Serial No.:** 1129361010

**ID No.:** UAE.WAS.002/2552

**Capacity:** 220 g

**Date of Calibration:** 1 June 2022

Page 2 of 3

**Environment Condition:** Ambient Temperature: 19.9 ± 0.3 °C Relative Humidity: 45 ± 1.5 %

**Place of Calibration:** 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	1-500mg	B308068554	TCS	M2201020S	6 January 2023
Standard Weight Class E2	1-500g	B308068128	TCS	M2201021S	6 January 2023

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	PONPE 490	NFI.BTH 010/18	Quality Reborn	QR22-0350	18 February 2023

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:

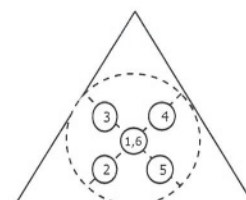
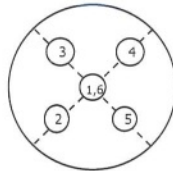
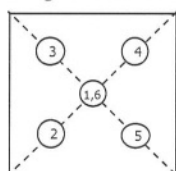
### 1. Repeatability of Reading:

Nominal Value ( g )	Standard Deviation of Reading ( g )
100	0.000048
200	0.000052

### 2. Off-Center Error:

A mass of 50 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 )
49.9999	49.9998	49.9998	49.9999	49.9998	49.9998	0.0001



## Calibration Report

**Certificate No.:** 2203120-001-01

**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:** 1 June 2022

Page 3 of 3

**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 <i>k</i>
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	0.0499	0.0001	0.000088	2.00
0.1	0.10000	0.1000	0.0000	0.000088	2.00
0.2	0.20000	0.2000	0.0000	0.000088	2.00
0.5	0.50000	0.5000	0.0000	0.000088	2.00
1	1.00000	0.9999	0.0001	0.000088	2.00
2	2.00000	1.9999	0.0001	0.000089	2.00
5	5.00000	5.0000	0.0000	0.000089	2.00
10	9.99998	9.9999	0.0001	0.000092	2.00
20	19.99999	19.9999	0.0001	0.000094	2.00
50	49.99990	49.9999	0.0000	0.00012	2.00
70	69.99989	69.9998	0.0001	0.00014	2.00
100	100.00001	99.9999	0.0001	0.00017	2.00
150	149.99991	149.9997	0.0002	0.00022	2.00
200	200.00007	199.9998	0.0003	0.00030	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)  
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.: 22TM90

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 :** 17 February 2022

**Calibration Date :** 17 February 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Kunchit Promprat

**Approved by :**

Approved Signatory

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

**Issue Date :** 22 February 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0038099



Equipment : BOD Incubator  
Condition As-Received : Used Item  
Reference : 2202-0446OC-1  
Procedure Used :-

Cert. No.: 22TM90

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

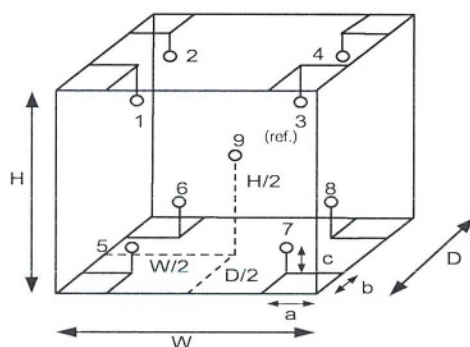
2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This 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 )	28	28
REL.Humid. ( % )	68	75
AC Supply ( Volt )	226	226

#### 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	18-10RTD-01
2	18-10RTD-02
3	18-10RTD-03
4	18-10RTD-04
5	18-10RTD-05
6	22-10RTD-10
7	18-10RTD-07
8	18-10RTD-08
9 (ref.)	18-10RTD-09



Equipment : BOD Incubator  
Condition As-Received : Used Item  
Reference : 2202-0446OC-1  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Not Available

Cert. No.: 22TM90

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>
20.0	19.5	19.4	0.30	0.58	1.0	0.55	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.154	20.013	20.356	19.939	19.834	19.761	19.817	19.824	19.922

**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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Cert. No.: 22TM305

Page.: 1 of 3

## Certificate of Calibration

**Equipment :** BOD Incubator

**Manufacturer :** ARCO

**Model :** UR-1320

**Serial No. :** -

**ID No. :** UAE.WAO.018/2551

**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 :** 7 April 2022

**Calibration Date :** 7 April 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Man Pattanapongpaiboon

**Approved by :**

Approved Signatory

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

**Issue Date :** 18 April 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0040246



**Equipment :** BOD Incubator  
**Condition As-Received :** Used Item  
**Reference :** 2204-0015OC-2  
**Procedure Used :-**

**Cert. No.:** 22TM305  
**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:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1 ) Data Acquisition	34970A	MY41021843	22LM4	10 Jan 2023

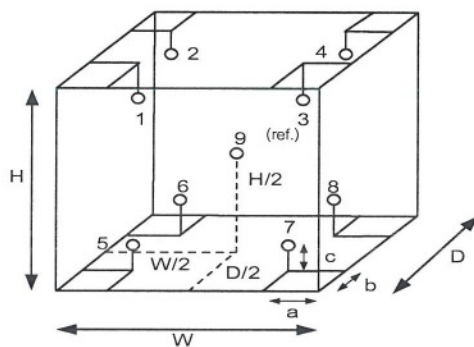
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

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

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

**Fresh air setting :** Not Available



Environment during calibration		
	Beginning	Finished
Temp. ( °C )	27	27
REL.Humid. ( % )	56	59
AC Supply ( Volt )	222	221

**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	18-04RTD-01
2	18-04RTD-02
3	18-04RTD-03
4	18-04RTD-04
5	18-04RTD-05
6	18-04RTD-06
7	18-04RTD-07
8	18-04RTD-08
9 (ref.)	18-04RTD-09

เอกสารไม่ควบคุม

a 1104314





Equipment : BOD Incubator  
Condition As-Received : Used Item  
Reference : 2204-0015OC-2  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Not Available

Cert. No.: 22TM305

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>
20.0	20.0	20.0	0.50	0.44	1.1	0.64	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.080	20.056	19.866	19.826	19.655	19.656	19.819	19.979	19.899

**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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a 1104313



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Cert. No.: 22TM306

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 :** 7 April 2022

**Calibration Date :** 7 April 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Man Pattanapongpaiboon

**Approved by :**

Approved Signatory

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

**Issue Date :** 18 April 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0040247



Equipment : BOD Incubator  
Condition As-Received : Used Item  
Reference : 2204-0015OC-3

Cert. No.: 22TM306

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	34970A	MY41021843	22LM4	10 Jan 2023

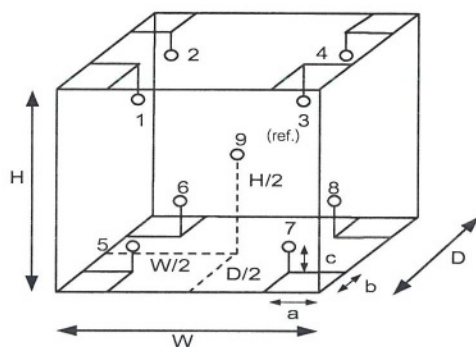
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

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

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

**Fresh air setting :** Not Available



Environment during calibration		
	Beginning	Finished
Temp. ( °C )	27	27
REL.Humid. ( % )	59	57
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	18-04RTD-01
2	18-04RTD-02
3	18-04RTD-03
4	18-04RTD-04
5	18-04RTD-05
6	18-04RTD-06
7	18-04RTD-07
8	18-04RTD-08
9 (ref.)	18-04RTD-09

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a 1104312





Equipment : BOD Incubator  
Condition As-Received : Used Item  
Reference : 2204-0015OC-3  
Result of Calibration :- ( \* ) Without Adjustment

Cert. No.: 22TM306

Page.: 3 of 3

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 )	Uncertainty ( ± °C )	Coverage Factor <i>k</i>
20.0	20.0	19.9	0.33	0.68	1.4	0.50	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.176	20.413	19.711	19.637	20.218	20.286	19.639	19.642	19.922

**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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a 1104311





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Cert. No.: 22TM347

Page.: 1 of 3

## Certificate of Calibration

**Equipment :** Cooled Incubator

**Manufacturer :** Binder

**Model :** KB 400 E6

**Serial No. :** 20200000015535

**ID No. :** UAE.MIC.018/2564

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

**Location :** Microbiology Laboratory

**Received Order :** 27 May 2022

**Calibration Date :** 27 May 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Suwit Imjai

**Approved by :**

Approved Signatory

( ) Pornthippa Tameyakul

(✓) Malee Butkruea

**Issue Date :** 2 June 2022

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Equipment : Cooled Incubator  
 Condition As-Received : Used Item  
 Reference : 2205-0764OC-1

Cert. No.: 22TM347  
 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	34970A	MY44067817	21LM10	20 Jul 2022

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

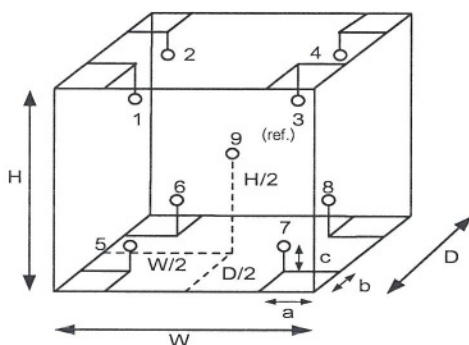
**Function of UUC\* :** Temperature Source

**Fresh air setting :** Not Available

**Fan Setting :** 100.0%

**Environment during calibration**

	Beginning	Finished
Temp. ( ° C )	21	21
REL.Humid. ( % )	67	65
AC Supply ( Volt )	233	234



**Probe Installation Details :**

a = 10 cm  
 b = 10 cm  
 c = 14 cm

**Dimension of Chamber :**

D = 0.48 m  
 W = 0.65 m  
 H = 1.3 m  
 Capacity = 0.40 m<sup>3</sup>

Position :	Ref. Std. ID No.:
1	15RTD2/11
2	15RTD2/12
3	15RTD2/13
4	15RTD2/14
5	15RTD2/15
6	15RTD2/16
7	15RTD2/17
8	15RTD2/18
9 (ref.)	15RTD2/19



**Equipment :** Cooled Incubator  
**Condition As-Received :** Used Item  
**Reference :** 2205-0764OC-1  
**Result of Calibration :-** ( \* ) Without Adjustment  
**Function of UUC\* :** Temperature Source  
**Fresh air setting :** Not Available

**Cert. No.:** 22TM347

**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	34.9	34.9	0.017	0.31	0.38	0.30	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
35.0	34.808	35.139	34.922	35.062	35.109	35.161	35.132	35.129	35.092

**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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TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 22TM672

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 :** 3 May 2022

**Calibration Date :** 5 May 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Preecha Hlahib

**Approved by :**

Approved Signatory

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

**Issue Date :** 11 May 2022

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Incubator  
 Condition As-Received : Used Item  
 Reference : 2205-0003OC-3

Cert. No.: 22TM672

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	34970A	MY44067817	21LM10	20 Jul 2022

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.

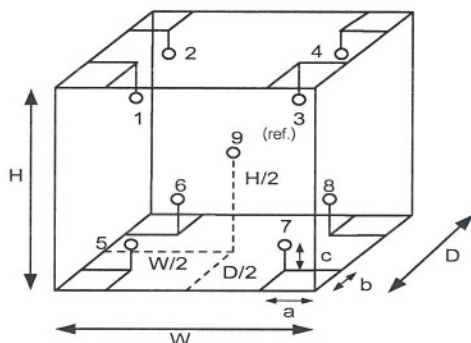
**Result of Calibration :-** ( \* ) Without Adjustment

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

**Fresh air setting :** Not Available

**Environment during calibration**

	Beginning	Finished
Temp. ( °C )	25	23
REL.Humid. ( % )	62	57
AC Supply ( Volt )	221	221



**Probe Installation Details :**

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

**Dimension of Chamber :**

D = 0.50 m  
 W = 0.60 m  
 H = 0.80 m  
 Capacity = 0.24 m<sup>3</sup>

Position :	Ref. Std. ID No.:
1	19-15RTD-01
2	19-15RTD-02
3	19-15RTD-03
4	19-15RTD-04
5	19-15RTD-05
6	21-15RTD-06
7	19-15RTD-07
8	19-15RTD-08
9 (ref.)	19-15RTD-09



**Equipment :** Incubator  
**Condition As-Received :** Used Item  
**Reference :** 2205-0003OC-3  
**Result of Calibration :-** ( \* ) Without Adjustment  
**Function of UUC\* :** Temperature Source  
**Fresh air setting :** Not Available

**Cert. No.:** 22TM672

**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>
25.0	25.0	25.0	0.021	0.18	0.33	0.30	2
36.0	36.0	36.0	0.077	0.96	1.8	0.33	2

Calibration Point ( °C )	Measured Temperature ( °C )								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
25.0	25.221	25.146	25.127	25.113	24.968	24.986	24.933	25.017	25.047
36.0	35.637	35.238	36.130	36.515	36.928	36.845	36.630	36.761	36.113

**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.

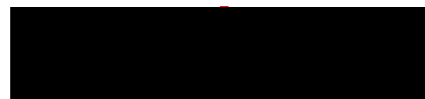
**Overall Variation :** The Difference of the maximum and minimum measured temperatures throughout observation.

**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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TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 22TM333

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 :** 17 February 2022

**Calibration Date :** 17 February 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Suwit Imjai

**Approved by :**

Approved Signatory

( / ) Pornthippa Tameyakul  
( / ) Malee Butkruea

**Issue Date :** 22 February 2022

The Uncertainties are for a confidence probability of approximately 95%

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**Equipment :** Water Bath  
**Condition As-Received :** Used Item  
**Reference :** 2202-0444OC-3  
**Procedure Used :-**

**Cert. No.:** 22TM333  
**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:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1 ) Data Acquisition	34970A	MY44067817	21LM10	20 Jul 2022

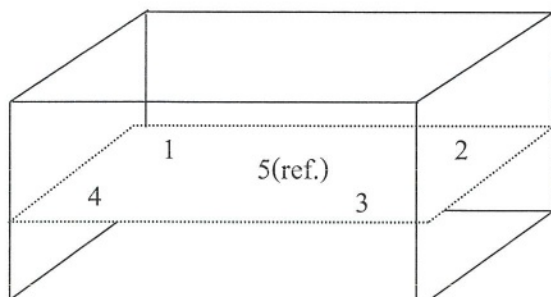
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

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

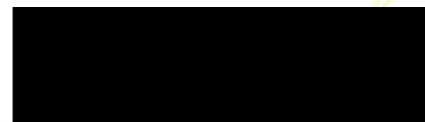
**Function of UUC\* :** Temperature Source

	Environmental		AC Voltage Supply
	( °C )	( %R.H. )	( Volt )
Beginning of Calibration	21	65	229
Finished of Calibration	22	58	230



Front

Position :	Ref. Std. ID No.:
1	70RC143
2	70RC144
3	70RC145
4	70RC146
5(ref.)	70RC147







Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2202-0444OC-3  
**Result of Calibration :-** ( \* ) Without Adjustment  
**Function of UUC\* :** Temperature Source

**Cert. No.:** 22TM333

**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	44.5	44.498	44.481	44.482	44.518	44.534

Calibration point ( °C )	Uniformity ( °C )	Stability ( ± °C )	Uncertainty ( ± °C )	Coverage Factor <i>k</i>
44.5	0.13	0.057	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 %.

-o0o-





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.: 22TM334

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 :** 17 February 2022

**Calibration Date :** 17 February 2022

**Ambient Temperature :** (  $26 \pm 10$  ) °C

**Relative Humidity :** (  $50 \pm 30$  ) %

**Calibrated by :** Suwit Imjai

**Approved by :**

Approved Signatory

( / ) Pornthippa Tameyakul  
( / ) Malee Butkruea

**Issue Date :**

22 February 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.

เอกสารไม่ควบคุม

A 0038095



**Equipment :** Water Bath  
**Condition As-Received :** Used Item  
**Reference :** 2202-0444OC-4

**Cert. No.:** 22TM334

**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:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1 ) Data Acquisition	34970A	MY44067817	21LM10	20 Jul 2022

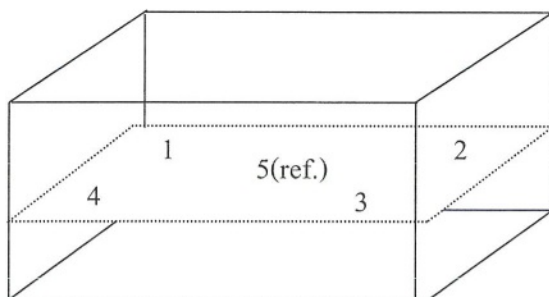
2. This certificate is valid only to the item calibrated on date and place of calibration.

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	21	65	229
Finished of Calibration	22	57	230



Front

Position :	Ref. Std. ID No.:
1	70RC143
2	70RC144
3	70RC145
4	70RC146
5(ref.)	70RC147

เอกสารไม่ควบคุม

a 1096055





Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2202-0444OC-4  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source

Cert. No.: 22TM334

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	44.5	44.572	44.514	44.507	44.530	44.565

Calibration point ( °C )	Uniformity ( °C )	Stability ( ± °C )	Uncertainty ( ± °C )	Coverage Factor <i>k</i>
44.5	0.10	0.042	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

a 1096054



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



NSC-TISI-TIS 17025  
CALIBRATION 0062

## 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:   
\* 0 3 3 2 4 2 3 9 0 6 \*

### Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument  
Model: AB204-S Asset Number: UAE.AIR.019/2550  
Serial No.: 1128312528 Terminal Model: N/A  
Building: N/A Terminal Serial No.: N/A  
Floor: 2 Terminal Asset No.: N/A  
Room: Balance Room 2 (206)

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 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: 22.5 °C	End: 21.4 °C	Start: 56.1 %	End: 63.2 %

As Found Calibration Date: 07-Apr-2022  
As Left Calibration Date: N/A  
Issue Date: 08-Apr-2022

Calibrator:

Approved Signatory:

- ☒ Kassakorn Tassanachaisakul  
☐ Santi Jitniyom  
☐ Surachet Sukkate

## Measurement Results

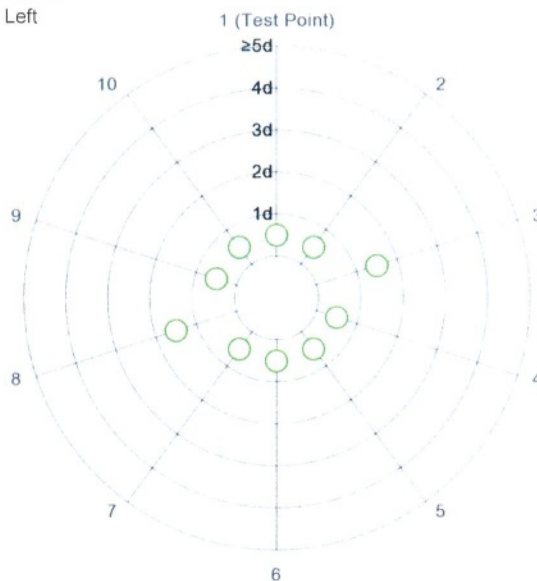
### Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9999 g	N/A
2	100.0000 g	N/A
3	99.9998 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A
6	100.0000 g	N/A
7	99.9999 g	N/A
8	100.0001 g	N/A
9	99.9999 g	N/A
10	100.0000 g	N/A

Standard Deviation	0.00008 g	N/A
--------------------	-----------	-----

○ As Found  
◆ As Left



The "d" in the graph represents the readability of the range/interval in which the test was performed.

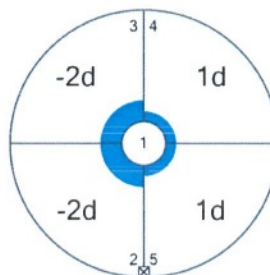
The results of this graph are based upon the absolute values of the differences from the mean value.

### Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	99.9998 g	N/A
3	99.9998 g	N/A
4	100.0001 g	N/A
5	100.0001 g	N/A

Maximum Deviation	0.0002 g	N/A
-------------------	----------	-----



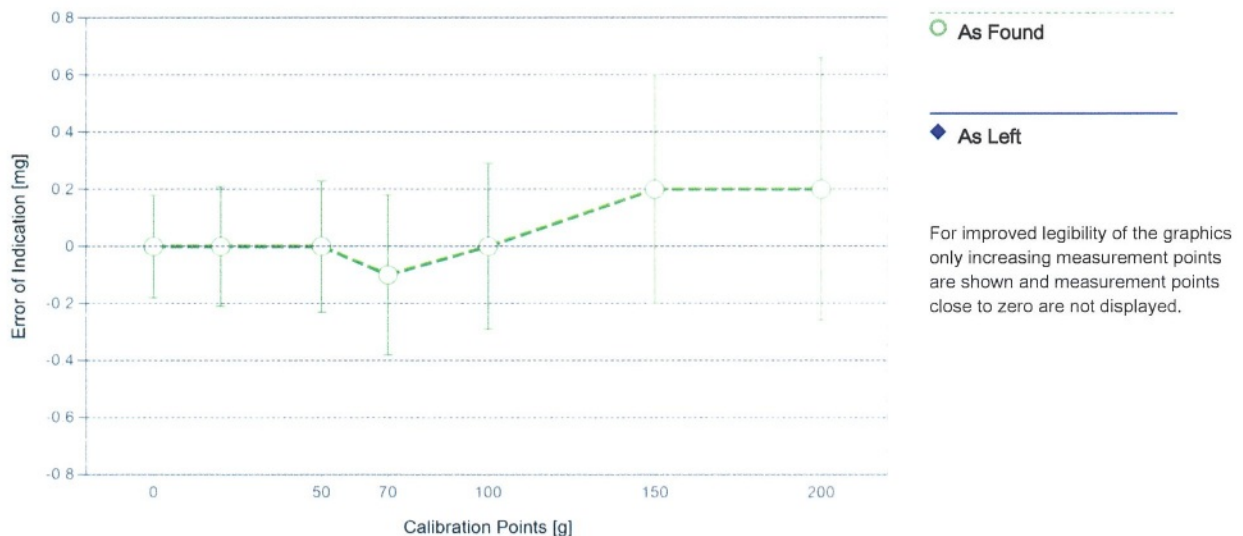
As Found

The "d" in the graph represents the readability of the range/interval in which the test was performed.

## Error of Indication

### As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.18 mg	2
2	0.1000 g	0.1000 g	0.0000 g	0.19 mg	2
3	1.0000 g	0.9999 g	-0.0001 g	0.19 mg	2
4	5.0000 g	5.0000 g	0.0000 g	0.19 mg	2
5	10.0000 g	9.9999 g	-0.0001 g	0.20 mg	2
6	20.0000 g	20.0000 g	0.0000 g	0.21 mg	2
7	50.0000 g	50.0000 g	0.0000 g	0.23 mg	2
8	70.0001 g	70.0000 g	-0.0001 g	0.28 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.29 mg	2
10	150.0000 g	150.0002 g	0.0002 g	0.40 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.46 mg	2



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.

## 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.:	WS80	Date of Issue:	23-Feb-2022
Certificate Number:	C208581631	Calibration Due Date:	14-Aug-2023

### Thermo Hygrometer

Equipment No.:	IN161	Date of Issue:	14-Jun-2021
Certificate Number:	21H1220	Calibration Due Date:	01-Jun-2022

---

**Remarks**

---

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

Test weight by Filter pan : 1 g = 0.9999 g, 3 g = 3.0000 g, 5 g = 5.0000 g

**End of Accredited Section**

---

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



## Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with  $k=2$  in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value  $R$  represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use:  $3.0 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

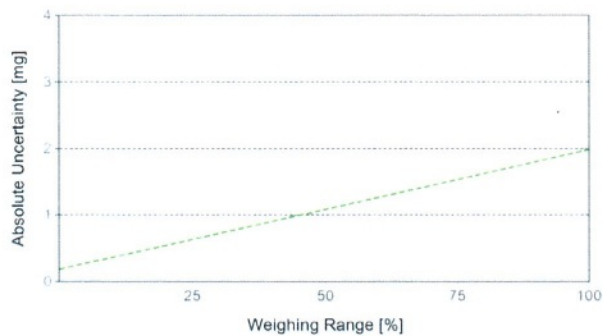
### Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.19 \text{ mg} + 0.00817 \text{ mg/g} \cdot R$	N/A

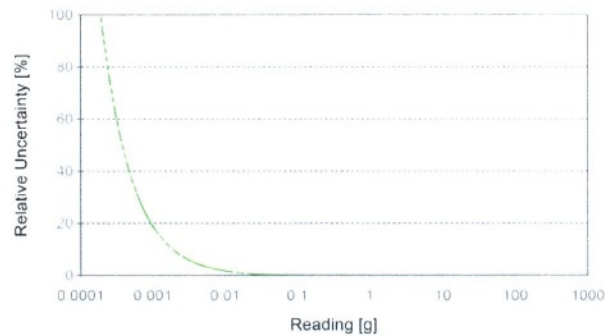
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

### Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.19 mg	0.86%	N/A	N/A
0.2200 g	0.19 mg	0.087%	N/A	N/A
2.2000 g	0.21 mg	0.0095%	N/A	N/A
22.0000 g	0.37 mg	0.0017%	N/A	N/A
220.0000 g	2.0 mg	0.00090%	N/A	N/A



As Found



As Left



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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



## Certificate of Calibration

Cert. No.: 22TM89

Page.: 1 of 3

**Equipment :** Autoclave

**Manufacturer :** ALP

**Model :** CL-40L

**Serial No. :** 802664

**ID No. :** UAE.MIC.014/2550

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

**Location :** Air Analysis Unit


**Received Order :** 17 February 2022

**Calibration Date :** 17 February 2022

**Ambient Temperature :** ( 26 ± 10 ) °C

**Relative Humidity :** ( 50 ± 30 ) %

**Calibrated by :** Kunchit Promprat

**Approved by :**   
Approved Signatory

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

**Issue Date :** 22 February 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.

เอกสารไม่ควบคุม



Equipment : Autoclave  
Condition As-Received : Used Item  
Reference : 2202-0444OC-1

Cert. No.: 22TM89  
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:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
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 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\*\*

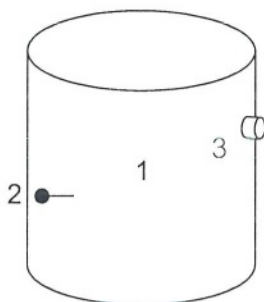
(\*\* = Categorization of pathogens according to hazard and categories of containment, second edition, 1990 )

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	68	226
Finished of Calibration	27	65	226

<u>Position</u>	<u>Description</u>	<u>Ref. Std. ID No.:</u>
1 =	Center of chamber	22-10TC-01
2 =	Temperature sensor	22-10TC-02
3 =	Exhaust port	22-10TC-03

เอกสารไม่ควบคุม





Equipment : Autoclave  
Condition As-Received : Used Item  
Reference : 2202-0444OC-1

Cert. No.: 22TM89

Page.: 3 of 3

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

Operating parameter Set : Temperature = 122 °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 <i>k</i>
122	122	1	122.373	0.32	0.12	1.2	2
		2	122.421				
		3	122.292				

**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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## Verification Certificate

**Certificate No.:** 2202361-001-01  
**Client name:** UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.  
**Address:** 3 Soi Udomsuk 41, Sukhumvit Road,  
Bangchack, Prakanong, 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.:** 2202361  
**Operation No.:** 2202361-001  
**Date of Receipt:** 4 April 2022  
**Date of Calibration:** 4-6 April 2022

**Calibrated by** Mr.Nuttapol Niyomchat  
Specialist

**Approved by**

Manager, Division of Calibration Laboratory

**Date of Issue:** 11 April 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 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.

## Verification Report

**Certificate No.:** 2202361-001-01  
**Equipment:** HEATING BLOCK DIGESTION  
Model: 2520 Serial No.: 91794469  
Resolution: 1 °C ID No.: UAE.WAS.011/2560  
Manufacturer: FOSS  
**Date of Calibration:** 4-6 April 2022

Page 2 of 4

**Location:** Laboratory Room, NATIONAL FOOD INSTITUTE  
**Environment Condition:** Ambient Temperature ( 25 ± 3 ) °C  
Relative Humidity ( 55 ± 15 ) %  
Line Voltage ( 220 ± 10 ) Volt

### Condition of this results of Calibration:

1. This instrument was calibrated by insert standard thermocouples type R into its heating block digestion and compared to temperature obtained from reference standards thermometer at calibrated point.
  - The temperature scale used was based on ITS - 90 .
  - All data show below were final values and the initial data may be obtained upon request.
2. Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
Digital Thermometer with Thermocouple	34970A/34901A	MY44045576/MY41194453	TC21/0041	24-Apr-2022	N.M. Technical Center Laboratory
	Type R	TC#101-103 / CH#101-103			

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

UUC\* Description

Time of Record - Hour 30 Minute At 380 °C

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

## Verification Report

**Certificate No.:** 2202361-001-01  
**Equipment:** HEATING BLOCK DIGESTION  
 Model: 2520 Serial No.: 91794469  
 Resolution: 1 °C ID No.: UAE.WAS.011/2560  
 Manufacturer: FOSS

**Date of Calibration:** 4-6 April 2022

Page 3 of 4

**Calibration point:** 380 °C

**Calibration result:**

### Reporting of Temperature

Block No.	UUC* Setting (°C)	UUC* Reading (°C)	Stability (±°C)	Standard Thermometer (°C)	Uncertainty (±°C)
1	380	380	0.13	376.48	1.5
2	380	380	0.12	376.58	1.5
3	380	380	0.12	376.51	1.5
4	380	380	0.14	376.70	1.6
5	380	380	0.18	376.81	1.6
6	380	380	0.12	377.23	1.6
7	380	380	0.12	377.37	1.5
8	380	380	0.13	376.68	1.5
9	380	380	0.14	376.72	1.5
10	380	380	0.18	378.97	1.6
11	380	380	0.25	378.79	1.6
12	380	380	0.11	377.14	1.6
13	380	380	0.19	379.65	1.6
14	380	380	0.16	379.61	1.6
15	380	380	0.16	378.66	1.6
16	380	380	0.15	379.18	1.6
17	380	380	0.23	377.39	1.6
18	380	380	0.11	377.71	1.6
19	380	380	0.22	376.64	1.6
20	380	380	0.16	376.56	1.6

### Note:

- UUC\* = Unit Under Calibration
- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.
- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

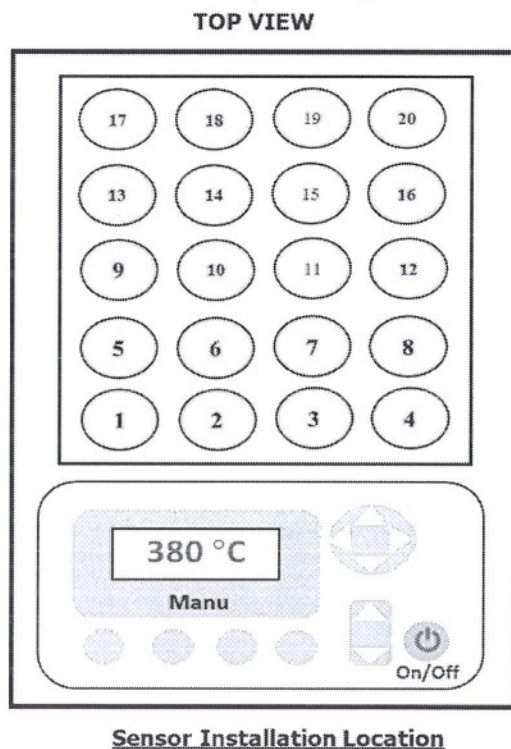


## Verification Report

**Certificate No.:** 2202361-001-01  
**Equipment:** HEATING BLOCK DIGESTION  
Model: 2520 Serial No.: 91794469  
Resolution: 1 °C ID No.: UAE.WAS.011/2560  
Manufacturer: FOSS  
**Date of Calibration:** 4-6 April 2022  
**Calibration point:** 380 °C  
**Calibration result:** Continued

Page 4 of 4

Figure 1. Location of Reference Standard and Block Diagram of Digestion Unit



**Note:**

- UUC\* = Unit Under Calibration
- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.
- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

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 -----



# FOSS

## Customer Service Report

FOSS South East Asia

3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,  
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Report No:

5874

Date:

30/11/21

Customer:

UAE

Address:

41 ซ.พญาศรี  
270027 นนทบุรี นนทบุรี 10260

Instrument:

KT200

Serial:

91790529

Hours

Travel To Customer

Start

8.00

Finish

9.00

1

Labour

9.00

19.00

Travel From Customer

14.00

15.00

1

## Job Type

Application		Special		Standard			
Normal	x	Courtesy Visit	x	Installation	x	Training	x
Distributor	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	x
Digital Service	x	Sales Support	x	Remote	x	Other	x

PO/Quote Number:

if applicable

PMA Type

Foss come Pro

Contract No.

if applicable

## Details of Work / Test

## Condition / Status

- 1. Check Instrument	OK
- 62/006 PM kit for kt200	Pass
- 62/006 Safety Valve	Pass
- 62/006 Rubber Grommet	Pass
- 62/006 Seal	Pass
- 62/006 Heating element	Pass
- 62/006 New panel PCB	Pass
- 62/006 Safety door complete	Pass
- Clean & lubricant	Pass
- Check leakaged	Pass
- Check volum Alkali set 30ml to 28ml	
-	
Instrument Ready for Use	OK
Not OK	If not OK - Comment

Part No:	Batch	Description	Qty
10009965	11235-983	Foss PM kit kt200	1
1575-0024	29.07.21	Safety Valve	1
15490025	09.11.20	Rubber Grommet for Heating	2
100035-12	02.08.21	Heating Element	1
10002762	16.11.20	Seal	1
60094273	19.07.20	kt200 new panel PCB	1
10009385	22.04.21	Safety door complete	1

Name

Name

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

Email

เอกสารไม่ควบคุม

# FOSS Preventive Maintenance Protocol

Customer : UAE

Instrument	Kjeltec™ 2100 = <i>kjeltec 200</i>	
Recommended PM interval (whichever occurs first between interval and no. of samples analysed)	12 months	No. of samples analysed (if applicable):
Preventive maintenance kit (P/N)	10009965	<i>S/N 91790524</i>

## Introduction

A maintenance protocol provides systematic and functional means of maintaining a specific instrument type. The recommended PM interval depends on the operational conditions and is based on our extensive experience and knowledge of manufacturing and maintaining analytical instruments.

Apart from sample throughput, the environmental conditions also need to be considered. A demanding environment, such as high ambient temperature, humidity, dirtiness etc can measurably shorten component lifetime and also the maintenance and component replacement intervals.

### NOTE!

The content of this protocol is subject to change over time. In order to safeguard that you obtain the correct parts, please make sure to indicate serial no and date of installation when contacting your FOSS representative.

## Dedicated Analytical Solutions

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## Maintenance Procedure

### Exchange of Parts and Cleaning

Step	Action	Part	P/N	OK
1	Replace	Adapter for dig. tube 250 ml	1000 0056	<input type="checkbox"/>
2	Replace	Non return valve	1000 3538	<input type="checkbox"/>
3	Replace valves in alkali pump	Valve kit reagent/water pump	1575 0093	<input type="checkbox"/>
4	Replace steam tubing	Silicone tubing 8/12 mm	1582 0006	<input type="checkbox"/>
5	Replace alkali tubing	Tubing reinforced for alkali	1582 0011	<input type="checkbox"/>
6	Replace water tubing	Tubing PVC 8/11 mm	1582 0004	<input type="checkbox"/>
7	Cleaning	Steam generator		<input type="checkbox"/>
8	Cleaning	Splash head		<input type="checkbox"/>

### Check and Adjustments

Step	Action	Module	Measured	Limits	OK
1	Check alkali volume, 10 ml/stroke	Alkali pump	98	At 50 ml -0/+3 ml	<input checked="" type="checkbox"/>
2	Check distillation volume		120 ml	100 – 150 ml/4 min	<input checked="" type="checkbox"/>
3	Check front panel switches				<input checked="" type="checkbox"/>
4	Check cables and electrical connections				<input checked="" type="checkbox"/>
5	Check level pins in steam generator				<input checked="" type="checkbox"/>
6	Check safety door switch				<input checked="" type="checkbox"/>