

ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือตรวจวัดและเครื่องมือวิเคราะห์

รายการใบรับรองสอบเทียบ/ทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์ สำหรับวิเคราะห์คุณภาพสิ่งแวดล้อม

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์คุณภาพน้ำ									
1	pH Meter	ความเป็นกรดเป็นด่าง (pH)	Mettler-Toledo	Seven Easy S20 / 1231155210	National Food Institute, Ministry of Industry, Thailand	2301846-001-01	24 Feb 23	23 Feb 24	-
2	pH Meter		Mettler-Toledo	Seven Easy S20 / 1230525212	National Food Institute, Ministry of Industry, Thailand	2302181-001-01	24 Mar 23	22 Mar 24	-
3	Analytical Balance (Readability 0.01 mg)	ของแข็งแขวนลอยทั้งหมด (SS) ของแข็งละลายน้ำ (TDS)	Mettler-Toledo	XSR205DU / C210685394	Technology Promotion Association (Thailand-Japan)	23MM113	26 Apr 23	24 Apr 24	-
4	Hot Air Oven		Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	23TM373	11 Apr 23	9 Apr 24	-
5	Analytical Balance (Readability 0.1 mg)	น้ำมัน และไขมัน (Fat, Oil & Grease)	Mettler-Toledo	XSR204 / C117635043	National Food Institute, Ministry of Industry, Thailand	2302827-001-01	10 May 23	8 May 24	-
6	BOD Incubator	บีโอดี(BOD)	Arco	UC4-1320 / (UAE.WAO.015/2561)	Technology Promotion Association (Thailand-Japan)	23TM249	15 Feb 23	14 Feb 24	-
7	BOD Incubator		Arco	UR-1320 / (UAE.WAO.018/2551)	Technology Promotion Association (Thailand-Japan)	23TM375	12 Apr 23	10 Apr 24	-
8	Digester Unit	ไนโตรเจนในรูปทีเคเอ็น (TKN)	FOSS TECATOR	2520auto / 91794469	National Food Institute, Ministry of Industry, Thailand	2302413-001-01	30 Mar 23	28 Mar 24	-
9	Distillation Unit (Kjeldahl Method)		FOSS TECATOR	KT8100/ 91889052	FOSS South East Asia	8411	29 May 23	24 Jul 23	-
10	Incubator	โคลิฟอร์มแบคทีเรีย (Coliform Bacteria) ฟิคอลโคลิฟอร์มแบคทีเรีย	Binder	KB400 / 20200000015535	Technology Promotion Association (Thailand-Japan)	23TM726	27 Apr 23	25 Apr 24	-
11	Incubator		Memmert	IPP 260 / V616.0066	Technology Promotion Association (Thailand-Japan)	23TM728	27 Apr 23	25 Apr 24	-

รายการใบรับรองสอบเทียบ/ทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์ สำหรับวิเคราะห์คุณภาพสิ่งแวดล้อม

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์คุณภาพน้ำ									
12	Water Bath		Memmert	WNE 14 / L416.0606	Technology Promotion Association (Thailand-Japan)	23TM193	15 Feb 23	14 Feb 24	-
13	Water Bath		Memmert	WNE 14 / L416.0612	Technology Promotion Association (Thailand-Japan)	23TM194	15 Feb 23	14 Feb 24	-
14	Auto Clave		ALP	CL-40L / 808763	Technology Promotion Association (Thailand-Japan)	23TM763	27 Apr 23	25 Apr 24	-
15	Auto Clave		ALP	CL-40L / 810010	DKSH (Thailand) Ltd.	C11230106	9 Jun 23	7 Jun 24	-
16	Refrigerator		Sanyo	SBC-337KD(GYN) / 71100607	Technology Promotion Association (Thailand-Japan)	23TM376	11 Apr 23	9 Apr 24	-
17	Refrigerator		Sanden	YPM11P / YPM11P-150801805	Technology Promotion Association (Thailand-Japan)	23TM1077	10 Jul 23	8 Jul 24	-
18	Analytical Balance		OHAUS	PX623 / C236754745	DKSH (Thailand) Ltd.	C01234158	8 Dec 23	6 Dec 24	-

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

Calibration Certificate

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

Page 1 of 5

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

Calibrated by Mr.Worapob Sooktong Scientist
Approved by (Mr.Nuttapol Niyomchart)
Specialist, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 24 February 2023

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

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

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

Calibration Report

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

Date of Calibration: 24 February 2023

Page 3 of 5

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

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (± mV)	Coverage Factor (k)
		mV	pH		
0	414.120	414	0.00	0.58	2.00
2	295.814	296	2.00	0.58	2.00
4	177.464	178	4.00	0.58	2.00
6	59.160	59	6.00	0.58	2.00
7	0.000	0	7.00	0.58	2.00
8	-59.156	-59	8.00	0.58	2.00
10	-177.460	-177	10.00	0.58	2.00
12	-295.811	-296	12.00	0.58	2.00
14	-414.117	-414	14.00	0.58	2.00

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

Equipment: pH Electrode Type: Combined Electrode
Manufacturer: Mettler Toledo Model: InLab Solids
Serial No.: 9016311 ID No.: N/A
Performance of Electrode system (Three-Point Calibration at pH 4, pH 7 and pH 10)

Certified Value (± 25 °C (pH))	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.008	4.01	186	-	0.0071	2.00
6.865	6.90	19	97.58	0.0075	2.00
10.008	10.01	-160	97.29	0.0095	2.00
6.985	6.99	15	-	0.0092	2.00

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

Calibration Report

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

Date of Calibration: 24 February 2023

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Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature: (25.1 ± 1.5) °C Relative Humidity: (50 ± 5) %
Condition of Equipment: Good Condition
Condition of this Results of Calibration

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

2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fluke	22E1959	17 June 2023
2.2 Digital Thermometer	2709007	Fluke	CC 650577-01	30 October 2023
2.3 Thermo-Hygro Meter	NFI.BTH 007/18	PONPE 490	QR22-0886	26 April 2023
Certified Reference Material				
	Lot No.	Manufacturer	Ref No.	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	832608	CPAchem	PH216.L5	8 August 2024
2.5 pH buffer 6.865 (Primary pH buffer Solution)	832607	CPAchem	PH217.L5	8 August 2024
2.6 pH buffer 10.01 (Primary pH buffer Solution)	832609	CPAchem	PH220.L5	8 August 2023
2.7 pH buffer 7.00 (Standard pH buffer Solution)	832610	CPAchem	PH107.L5	8 August 2023

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

3.1 Instruments No.2.1 through NSC-TIS-TIS 17025 Laboratory Accreditation of Calibration No.0008
3.2 Instruments No.2.2 through NSC-TIS-TIS 17025 Laboratory Accreditation of Calibration No.0061
3.3 Instruments No.2.3 through NSC-TIS-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 H-27 LoN (04.06.2021; BIM RefN H-28 LoN 28.05.2021; BIM RefN H-27 LoN (04.06.2021; BIM RefN H-28 LoN 28.05.2021, the Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

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

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

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

Calibration Report

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

Date of Calibration: 24 February 2023

Page 4 of 5

Location: Chemical Calibration Laboratory, National Food Institute

Environment Condition: Ambient Temperature 25 °C ± 1 °C
Relative Humidity 48 % ± 3 %

Condition of this results of Calibration:

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

2. Reference Standard Instrument :

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

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

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

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

Calibration Report

Certificate No.: 2301846-001-01
Equipment: Digital Thermometer with RTD
Resolution: 0.1 °C Model: SevenEasy TM 520 pH
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553
Manufacturer: Mettler Toledo

Date of Calibration: 24 February 2023

Calibration point: 15.0, 25.0 and 35.0 °C
Calibration result:
- The probe was immersed in liquid bath or dry bath to a minimum depth of 120 mm.
- Description of probe, model : - S/N : -
Dimension of probe : Diameter 9 mm, Length 120 mm.,
Sheath material : Stainless Steel

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

Note

- UUC* : Unit Under Calibration

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

----- End -----

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

Calibration Certificate

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

Page 1 of 5

Equipment: pH Meter
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1230525212
ID No.: UAE.WAS.003/2553
Order No.: 2302181
Operation No.: 2302181-001
Date of Receipt: 14 March 2023
Date of Calibration: 24 March 2023

Calibrated by Mr.Pheraphat Tuanjit **Approved by** [Signature]
Scientist (Mr.Nuttapol Niyomchart)
Specialist, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 24 March 2023

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

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

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

Calibration Report

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

Date of Calibration: 24 March 2023

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

Condition of this Results of Calibration

1. Calibration Method
In house method : W-CC-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)
2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fluke	22E1959	17 June 2023
2.2 Digital Thermometer	2709007	Fluke	CC-650557-01	30 October 2023
2.3 Thermo-Hygro Meter	NFLBTH003/17	PONPE	TE 650555-01	21 September 2023

Certified Reference Material	Lot No.	Manufacturer	Ref N	Expiry Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	873608	CPAchem	PHQ16.L5	16 February 2025
2.5 pH buffer 6.865 (Primary pH buffer Solution)	873609	CPAchem	PHQ17.L5	16 February 2025
2.6 pH buffer 10.01 (Primary pH buffer Solution)	873611	CPAchem	PHQ20.L5	16 February 2024
2.7 pH buffer 7.00 (Standard pH buffer Solution)	873612	CPAchem	PH107.L5	16 February 2024
3. This certification is traceable to The International System of Unit (SI Unit)
 - 3.1 Instruments No.2.1 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0068
 - 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.0061
 - 3.4 Certified Reference Material No. 2.4 to 2.6 traceable to Primary measurement method- Harned cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
 - 3.5 Certified Reference Material No.2.7 traceable to BIM RefN HI-13 LoIn 25.05.2022; BIM RefN HI-16 LoIn 02.06.2022; BIM RefN HI-13 LoIn 25.05.2022; BIM RefN HI-16 LoIn 02.06.2022, the Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.

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

Calibration Report

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

Date of Calibration: 24 March 2023

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

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (±mV)	Coverage Factor (k)
		mV	pH		
0	414.120	414	0.00	0.58	2.00
2	295.814	296	2.00	0.58	2.00
4	177.464	178	4.00	0.58	2.00
6	59.160	59	6.00	0.58	2.00
7	0.000	0	7.00	0.58	2.00
8	-59.158	-59	8.00	0.58	2.00
10	-177.460	-177	10.00	0.58	2.00
12	-295.811	-296	12.00	0.58	2.00
14	-414.117	-414	14.00	0.58	2.00

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

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

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

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.008	4.01	187	-	0.0071	2.00
6.865	6.86	22	97.86	0.0075	2.00
10.010	10.01	-160	97.66	0.0086	2.00
6.985	6.99	14	-	0.0093	2.00

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

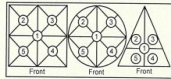


Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : Z304-0459OC-2

Cert.No.: 23MM113
Page: 3 of 3

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)
0.0001

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

3. Departure from nominal value

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
Unload	0.00000	0.00000	0.014	2.11
0.05	0.04999	+0.00001	0.015	2.09
0.1	0.09999	+0.00001	0.015	2.07
1	1.00000	0.00000	0.018	2.04
5	5.00000	0.00000	0.026	2.00
20	20.00002	-0.00002	0.045	2.00
50	50.00002	-0.00002	0.080	2.00
80	80.00002	-0.00002	0.15	2.00
100	100.0000	0.0000	0.17	2.00
150	150.0000	0.0000	0.29	2.00
200	199.9999	+0.0001	0.29	2.00

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

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เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD 50/18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2713-3000-29 FAX. 0-2719-9484



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

Certificate of Calibration

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

Calibrated by : Krisda Malee

Approved by : 
Approved Signatory

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

Issue Date : 24 April 2023

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

A 0053359



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

Cert. No.: 23TM373
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

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

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

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

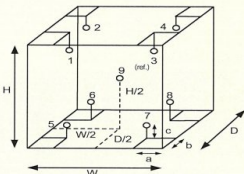
Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

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

Ref. Std. ID No.: @ Calibration Point		
Position :	(120 to 180) °C	(104) °C
1	18-20TC-01	20RTD-2/1
2	18-20TC-02	20RTD-2/2
3	18-20TC-03	20RTD-2/3
4	18-20TC-04	20RTD-2/4
5	18-20TC-05	20RTD-2/5
6	18-20TC-06	20RTD-2/6
7	18-20TC-07	20RTD-2/7
8	18-20TC-08	20RTD-2/8
9 (ref.)	18-20TC-09	20RTD-2/9



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

เอกสารไม่ควบคุม

a 1158261



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

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

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

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

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1158260





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



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

Certificate of Calibration

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

Issue Date : 24 February 2023

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

A 0051476



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2302-0297OC-1

Cert. No.: 23TM249
Page : 2 of 3

Procedure Used :-

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

Condition of this result of calibration

1. Reference standard instrument:-

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

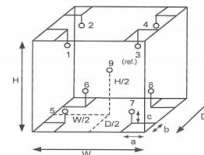
2. This certification is valid only to the item calibrated on date and place of calibration.

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



Probe Installation Details :

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

Dimension of Chamber :

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

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

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

เอกสารไม่ควบคุม

A 1140547



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

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

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

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

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1149512



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



Cert. No.: 23TM375
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 : 11 April 2023
Calibration Date : 12 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Krisda Malee
Approved by : [Signature]
() Pornthippa Tameyakul
(/) Malee Butkruea
() Suwit Imjai
Issue Date : 24 April 2023

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

A 0053360



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2304-0156OC-2

Cert. No.: 23TM375
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

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

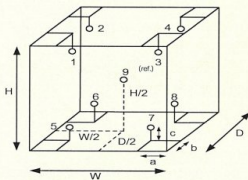
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available



Probe Installation Details :

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

Dimension of Chamber :

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

Environment during calibration	
	Beginning
Temp. (°C)	28
REL.Humid. (%)	42
AC Supply (Volt)	219

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

เอกสารไม่ควบคุม

a 1158259



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2304-0156OC-2

Cert. No.: 23TM375
Page : 3 of 3

Result of Calibration :-

(*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.48	0.42	1.2	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	20.040	20.170	20.263	20.093	19.749	19.704	19.920	20.191	20.020	0.66

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1158258



จุฬาลงกรณ์มหาวิทยาลัย
ศูนย์บริการตรวจสอบและวิเคราะห์อาหาร
Food Industrial Laboratory Service Center

Verification Certificate

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

Page 1 of 4

Equipment: HEATING BLOCK DIGESTION

Manufacturer: FOSS

Model: 2520

Serial No.: 91794469

ID No.: UAE.WAS.011/2560

Order No.: 2302413

Operation No.: 2302413-001

Date of Receipt: 28 March 2023

Date of Calibration: 30-31 March 2023

Calibrated by Mr.Nuttapol Niyomchat
Specialist

Approved by (Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 10 April 2023

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

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2008 ๒๕๕๑-๒๕๕๓ ๒๕๕๔-๒๕๕๕ ๒๕๕๖-๒๕๕๗ ๒๕๕๘-๒๕๕๙ ๒๕๖๐-๒๕๖๑ ๒๕๖๒-๒๕๖๓ ๒๕๖๔-๒๕๖๕ ๒๕๖๖-๒๕๖๗ ๒๕๖๘-๒๕๖๙ ๒๕๗๐-๒๕๗๑ ๒๕๗๒-๒๕๗๓ ๒๕๗๔-๒๕๗๕ ๒๕๗๖-๒๕๗๗ ๒๕๗๘-๒๕๗๙ ๒๕๘๐-๒๕๘๑ ๒๕๘๒-๒๕๘๓ ๒๕๘๔-๒๕๘๕ ๒๕๘๖-๒๕๘๗ ๒๕๘๘-๒๕๘๙ ๒๕๙๐-๒๕๙๑ ๒๕๙๒-๒๕๙๓ ๒๕๙๔-๒๕๙๕ ๒๕๙๖-๒๕๙๗ ๒๕๙๘-๒๕๙๙ ๒๖๐๐-๒๖๐๑ ๒๖๐๒-๒๖๐๓ ๒๖๐๔-๒๖๐๕ ๒๖๐๖-๒๖๐๗ ๒๖๐๘-๒๖๐๙ ๒๖๑๐-๒๖๑๑ ๒๖๑๒-๒๖๑๓ ๒๖๑๔-๒๖๑๕ ๒๖๑๖-๒๖๑๗ ๒๖๑๘-๒๖๑๙ ๒๖๒๐-๒๖๒๑ ๒๖๒๒-๒๖๒๓ ๒๖๒๔-๒๖๒๕ ๒๖๒๖-๒๖๒๗ ๒๖๒๘-๒๖๒๙ ๒๖๓๐-๒๖๓๑ ๒๖๓๒-๒๖๓๓ ๒๖๓๔-๒๖๓๕ ๒๖๓๖-๒๖๓๗ ๒๖๓๘-๒๖๓๙ ๒๖๔๐-๒๖๔๑ ๒๖๔๒-๒๖๔๓ ๒๖๔๔-๒๖๔๕ ๒๖๔๖-๒๖๔๗ ๒๖๔๘-๒๖๔๙ ๒๖๕๐-๒๖๕๑ ๒๖๕๒-๒๖๕๓ ๒๖๕๔-๒๖๕๕ ๒๖๕๖-๒๖๕๗ ๒๖๕๘-๒๖๕๙ ๒๖๖๐-๒๖๖๑ ๒๖๖๒-๒๖๖๓ ๒๖๖๔-๒๖๖๕ ๒๖๖๖-๒๖๖๗ ๒๖๖๘-๒๖๖๙ ๒๖๗๐-๒๖๗๑ ๒๖๗๒-๒๖๗๓ ๒๖๗๔-๒๖๗๕ ๒๖๗๖-๒๖๗๗ ๒๖๗๘-๒๖๗๙ ๒๖๘๐-๒๖๘๑ ๒๖๘๒-๒๖๘๓ ๒๖๘๔-๒๖๘๕ ๒๖๘๖-๒๖๘๗ ๒๖๘๘-๒๖๘๙ ๒๖๙๐-๒๖๙๑ ๒๖๙๒-๒๖๙๓ ๒๖๙๔-๒๖๙๕ ๒๖๙๖-๒๖๙๗ ๒๖๙๘-๒๖๙๙ ๒๗๐๐-๒๗๐๑ ๒๗๐๒-๒๗๐๓ ๒๗๐๔-๒๗๐๕ ๒๗๐๖-๒๗๐๗ ๒๗๐๘-๒๗๐๙ ๒๗๑๐-๒๗๑๑ ๒๗๑๒-๒๗๑๓ ๒๗๑๔-๒๗๑๕ ๒๗๑๖-๒๗๑๗ ๒๗๑๘-๒๗๑๙ ๒๗๒๐-๒๗๒๑ ๒๗๒๒-๒๗๒๓ ๒๗๒๔-๒๗๒๕ ๒๗๒๖-๒๗๒๗ ๒๗๒๘-๒๗๒๙ ๒๗๓๐-๒๗๓๑ ๒๗๓๒-๒๗๓๓ ๒๗๓๔-๒๗๓๕ ๒๗๓๖-๒๗๓๗ ๒๗๓๘-๒๗๓๙ ๒๗๔๐-๒๗๔๑ ๒๗๔๒-๒๗๔๓ ๒๗๔๔-๒๗๔๕ ๒๗๔๖-๒๗๔๗ ๒๗๔๘-๒๗๔๙ ๒๗๕๐-๒๗๕๑ ๒๗๕๒-๒๗๕๓ ๒๗๕๔-๒๗๕๕ ๒๗๕๖-๒๗๕๗ ๒๗๕๘-๒๗๕๙ ๒๗๖๐-๒๗๖๑ ๒๗๖๒-๒๗๖๓ ๒๗๖๔-๒๗๖๕ ๒๗๖๖-๒๗๖๗ ๒๗๖๘-๒๗๖๙ ๒๗๗๐-๒๗๗๑ ๒๗๗๒-๒๗๗๓ ๒๗๗๔-๒๗๗๕ ๒๗๗๖-๒๗๗๗ ๒๗๗๘-๒๗๗๙ ๒๗๘๐-๒๗๘๑ ๒๗๘๒-๒๗๘๓ ๒๗๘๔-๒๗๘๕ ๒๗๘๖-๒๗๘๗ ๒๗๘๘-๒๗๘๙ ๒๗๙๐-๒๗๙๑ ๒๗๙๒-๒๗๙๓ ๒๗๙๔-๒๗๙๕ ๒๗๙๖-๒๗๙๗ ๒๗๙๘-๒๗๙๙ ๒๘๐๐-๒๘๐๑ ๒๘๐๒-๒๘๐๓ ๒๘๐๔-๒๘๐๕ ๒๘๐๖-๒๘๐๗ ๒๘๐๘-๒๘๐๙ ๒๘๑๐-๒๘๑๑ ๒๘๑๒-๒๘๑๓ ๒๘๑๔-๒๘๑๕ ๒๘๑๖-๒๘๑๗ ๒๘๑๘-๒๘๑๙ ๒๘๒๐-๒๘๒๑ ๒๘๒๒-๒๘๒๓ ๒๘๒๔-๒๘๒๕ ๒๘๒๖-๒๘๒๗ ๒๘๒๘-๒๘๒๙ ๒๘๓๐-๒๘๓๑ ๒๘๓๒-๒๘๓๓ ๒๘๓๔-๒๘๓๕ ๒๘๓๖-๒๘๓๗ ๒๘๓๘-๒๘๓๙ ๒๘๔๐-๒๘๔๑ ๒๘๔๒-๒๘๔๓ ๒๘๔๔-๒๘๔๕ ๒๘๔๖-๒๘๔๗ ๒๘๔๘-๒๘๔๙ ๒๘๕๐-๒๘๕๑ ๒๘๕๒-๒๘๕๓ ๒๘๕๔-๒๘๕๕ ๒๘๕๖-๒๘๕๗ ๒๘๕๘-๒๘๕๙ ๒๘๖๐-๒๘๖๑ ๒๘๖๒-๒๘๖๓ ๒๘๖๔-๒๘๖๕ ๒๘๖๖-๒๘๖๗ ๒๘๖๘-๒๘๖๙ ๒๘๗๐-๒๘๗๑ ๒๘๗๒-๒๘๗๓ ๒๘๗๔-๒๘๗๕ ๒๘๗๖-๒๘๗๗ ๒๘๗๘-๒๘๗๙ ๒๘๘๐-๒๘๘๑ ๒๘๘๒-๒๘๘๓ ๒๘๘๔-๒๘๘๕ ๒๘๘๖-๒๘๘๗ ๒๘๘๘-๒๘๘๙ ๒๘๙๐-๒๘๙๑ ๒๘๙๒-๒๘๙๓ ๒๘๙๔-๒๘๙๕ ๒๘๙๖-๒๘๙๗ ๒๘๙๘-๒๘๙๙ ๒๙๐๐-๒๙๐๑ ๒๙๐๒-๒๙๐๓ ๒๙๐๔-๒๙๐๕ ๒๙๐๖-๒๙๐๗ ๒๙๐๘-๒๙๐๙ ๒๙๑๐-๒๙๑๑ ๒๙๑๒-๒๙๑๓ ๒๙๑๔-๒๙๑๕ ๒๙๑๖-๒๙๑๗ ๒๙๑๘-๒๙๑๙ ๒๙๒๐-๒๙๒๑ ๒๙๒๒-๒๙๒๓ ๒๙๒๔-๒๙๒๕ ๒๙๒๖-๒๙๒๗ ๒๙๒๘-๒๙๒๙ ๒๙๓๐-๒๙๓๑ ๒๙๓๒-๒๙๓๓ ๒๙๓๔-๒๙๓๕ ๒๙๓๖-๒๙๓๗ ๒๙๓๘-๒๙๓๙ ๒๙๔๐-๒๙๔๑ ๒๙๔๒-๒๙๔๓ ๒๙๔๔-๒๙๔๕ ๒๙๔๖-๒๙๔๗ ๒๙๔๘-๒๙๔๙ ๒๙๕๐-๒๙๕๑ ๒๙๕๒-๒๙๕๓ ๒๙๕๔-๒๙๕๕ ๒๙๕๖-๒๙๕๗ ๒๙๕๘-๒๙๕๙ ๒๙๖๐-๒๙๖๑ ๒๙๖๒-๒๙๖๓ ๒๙๖๔-๒๙๖๕ ๒๙๖๖-๒๙๖๗ ๒๙๖๘-๒๙๖๙ ๒๙๗๐-๒๙๗๑ ๒๙๗๒-๒๙๗๓ ๒๙๗๔-๒๙๗๕ ๒๙๗๖-๒๙๗๗ ๒๙๗๘-๒๙๗๙ ๒๙๘๐-๒๙๘๑ ๒๙๘๒-๒๙๘๓ ๒๙๘๔-๒๙๘๕ ๒๙๘๖-๒๙๘๗ ๒๙๘๘-๒๙๘๙ ๒๙๙๐-๒๙๙๑ ๒๙๙๒-๒๙๙๓ ๒๙๙๔-๒๙๙๕ ๒๙๙๖-๒๙๙๗ ๒๙๙๘-๒๙๙๙ ๓๐๐๐-๓๐๐๑ ๓๐๐๒-๓๐๐๓ ๓๐๐๔-๓๐๐๕ ๓๐๐๖-๓๐๐๗ ๓๐๐๘-๓๐๐๙ ๓๐๑๐-๓๐๑๑ ๓๐๑๒-๓๐๑๓ ๓๐๑๔-๓๐๑๕ ๓๐๑๖-๓๐๑๗ ๓๐๑๘-๓๐๑๙ ๓๐๒๐-๓๐๒๑ ๓๐๒๒-๓๐๒๓ ๓๐๒๔-๓๐๒๕ ๓๐๒๖-๓๐๒๗ ๓๐๒๘-๓๐๒๙ ๓๐๓๐-๓๐๓๑ ๓๐๓๒-๓๐๓๓ ๓๐๓๔-๓๐๓๕ ๓๐๓๖-๓๐๓๗ ๓๐๓๘-๓๐๓๙ ๓๐๔๐-๓๐๔๑ ๓๐๔๒-๓๐๔๓ ๓๐๔๔-๓๐๔๕ ๓๐๔๖-๓๐๔๗ ๓๐๔๘-๓๐๔๙ ๓๐๕๐-๓๐๕๑ ๓๐๕๒-๓๐๕๓ ๓๐๕๔-๓๐๕๕ ๓๐๕๖-๓๐๕๗ ๓๐๕๘-๓๐๕๙ ๓๐๖๐-๓๐๖๑ ๓๐๖๒-๓๐๖๓ ๓๐๖๔-๓๐๖๕ ๓๐๖๖-๓๐๖๗ ๓๐๖๘-๓๐๖๙ ๓๐๗๐-๓๐๗๑ ๓๐๗๒-๓๐๗๓ ๓๐๗๔-๓๐๗๕ ๓๐๗๖-๓๐๗๗ ๓๐๗๘-๓๐๗๙ ๓๐๘๐-๓๐๘๑ ๓๐๘๒-๓๐๘๓ ๓๐๘๔-๓๐๘๕ ๓๐๘๖-๓๐๘๗ ๓๐๘๘-๓๐๘๙ ๓๐๙๐-๓๐๙๑ ๓๐๙๒-๓๐๙๓ ๓๐๙๔-๓๐๙๕ ๓๐๙๖-๓๐๙๗ ๓๐๙๘-๓๐๙๙ ๓๑๐๐-๓๑๐๑ ๓๑๐๒-๓๑๐๓ ๓๑๐๔-๓๑๐๕ ๓๑๐๖-๓๑๐๗ ๓๑๐๘-๓๑๐๙ ๓๑๑๐-๓๑๑๑ ๓๑๑๒-๓๑๑๓ ๓๑๑๔-๓๑๑๕ ๓๑๑๖-๓๑๑๗ ๓๑๑๘-๓๑๑๙ ๓๑๒๐-๓๑๒๑ ๓๑๒๒-๓๑๒๓ ๓๑๒๔-๓๑๒๕ ๓๑๒๖-๓๑๒๗ ๓๑๒๘-๓๑๒๙ ๓๑๓๐-๓๑๓๑ ๓๑๓๒-๓๑๓๓ ๓๑๓๔-๓๑๓๕ ๓๑๓๖-๓๑๓๗ ๓๑๓๘-๓๑๓๙ ๓๑๔๐-๓๑๔๑ ๓๑๔๒-๓๑๔๓ ๓๑๔๔-๓๑๔๕ ๓๑๔๖-๓๑๔๗ ๓๑๔๘-๓๑๔๙ ๓๑๕๐-๓๑๕๑ ๓๑๕๒-๓๑๕๓ ๓๑๕๔-๓๑๕๕ ๓๑๕๖-๓๑๕๗ ๓๑๕๘-๓๑๕๙ ๓๑๖๐-๓๑๖๑ ๓๑๖๒-๓๑๖๓ ๓๑๖๔-๓๑๖๕ ๓๑๖๖-๓๑๖๗ ๓๑๖๘-๓๑๖๙ ๓๑๗๐-๓๑๗๑ ๓๑๗๒-๓๑๗๓ ๓๑๗๔-๓๑๗๕ ๓๑๗๖-๓๑๗๗ ๓๑๗๘-๓๑๗๙ ๓๑๘๐-๓๑๘๑ ๓๑๘๒-๓๑๘๓ ๓๑๘๔-๓๑๘๕ ๓๑๘๖-๓๑๘๗ ๓๑๘๘-๓๑๘๙ ๓๑๙๐-๓๑๙๑ ๓๑๙๒-๓๑๙๓ ๓๑๙๔-๓๑๙๕ ๓๑๙๖-๓๑๙๗ ๓๑๙๘-๓๑๙๙ ๓๒๐๐-๓๒๐๑ ๓๒๐๒-๓๒๐๓ ๓๒๐๔-๓๒๐๕ ๓๒๐๖-๓๒๐๗ ๓๒๐๘-๓๒๐๙ ๓๒๑๐-๓๒๑๑ ๓๒๑๒-๓๒๑๓ ๓๒๑๔-๓๒๑๕ ๓๒๑๖-๓๒๑๗ ๓๒๑๘-๓๒๑๙ ๓๒๒๐-๓๒๒๑ ๓๒๒๒-๓๒๒๓ ๓๒๒๔-๓๒๒๕ ๓๒๒๖-๓๒๒๗ ๓๒๒๘-๓๒๒๙ ๓๒๓๐-๓๒๓๑ ๓๒๓๒-๓๒๓๓ ๓๒๓๔-๓๒๓๕ ๓๒๓๖-๓๒๓๗ ๓๒๓๘-๓๒๓๙ ๓๒๔๐-๓๒๔๑ ๓๒๔๒-๓๒๔๓ ๓๒๔๔-๓๒๔๕ ๓๒๔๖-๓๒๔๗ ๓๒๔๘-๓๒๔๙ ๓๒๕๐-๓๒๕๑ ๓๒๕๒-๓๒๕๓ ๓๒๕๔-๓๒๕๕ ๓๒๕๖-๓๒๕๗ ๓๒๕๘-๓๒๕๙ ๓๒๖๐-๓๒๖๑ ๓๒๖๒-๓๒๖๓ ๓๒๖๔-๓๒๖๕ ๓๒๖๖-๓๒๖๗ ๓๒๖๘-๓๒๖๙ ๓๒๗๐-๓๒๗๑ ๓๒๗๒-๓๒๗๓ ๓๒๗๔-๓๒๗๕ ๓๒๗๖-๓๒๗๗ ๓๒๗๘-๓๒๗๙ ๓๒๘๐-๓๒๘๑ ๓๒๘๒-๓๒๘๓ ๓๒๘๔-๓๒๘๕ ๓๒๘๖-๓๒๘๗ ๓๒๘๘-๓๒๘๙ ๓๒๙๐-๓๒๙๑ ๓๒๙๒-๓๒๙๓ ๓๒๙๔-๓๒๙๕ ๓๒๙๖-๓๒๙๗ ๓๒๙๘-๓๒๙๙ ๓๓๐๐-๓๓๐๑ ๓๓๐๒-๓๓๐๓ ๓๓๐๔-๓๓๐๕ ๓๓๐๖-๓๓๐๗ ๓๓๐๘-๓๓๐๙ ๓๓๑๐-๓๓๑๑ ๓๓๑๒-๓๓๑๓ ๓๓๑๔-๓๓๑๕ ๓๓๑๖-๓๓๑๗ ๓๓๑๘-๓๓๑๙ ๓๓๒๐-๓๓๒๑ ๓๓๒๒-๓๓๒๓ ๓๓๒๔-๓๓๒๕ ๓๓๒๖-๓๓๒๗ ๓๓๒๘-๓๓๒๙ ๓๓๓๐-๓๓๓๑ ๓๓๓๒-๓๓๓๓ ๓๓๓๔-๓๓๓๕ ๓๓๓๖-๓๓๓๗ ๓๓๓๘-๓๓๓๙ ๓๓๔๐-๓๓๔๑ ๓๓๔๒-๓๓๔๓ ๓๓๔๔-๓๓๔๕ ๓๓๔๖-๓๓๔๗ ๓๓๔๘-๓๓๔๙ ๓๓๕๐-๓๓๕๑ ๓๓๕๒-๓๓๕๓ ๓๓๕๔-๓๓๕๕ ๓๓๕๖-๓๓๕๗ ๓๓๕๘-๓๓๕๙ ๓๓๖๐-๓๓๖๑ ๓๓๖๒-๓๓๖๓ ๓๓๖๔-๓๓๖๕ ๓๓๖๖-๓๓๖๗ ๓๓๖๘-๓๓๖๙ ๓๓๗๐-๓๓๗๑ ๓๓๗๒-๓๓๗๓ ๓๓๗๔-๓๓๗๕ ๓๓๗๖-๓๓๗๗ ๓๓๗๘-๓๓๗๙ ๓๓๘๐-๓๓๘๑ ๓๓๘๒-๓๓๘๓ ๓๓๘๔-๓๓๘๕ ๓๓๘๖-๓๓๘๗ ๓๓๘๘-๓๓๘๙ ๓๓๙๐-๓๓๙๑ ๓๓๙๒-๓๓๙๓ ๓๓๙๔-๓๓๙๕ ๓๓๙๖-๓๓๙๗ ๓๓๙๘-๓๓๙๙ ๓๔๐๐-๓๔๐๑ ๓๔๐๒-๓๔๐๓ ๓๔๐๔-๓๔๐๕ ๓๔๐๖-๓๔๐๗ ๓๔๐๘-๓๔๐๙ ๓๔๑๐-๓๔๑๑ ๓๔๑๒-๓๔๑๓ ๓๔๑๔-๓๔๑๕ ๓๔๑๖-๓๔๑๗ ๓๔๑๘-๓๔๑๙ ๓๔๒๐-๓๔๒๑ ๓๔๒๒-๓๔๒๓ ๓๔๒๔-๓๔๒๕ ๓๔๒๖-๓๔๒๗ ๓๔๒๘-๓๔๒๙ ๓๔๓๐-๓๔๓๑ ๓๔๓๒-๓๔๓๓ ๓๔๓๔-๓๔๓๕ ๓๔๓๖-๓๔๓๗ ๓๔๓๘-๓๔๓๙ ๓๔๔๐-๓๔๔๑ ๓๔๔๒-๓๔๔๓ ๓๔๔๔-๓๔๔๕ ๓๔๔๖-๓๔๔๗ ๓๔๔๘-๓๔๔๙ ๓๔๕๐-๓๔๕๑ ๓๔๕๒-๓๔๕๓ ๓๔๕๔-๓๔๕๕ ๓๔๕๖-๓๔๕๗ ๓๔๕๘-๓๔๕๙ ๓๔๖๐-๓๔๖๑ ๓๔๖๒-๓๔๖๓ ๓๔๖๔-๓๔๖๕ ๓๔๖๖-๓๔๖๗ ๓๔๖๘-๓๔๖๙ ๓๔๗๐-๓๔๗๑ ๓๔๗๒-๓๔๗๓ ๓๔๗๔-๓๔๗๕ ๓๔๗๖-๓๔๗๗ ๓๔๗๘-๓๔๗๙ ๓๔๘๐-๓๔๘๑ ๓๔๘๒-๓๔๘๓ ๓๔๘๔-๓๔๘๕ ๓๔๘๖-๓๔๘๗ ๓๔๘๘-๓๔๘๙ ๓๔๙๐-๓๔๙๑ ๓๔๙๒-๓๔๙๓ ๓๔๙๔-๓๔๙๕ ๓๔๙๖-๓๔๙๗ ๓๔๙๘-๓

Verification Report

Certificate No.: 2302413-001-01
Equipment: HEATING BLOCK DIGESTION
Model: 2520 Serial No.: 91794469
Resolution: 1 °C ID No.: UAE.WAS.011/2560
Manufacturer: FOSS

Date of Calibration: 30-31 March 2023 **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	0.96	377.74	2.1
2	380	380	0.40	377.28	2.1
3	380	380	1.18	377.82	2.1
4	380	380	0.44	377.19	1.6
5	380	380	0.11	377.30	1.6
6	380	380	0.14	377.90	1.6
7	380	380	1.17	373.85	2.1
8	380	380	0.33	376.96	2.1
9	380	380	0.14	374.18	2.1
10	380	380	0.96	378.56	2.0
11	380	380	1.04	378.34	2.0
12	380	380	0.35	378.06	2.0
13	380	380	0.48	377.05	1.6
14	380	380	0.38	379.19	1.6
15	380	380	0.50	377.48	1.6
16	380	380	0.48	378.33	1.7
17	380	380	0.71	377.60	1.7
18	380	380	0.35	376.77	1.7
19	380	380	0.84	377.06	1.8
20	380	380	0.41	378.58	1.8

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.

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

2008 ๒๕๔๙ มูลนิธิพัฒนาเทคโนโลยีเพื่ออุตสาหกรรม 107/2008 ซอย 35, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phli District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545 **เอกสารไม่ควบคุม** nfi.co.th

Verification Report

Certificate No.: 2302413-001-01
Equipment: HEATING BLOCK DIGESTION
Model: 2520 Serial No.: 91794469
Resolution: 1 °C ID No.: UAE.WAS.011/2560
Manufacturer: FOSS

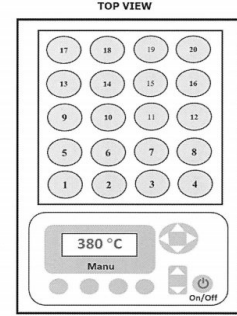
Date of Calibration: 30-31 March 2023 **Page 4 of 4**

Calibration point: 380 °C

Calibration result:

Continued

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



Sensor Installation Location

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 %.

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

2008 ๒๕๔๙ มูลนิธิพัฒนาเทคโนโลยีเพื่ออุตสาหกรรม 107/2008 ซอย 35, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phli District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545 **เอกสารไม่ควบคุม** nfi.co.th

FOSS

Customer Service Report

Date: 29/05/23
Customer: UAE
Instrument: KT8100
Address: Bangkok, Thailand
Serial: 91829052
Travel From Customer: 18.30 hr

Application	Special	Standard
Normal	Courtesy Visit	Installation
Distributor	PMA Onboarding	Quote
Internal	Warranty	Repair
Digital Service	Sales Support	Remote

PO/Quote Number: If applicable
PMA Type: PMA type, If applicable
Contract No.: If applicable

Details of Work / Test	Condition / Status
- ตรวจสอบ Function Test เครื่องวัด PM	OK
- ตรวจสอบ Part ของ PM - kit 2100/200 12 Mo	OK
- ตรวจสอบ Heating Coil = 32.3 °C	OK
- ตรวจสอบ Steam Generator	OK
- ตรวจสอบ Steam Valve = 54.8 °C	OK
- ตรวจสอบ Condenser Water Cooling Valve A/B = 54.8 °C	OK
- ตรวจสอบ Water level = 100 ml / 120 ml	OK
- ตรวจสอบ Air flow = 1.70 m/s	OK
- ตรวจสอบ Air flow = 1.70 m/s	OK

Part No.	Batch	Description	Qty
60031807	13.07.2023	Fog PM kit KT8100/2100 12 Mo	1

I confirm this report is accurate and complete
Signed FOSS: [Signature]
Signed Customer: [Signature]
Name: Pothana Pothana

Would you be willing to participate in a brief survey in order to tell us how we performed? Karnphong, B @ Vae.consum@nfi.co.th

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



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

Certificate of Calibration

Equipment: Cooled Incubator
Manufacturer: Binder
Model: KB 400 E6
Serial No.: 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 (302)
Received Order: 27 April 2023
Calibration Date: 27 April 2023
Ambient Temperature: (26 ± 10) °C
Relative Humidity: (50 ± 30) %
Calibrated by: Tawatchai Pama

Approved by: [Signature]
() Ponthippa Tameyakul
() Malee Butkruea
() Suwit Imjai

Issue Date: 12 May 2023

The Uncertainties are for a confidence probability of approximately 95 %
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Equipment : Cooled Incubator
Condition As-Received : Used Item
Reference : 2304-0461OC-1

Cert. No.: 23TM726
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument-

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

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

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

Result of Calibration :-

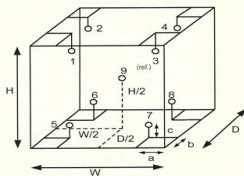
(*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

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

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



Probe Installation Details :

Dimension of Chamber :
a = 10 cm
b = 10 cm
c = 10 cm
D = 0.48 m
W = 0.65 m
H = 1.2 m
Capacity = 0.37 m³

เอกสารไม่ควบคุม



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

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

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.0090	0.16	0.21	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
35.0	34.913	34.997	34.834	34.893	35.034	35.027	35.025	35.035	34.980	0.30

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

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

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

UUC* : Unit Under Calibration

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

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

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TEL. 02-2717-3000-29 FAX. 02-1719-9484



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

Certificate of Calibration

Equipment : Incubator

Manufacturer : Memmert

Model : IPP 260

Serial No. : V616.0066

ID No. : UAE.MIC.032/2559

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

Location : Microbiology Laboratory (302)

Received Order : 27 April 2023

Calibration Date : 27 - 28 April 2023

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Tawatchai Pama

Approved by : 
Approved Signatory

() Pormthippa Tameyakul
() Malee Butkruea
() Suwit Imjai

Issue Date : 11 May 2023

The Uncertainties are for a confidence probability of approximately 95%

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

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

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

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

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

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

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

UUC* : Unit Under Calibration

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

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

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

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

Procedure Used :-

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

Condition of this result of calibration

1. Reference standard instrument:-

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

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

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

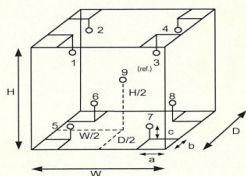
Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

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

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



Probe Installation Details :

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

Dimension of Chamber :

D = 0.50 m
W = 0.64 m
H = 0.80 m
Capacity = 0.26 m³

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



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

Certificate of Calibration

Equipment : Water Bath

Manufacturer : Memmert

Model : WNE 14

Serial No. : L416.0606

ID No. : UAE.MIC.002/2560

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

Location : Microbiology Laboratory

Received Order : 15 February 2023

Calibration Date : 15 February 2023

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Suwit Imjai

Approved by :

Approved Signatory

() Pornthippa Tameyakul
(/) Malee Butkruea

Issue Date : 24 February 2023

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-0295OC-2

Cert. No.: 23TM193
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

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

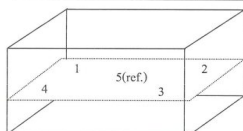
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

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



Front

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

เอกสารไม่ควบคุม



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-0295OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 23TM193
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	44.453	44.437	44.428	44.477	44.459

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

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

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

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

UUC* : Unit Under Calibration

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

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

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



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

Certificate of Calibration

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

The Uncertainties are for a confidence probability of approximately 95%

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

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

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY59003411	Z2LM165	26 Nov 2023

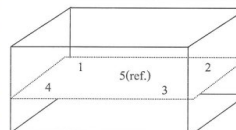
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

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



Front

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

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Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2302-0295OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

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

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

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

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

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

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

UUC* : Unit Under Calibration

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

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

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



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

Certificate of Calibration

Equipment : Autoclave
Manufacturer : ALP
Model : CL-40L
Serial No. : 808763
ID No. : UAE.MIC.026/2563
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory (301)
Received Order : 27 April 2023
Calibration Date : 27 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Preecha Hlahib
Approved by :
() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date : 11 May 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0053944



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2304-0461OC-2
Cert. No.: 23TM763
Page : 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT03 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T
The temperature scale used was based on ITS-90.

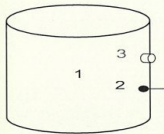
Condition of this result of calibration

1. Reference standard instrument:-

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

- This certificate is valid only to the item calibrated on date and place of calibration.
- This certification is traceable to the International System of Unit.
- This result of calibration covers laboratory autoclaves for the sterilization of goods and material which could be infected with organisms categorized as Hazard Group 1, 2 and 3**
- (** = Categorization of pathogens according to hazard and categories of containment, second edition, 1990)
It does not cover autoclaves for use with material infect with organisms in Hazard Group 4, for which complete containment and sterilization of infected condensate is considered to be essential.
This result of calibration does not apply to sterilizers or disinfectors used for medical, dental, pharmaceutical or veterinary purposes which are directly concerned with patient care, or those used for fabrics subjected to sterilization which are required to be dry at the end of cycle.

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



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

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

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a 1159968



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2304-0461OC-2
Cert. No.: 23TM763
Page : 3 of 3

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

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

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

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

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

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

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

UUC* : Unit Under Calibration

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

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

-o-o-

เอกสารไม่ควบคุม

a 1159967



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



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

Certificate of Calibration

Equipment : Autoclave
Manufacturer : ALP
Model : CL-40L
Serial No. : 808763
ID No. : UAE.MIC.026/2563
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory (301)
Received Order : 27 April 2023
Calibration Date : 27 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Preecha Hlahib
Approved by :
() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date : 11 May 2023

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

A 0053944



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2304-0461OC-2
Cert. No.: 23TM763
Page : 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT03 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T
The temperature scale used was based on ITS-90.

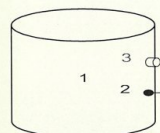
Condition of this result of calibration

1. Reference standard instrument:-

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

- This certificate is valid only to the item calibrated on date and place of calibration.
- This certification is traceable to the International System of Unit.
- This result of calibration covers laboratory autoclaves for the sterilization of goods and material which could be infected with organisms categorized as Hazard Group 1, 2 and 3**
- (** = Categorization of pathogens according to hazard and categories of containment, second edition, 1990)
It does not cover autoclaves for use with material infect with organisms in Hazard Group 4, for which complete containment and sterilization of infected condensate is considered to be essential.
This result of calibration does not apply to sterilizers or disinfectors used for medical, dental, pharmaceutical or veterinary purposes which are directly concerned with patient care, or those used for fabrics subjected to sterilization which are required to be dry at the end of cycle.

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



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

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

เอกสารไม่ควบคุม

a 1159968



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2304-0461OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

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

Operating parameter Set : Temperature = 115.0 °C		Sterilization period = 15 minute		Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)				
115.0	115.0	1	115.213				
		2	115.166				

Operating parameter Set : Temperature = 121.0 °C		Sterilization period = 30 minute		Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)				
121.0	121.0	1	121.260				
		2	121.224				

Average* : The average of 30 values in each position.
Stability : One-half of the greatest maximum difference of measured temperature at any one probe.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

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เอกสารไม่ควบคุม

a 1159967



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



Cert. No.: 23TM376
Page : 1 of 3

Certificate of Calibration

Equipment : Refrigerator
Manufacturer : Sanyo
Model : SBC-337KD(GYN)
Serial No. : 71100607
ID No. : UAE.MIC.003/2551
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 : 11 April 2023
Calibration Date : 12 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Preecha Hlahib
Approved by :
() Ponthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date : 24 April 2023

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

a 0257354



Equipment : Refrigerator
Condition As-Received : Used Item
Reference : 2304-0155OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 23TM376
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
4	4	-	3.6	2.3	8.2	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
4	5.544	4.470	4.383	4.041	3.949	3.838	3.457	3.471	3.891	4.3

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

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เอกสารไม่ควบคุม

a 1159270



Equipment : Refrigerator
Condition As-Received : Used Item
Reference : 2304-0155OC-2

Cert. No.: 23TM376
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 Thermocouple Type T.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

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

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

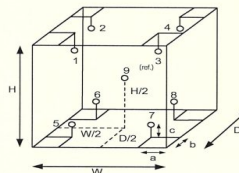
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	30
REL.Humid. (%)	65	70
AC Supply (Volt)	220	221



Probe Installation Details :

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

Dimension of Chamber :

D = 0.45 m
W = 0.45 m
H = 1.0 m
Capacity = 0.20 m³

Position :	Ref. Std. ID No.:
1	20-19TC-01
2	20-19TC-02
3	20-19TC-03
4	20-19TC-04
5	20-19TC-05
6	20-19TC-06
7	20-19TC-07
8	20-19TC-08
9 (ref.)	20-19TC-09

เอกสารไม่ควบคุม

a 1159271



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



Cert. No.: 23TM1077
Page : 1 of 3

Certificate of Calibration

Equipment : Refrigerator
Manufacturer : Sanden Intersol
Model : YPM11P
Serial No. : YPM11P-150801805
ID No. : UAE.MIC.012/2558
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 10 July 2023
Calibration Date : 10 July 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Man Pattanapongpaiboon
Approved by :
() Ponthippa Tameyakul
() Malee Butkruea
() Suwit Imjai

Issue Date : 20 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม



Equipment : Refrigerator
Condition As-Received : Used Item
Reference : 2307-0087OC-4
Procedure Used :-

Cert. No.: 23TM1077
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	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY59003411	22LM165	TPA	26 Nov 2023

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

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

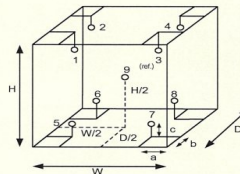
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	24	24
REL.Humid. (%)	54	56
AC Supply (Volt)	221	222



Probe Installation Details :

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

Dimension of Chamber :

D = 0.51 m
W = 1.0 m
H = 1.2 m
Capacity = 0.61 m³

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

เอกสารไม่ควบคุม



Equipment : Refrigerator
Condition As-Received : Used Item
Reference : 2307-0087OC-4
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 23TM1077
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
5.0	5.0	-1.9	2.6	3.2	5.9	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
5.0	2.237	2.432	2.281	2.637	4.642	4.536	4.667	4.577	3.015	3.2

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม



Certificate of Calibration

Equipment : Balance
Model : PX623
Serial No. (or ID.) : C236754745 (UAE.MIC.055/2565)
Manufacturer : Ohaus
Condition : In condition

Certificate No.: C01234158
Issued Date: 08 December 2023
Job No.: WO-00011251
Page: 1 of 3

Customer : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak Sub-District,
Phrakhanong District, Bangkok, THAILAND 10260

Environment Condition: Temperature 25 °C ± 0.5 °C
Humidity 54 %RH ± 1.7 %RH

Calibration Place: United Analyst and Engineering Consultant Co., Ltd. (301 Microbiology Room)
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak Sub-District,
Phrakhanong District, Bangkok, THAILAND 10260

Calibration By: Mr. Adisai Maknoi
Calibration Date: 07 December 2023
The Method used: In-house method, CAL-WI-47, based on UKAS Lab 14
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Co., Ltd. Certificate No. C02222534

(Mr. Adisai Maknoi)

Person in charge

(Mr. Rungrud Jenkitkulchai)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2636 7300 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-hailand

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CAL-FM-C01-14: 12 Sep 2022

Calibration Results:

Before Adjustment

Eccentric Error: Weight to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.

Nominal Test Value		Reference Points (g)				
		A	B	C	D	E
200 (g)		-	0.000	-0.003	0.000	0.001

Repeatability: Determination of the standard deviation of weighing balance., Readability 0.001 (g)

Nominal test value (g)	Standard Deviation
50	0.0006
500	0.0008

Error of Indication from nominal or conventional mass value., Readability 0.001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
1	1.0000	1.000	0.000	0.0013	2.10
5	5.0001	5.000	0.000	0.0013	2.10
10	10.0001	10.001	0.001	0.0013	2.10
20	20.0000	20.000	0.000	0.0013	2.09
50	50.0001	50.000	0.000	0.0013	2.09
100	100.0001	100.001	0.001	0.0013	2.09
200	200.0004	200.002	0.002	0.0014	2.07
300	300.0005	300.002	0.002	0.0015	2.05
400	400.0006	400.004	0.003	0.0016	2.03
500	500.0006	500.008	0.007	0.0019	2.02
600	600.0007	600.009	0.008	0.0021	2.01

After Adjustment

Eccentric Error: Weight to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.

Nominal Test Value		Reference Points (g)				
		A	B	C	D	E
200 (g)		-	0.001	-0.002	-0.002	0.001

Repeatability: Determination of the standard deviation of weighing balance., Readability 0.001 (g)

Nominal test value (g)	Standard Deviation
50	0.0006
500	0.0008

Error of Indication from nominal or conventional mass value., Readability 0.001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
1	1.0000	1.000	0.000	0.0013	2.10
5	5.0001	5.000	0.000	0.0013	2.10
10	10.0001	10.000	0.000	0.0013	2.10
20	20.0000	20.000	0.000	0.0013	2.10
50	50.0001	50.000	0.000	0.0013	2.10
100	100.0001	100.000	0.000	0.0014	2.09
200	200.0004	200.000	0.000	0.0014	2.07
300	300.0005	300.001	0.001	0.0015	2.05
400	400.0006	400.002	0.001	0.0017	2.04
500	500.0006	500.001	0.000	0.0019	2.02
600	600.0007	600.002	0.001	0.0021	2.01

The End of Certificate

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The error of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, UKAS Lab14. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk < 50% PFA.
☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).
; PFA – Probability of False Accept

(Mr. Rungrod Jenkitrakulchai)

Authorized signatory

Statements of conformity:

Before Adjustment

Readability: 0.001 g

Nominal Value g	Error of Indication g	Guard band (w) g	Tolerance (±) g	Conformity
1	0.000	0.0013	0.002	Pass
5	0.000	0.0013	0.010	Pass
10	0.001	0.0013	0.020	Pass
20	0.000	0.0013	0.040	Pass
50	0.000	0.0013	0.100	Pass
100	0.001	0.0013	0.200	Pass
200	0.002	0.0014	0.400	Pass
300	0.002	0.0015	0.600	Pass
400	0.003	0.0016	0.800	Pass
500	0.007	0.0019	1.000	Pass
600	0.008	0.0021	1.200	Pass

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

Statements of conformity:

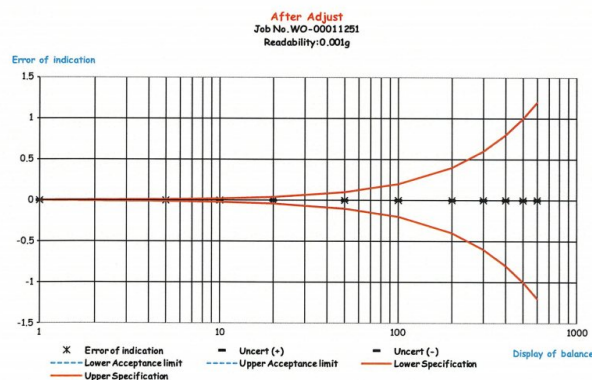
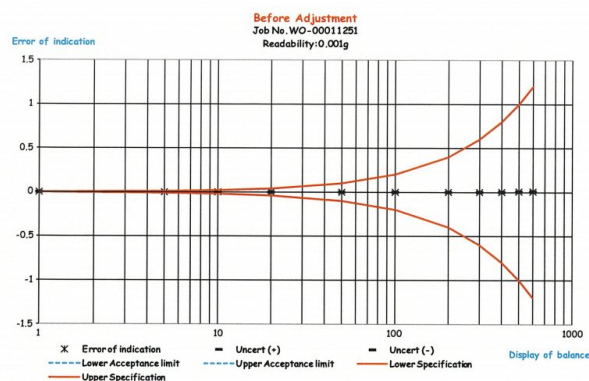
After Adjustment

Readability: 0.001 g

Nominal Value g	Error of Indication g	Guard band (w) g	Tolerance (±) g	Conformity
1	0.000	0.0013	0.002	Pass
5	0.000	0.0013	0.010	Pass
10	0.000	0.0013	0.020	Pass
20	0.000	0.0013	0.040	Pass
50	0.000	0.0013	0.100	Pass
100	0.000	0.0014	0.200	Pass
200	0.000	0.0014	0.400	Pass
300	0.001	0.0015	0.600	Pass
400	0.001	0.0017	0.800	Pass
500	0.000	0.0019	1.000	Pass
600	0.001	0.0021	1.200	Pass

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of conformity



ใบตรวจสอบสภาพเครื่องชั่ง

เลขที่ใบงาน: WO-00011251

ชนิดเครื่องมือ: Balance

รุ่น: PX623

หมายเลขเครื่อง: C236754745

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
07 Dec 2023			07 Dec 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ/Adapter, power supply 220/110V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสมบูรณ์ชุดกระดกกันแอม (Cover)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. ความสมบูรณ์ชุดของระดับน้ำ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การปรับระดับของขาตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทดสอบของไม่กด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. ความสมบูรณ์ของ Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. การแสดงผลของ Display หลังวางน้ำหนัก	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ชุดรองจานเชิง (Stopper) / pan support	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	การทำงานของ Function Internal / External	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. ความสะอาดของตัวเครื่องมือภายนอกและภายใน load cell	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

หมายเหตุเพิ่มเติม/ข้อแนะนำ :

Mr. Adisai Maknoi
Service Engineer