ภาคผนวก จ
เอกสารสอบเทียบเครื่องมือ



แผนการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการโรงแรมแกรนด์ เซ็นเตอร์ พอยท์ โฮเท็ล เพลินจิต

ระหว่างเดือนมกราคม-มิถุนายน พ.ศ. 2566

รายการใบรับรองสอบเทียบ ทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์ สำหรับคุณภาพน้ำ

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์สำหรับคุณภาพน้ำ									
1	pH Meter	อุณหภูมิ ความเป็นกรด-ด่าง	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 / 123052512	National Food Institute, Ministry of Industry, Thailand	2202093-001-01	24 Mar 23	22 Mar 24	-
3	Analytical Balance (Repeatability 0.01 mg)	ปริมาณของแข็งแขวนลอยทั้งหมด	Mettler-Toledo	XP6/ B322373893	Mettler-Toledo	TH20558-099-040722- ACC-TH	7 Apr 22	6 Apr 23	-
4	Hot Air Oven		Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	23TM373	11 Apr 23	9 Apr 24	-
5	BOD Incubator	บีโอดี	Arco	UR-1320	Technology Promotion Association (Thailand-Japan)	23TM372	11 Apr 23	9 Apr 24	-
6	BOD Incubator		Arco	UR-1320	Technology Promotion Association (Thailand-Japan)	23TM375	12 Apr 23	10 Apr 24	-
7	Digestor Unit	ไนโตรเจนในรูป ที เค เอ็น	FOSS	2520 / 91794469	National Food Institute, Ministry of Industry, Thailand	2302413-001-01	30 Mar 23	28 Mar 24	-
8	Distillation Unit (Kjeldahl Method)		FOSS	KT200 / 91790524	FOSS	MS63FOT0084B	30 Nov 22	29 Nov 23	-
9	Analytical Balance (Repeatability 0.1 mg)	น้ำมันและไขมัน	Mettler-Toledo	AB-204S/FACT / 1129361010	Mettler-Toledo	2303074-001-01	26 May 23	24 May 24	-
10	Incubator	Legionella sp. Coliform Bacteria	Memmert	IPP 260 / V618.0033	Technology Promotion Association (Thailand-Japan)	23TM729	27 Apr 23	25 Apr 24	-
11	Incubator	Standard Plate Count E. Coli	Memmert	IPP 260 / V615.0187	Technology Promotion Association (Thailand-Japan)	23TM378	12 Apr 23	10 Apr 24	-
12	Incubator		Memmert	INB400 / E411.1325	Technology Promotion Association (Thailand-Japan)	22TM1063	11 Jul 22	10 Jul 23	-
13	Water Bath		Memmert	WNE 14 / L416.0606	Technology Promotion Association (Thailand-Japan)	23TM193	15 Feb 23	14 Feb 24	-
14	Water Bath	Legionella sp. Coliform Bacteria	Memmert	WNE 14 / L416.0612	Technology Promotion Association (Thailand-Japan)	23TM194	15 Feb 23	14 Feb 24	-
15	Analytical Balance	Standard Plate Count E. Coli	Mettler-Toledo	XPE205 / B748058497	Mettler-Toledo	TH2065-067-092322- ACC-TH	26 Sep 22	25 Sep 23	-
16	Autoclave		ALP	CL-40L / 808763	Technology Promotion Association (Thailand-Japan)	23TM763	27 Apr 23	25 Apr 24	-

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

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

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 N	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	832606	CPAchem	PH216.L5	8 August 2024
2.5 pH buffer 6.865 (Primary pH buffer Solution)	832607	CPAchem	PH217.L5	8 August 2024
2.6 pH buffer 10.01 (Primary pH buffer Solution)	832609	CPAchem	PH220.L5	8 August 2023
2.7 pH buffer 7.00 (Standard pH buffer Solution)	832610	CPAchem	PH107.L5	8 August 2023

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

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

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

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

[redacted]

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CALIBRATION 0061

Calibration Certificate

Certificate No.: 2301846-001-01

Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

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 [redacted]
(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.

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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

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:

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 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.

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

[redacted]

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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

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.: 9018311 **ID.No.** N/A

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

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

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THAILAND
NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Certificate

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

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
Scientist

Approved by [redacted]
(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.

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CALIBRATION 0061

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

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

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

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

Note
- UUC* : Unit Under Calibration

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

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CALIBRATION 0061

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

[redacted]

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CALIBRATION 0061

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	NFI.BTH003/17	PONPE	TE 650555-01	21 September 2023

	Certified Reference Material	Lot. No.	Manufacturer	Ref N	Expire Date
2.4	pH buffer 4.008 (Primary pH buffer Solution)	873608	CPAchem	PH216.L5	16 February 2025
2.5	pH buffer 6.865 (Primary pH buffer Solution)	873609	CPAchem	PH217.L5	16 February 2025
2.6	pH buffer 10.01 (Primary pH buffer Solution)	873611	CPAchem	PH220.L5	16 February 2024
2.7	pH buffer 7.00 (Standard pH buffer Solution)	873612	CPAchem	PH107.L5	16 February 2024

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

3.1	Instruments No.2.1	through	NSC-TISI-TIS 17025 Laboratory Accredition of Calibration No.0008
3.2	Instruments No.2.2	through	NSC-TISI-TIS 17025 Laboratory Accredition of Calibration No.0061
3.3	Instruments No.2.3	through	NSC-TISI-TIS 17025 Laboratory Accredition of Calibration No.0061
3.4	Certified Reference Material No. 2.4 to 2.6	traceable to	Primary measurement method- Harned cell using calibrated thermometer, barometer, and nanovoltmeter.The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
3.5	Certified Reference Material No.2.7	traceable to	BIM RefN HI-13 LotN 25.05.2022; BIM RefN HI-16 LotN 02.06.2022; BIM RefN HI-13 LotN 25.05.2022; BIM RefN HI-16 LotN 02.06.2022, the Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

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

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

[redacted]

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

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NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Report

Certificate No.: 2302181-001-01

Equipment: Digital Thermometer with RTD (pH Meter)

Resolution: 0.1 °C Model: SevenEasy pH

Serial No.: 1230525212 ID No.: UAE.WAS.003/2553

Manufacturer: METTLER TOLEDO

Date of Calibration: 24 March 2023

Calibration point: 15.0, 25.0 and 30.0 °C

Calibration result:

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

Dimension of probe : Diameter 3 mm., Length 120 mm.,

Sheath material : N/A

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

Note

- UUC* : Unit Under Calibration

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

--------- End ---------

[redacted]

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Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545
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national food institute
ministry of industry
อุตสาหกรรมพัฒนามูลนิธิเพื่อสถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

ilac-MRA

NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Report

Certificate No.: 2302181-001-01

Equipment: Digital Thermometer with RTD (pH Meter)

Resolution: 0.1 °C Model: SevenEasy pH

Serial No.: 1230525212 ID No.: UAE.WAS.003/2553

Manufacturer: METTLER TOLEDO

Date of Calibration: 24 March 2023

Location: Chemical Calibration Laboratory, National Food Institute

Environment Condition: Ambient Temperature 25 °C ± 1 °C

Relative Humidity 55 % ± 5 %

Condition of this results of Calibration:

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

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

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

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

[redacted]

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

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2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545
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เอกสารไม่ควบคุม

Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-0015OC-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:-

Instruments	Model	Serial No.	ID No.	Test report No.	Due date
1) Standard Weight Set (E2)	15884	24053	70RC007	MM-0010-22	20 Jan 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration ( ) Without Adjustment (*) After Adjustment by Internal Calibration
Range capacity : 0 g to 6.1 g **Resolution** 0.000001 g

Before Adjustment :

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
3	2.999987	+0.000013	0.026	2.00
6	6.000003	-0.000003	0.036	2.00

After Adjustment :

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

Applied Weight (g)	Standard Deviation of Reading (g)
3	0.0000027
6	0.0000030

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
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TEL. 0-2717-3000-29 FAX. 0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : XP6
Serial No. : B322373893
ID No. : UAE.AIR.019/2556
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Balance Room 2
Received order : 07 April 2023
Calibration Date : 07 April 2023
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 90 %
Calibrated by : Suwit Imjai
Approved by : [redacted]
Approved Signatory

( ) Pornthippa Tameyakul
(✓) Malee Butkruea

Issue Date : 10 April 2023

The Uncertainties are for a confidence probability of approximately 95%

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NSC-TISI-TIS17025
CALIBRATION 0008

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 :	[redacted] Approved Signatory

( ) 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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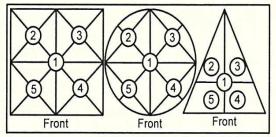
A 0053359

Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-0015OC-3

Result of calibration

2. Effect of off center loading

A mass of 2 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table



Position 1 (g)	Position 2 (g)	Position 3 (g)	Position 4 (g)	Position 5 (g)	Maximum difference between off-center and central loading (g)
-0.000006	-0.000007	-0.000007	-0.000010	-0.000002	0.000004

3. Departure from nominal value

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (*k*)
Unload	0.000000	0.000000	0.0060	2.37
0.01	0.009998	+0.000002	0.0060	2.13
0.05	0.050003	-0.000003	0.0070	2.05
0.1	0.100007	-0.000007	0.0090	2.03
0.15	0.150000	0.000000	0.011	2.00
0.17	0.169998	+0.000002	0.014	2.00
0.2	0.200002	-0.000002	0.014	2.00
1.5	1.500001	-0.000001	0.020	2.00
3	2.999990	+0.000010	0.026	2.00
4.5	4.499994	+0.000006	0.036	2.00
6	5.999982	+0.000018	0.036	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-

เอกสารไม่ควบคุม

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

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

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

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

-o0o-

[redacted]

เอกสารไม่ควบคุม

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

Cert. No.: 23TM373

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

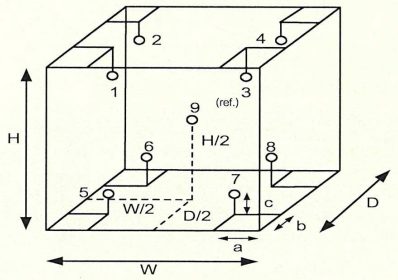
1. Reference standard instrument:-

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

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

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

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



Probe Installation Details :

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

Dimension of Chamber :

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

Position :	Ref. Std. ID No.: @ Calibration Point (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

[redacted]

เอกสารไม่ควบคุม

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

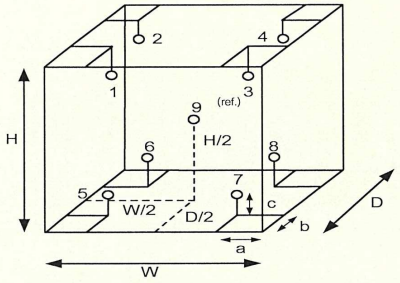
1. Reference standard instrument:-

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

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



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

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

[redacted]

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NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : ARCO
Model : UR-1320
Serial No. : -
ID No. : UAE.WAO.006/2553
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2

Received Order : 11 April 2023
Calibration Date : 11 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Krisda Malee

Approved by : [redacted]
Approved Signatory

( ) 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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NSC-TISI-TIS17025
CALIBRATION 0008

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 :	[redacted] Approved Signatory

( ) 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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A 0053360

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

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

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor **k**
20.0	20.0	19.9	0.40	0.72	0.97	2

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

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

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

-o0o-

[redacted]

เอกสารไม่ควบคุม

a 1151821

Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2304-0156OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 23TM375

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) Position									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 %.

-o0o-

[redacted]

เอกสารไม่ควบคุม

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

Cert. No.: 23TM375

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

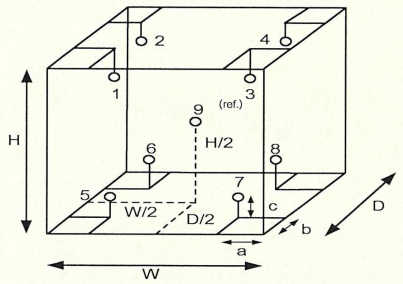
1. Reference standard instrument:-

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

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	27
REL.Humid. (%)	42	45
AC Supply (Volt)	219	220



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

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^3

[redacted]

เอกสารไม่ควบคุม

nfi
national food institute
ministry of industry
อุตสาหกรรมพัฒนามูลนิธิเพื่อสถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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

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 thermocuples 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	MY44045576/MY41194453	TC22/0044	5-May-2023	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 : [X] Without adjustment [ ] After adjustment

[redacted]

2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่ขัน เขตบางพลัด กรุงเทพมหานคร 10700
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545
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ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Verification Certificate

Certificate No.: 2302413-001-01

Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

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 [redacted]
(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 %.

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.

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

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

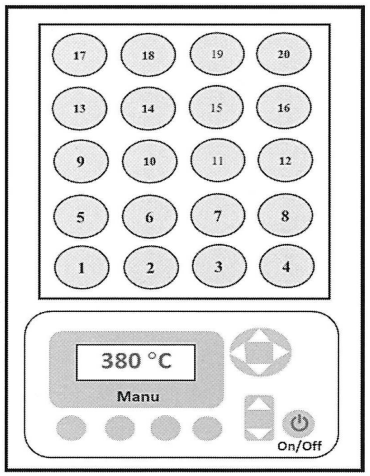
Date of Calibration: 30-31 March 2023

Calibration point: 380 °C

Calibration result: Continued

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

TOP VIEW



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 %.

--------- End ---------

[redacted]

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Food Industrial Laboratory Service Center

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

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.

[redacted]

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

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FossCare™

FOSS Preventive Maintenance Protocol

Customer : UAE

Instrument	Kjeltec™ 2100 = Kjeltec 200	
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	S/N 91790524

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

FOSS Analytical A/S
69 Slangerupgate
DK-3400 Hillerød
Denmark
Tel +45 7010 3370
Fax +45 7010 3371
E-mail support@foss.dk
Web www.foss.dk

FOSS Analytical AB
Box 70
SE-263 21 Höganäs
Sweden
Tel +46 42 361500
Fax +46 42 340349
E-mail support@foss.dk
Web www.foss.dk

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FOSS

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

Customer Service Report

Report No: 5874

Date:	30/11/21
Customer:	UAE
Instrument:	KT200
Address:	91 ม.[illegible] [illegible] [illegible] [illegible]
Serial:	91790524

Hours	Travel To Customer		Labour		Travel From Customer	
Start	8.00	1	9.00		14.00	1
Finish	9.00		14.00		15.00	

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 compatible Pro **Contract No.** if applicable

Details of Work / Test	Condition / Status
- 1. Check Instrument	Ok
- 2/ตัวเลข PM kit for kt 200	Pass
- 2/ตัวเลข Safety Valve	Pass
- 2/ตัวเลข Rubber Grommet	Pass
- 2/ตัวเลข Seal	Pass
- 2/ตัวเลข Heating element	Pass
- 2/ตัวเลข New panel PCB	Pass
- 2/ตัวเลข Safety door complete	Pass
- Clean & lubricant	Pass
- Check leakaged	Pass
- Check volum Alkali set 30ml for 28 ml	
-	

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
1549-0028	09.11.20	Rubber Grommet for Heating coil	2
10005512	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

I confirm this report is accurate and complete

Signed FOSS	[redacted]	**Signed Customer**	[redacted]
Name		**Name**	

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

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Food Industrial Laboratory Service Center

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NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Certificate

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

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: AB204-S/FACT

Serial No.: 1129361010

ID No.: UAE.WAS.002/2552

Order No.: 2303074

Operation No.: 2303074-001

Date of Receipt: 26 May 2023

Date of Calibration: 26 May 2023

Calibrated by Mr.Pheraphat Tuanjit
Scientist

Approved by [redacted]
(Miss Preeyaporn Jaengkarnkit)
Vice President, Department of Laboratory Services
Responsible for the Technical Management Team

Date of Issue: 29 May 2023

The uncertainties are for a confidence probability of approximately 95%

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

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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	☐
2	Replace	Non return valve	1000 3538	☐
3	Replace valves in alkali pump	Valve kit reagent/water pump	1575 0093	☐
4	Replace steam tubing	Silicone tubing 8/12 mm	1582 0006	☐
5	Replace alkali tubing	Tubing reinforced for alkali	1582 0011	☐
6	Replace water tubing	Tubing PVC 8/11 mm	1582 0004	☐
7	Cleaning	Steam generator		☐
8	Cleaning	Splash head		☐

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	☑
2	Check distillation volume		120ml	100 – 150 ml/4 min	☑
3	Check front panel switches				☑
4	Check cables and electrical connections				☑
5	Check level pins in steam generator				☑
6	Check safety door switch				☑

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NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Report

Certificate No.: 2303074-001-01

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: 26 May 2023

Calibration Results: **(Continued)**

Calibration Range: 0-200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

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

[redacted]

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

---------- **End** ----------

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Food Industrial Laboratory Service Center

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NSC-TISI-TIS 17025
CALIBRATION 0061

Calibration Report

Certificate No.: 2303074-001-01

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: 26 May 2023

Environment Condition: Ambient Temperature: 23.7 ± 0.1 °C Relative Humidity: 61 ± 2.2 %

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

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

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

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	B505567572	TCS	M2304053S	8 April 2024

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	608-H1	NFI.BTH 018/23	Quality Reborn	QR23-0491	21 February 2024

3. This certification is traceable to SI UNIT

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

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

Calibration Results:

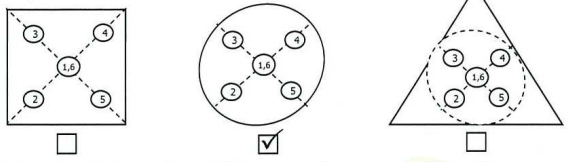
1. Repeatability of Reading:

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

2. Off-Center Error:

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

The balance reading obtained is given in the table.



☐ ☑ ☐

1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
99.9996	99.9995	99.9995	99.9999	99.9999	99.9997	0.0003

[redacted]

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เอกสารไม่ควบคุม

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2304-0461OC-7

Cert. No.: 23TM729
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

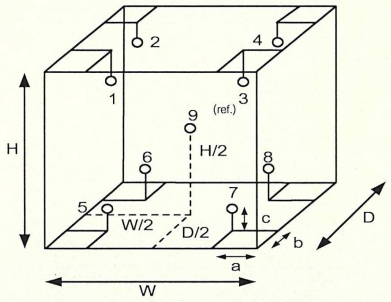
1. Reference standard instrument:-

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	21
REL.Humid. (%)	72	77
AC Supply (Volt)	230	231



Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	18-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	18-18RTD-10
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	18-18RTD-09

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	m^3

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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

NSC-TISI-TIS17025
CALIBRATION 0008

Cert. No.: 23TM729
Page : 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : IPP 260
Serial No. : V618.0033
ID No. : UAE.MIC.021/2561
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory (302)
Received Order : 27 April 2023
Calibration Date : 27 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Tawatchai Pama
Approved by : [redacted]
Approved Signatory

( ) 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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CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
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TEL. 0-2717-3000-29 FAX. 0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

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

Certificate of Calibration

Equipment : Incubator

Manufacturer : Memmert

Model : IPP 260

Serial No. : V615.0187

ID No. : UAE.MIC.003/2559

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

Location : Microbiology Laboratory

Received Order : 11 April 2023
Calibration Date : 12 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Preecha Hlahib

Approved by : [redacted]
Approved Signatory

( ) 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

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2304-0461OC-7
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
22.0	22.0	22.0	0.058	0.11	0.19	2
44.0	44.0	44.0	0.066	0.50	0.87	2

Calibration Point (°C)	Measured Temperature (°C) Position									Uncertainty (±°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
22.0	22.009	22.038	21.971	22.005	22.004	22.009	21.941	21.959	22.022	0.30
44.0	44.393	44.447	44.029	44.204	43.899	43.895	43.637	43.923	44.085	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 %.

-o0o-

เอกสารไม่ควบคุม

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

Cert. No.: 23TM378

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

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

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

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

-o0o-

เอกสารไม่ควบคุม

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2304-0155OC-1

Cert. No.: 23TM378

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

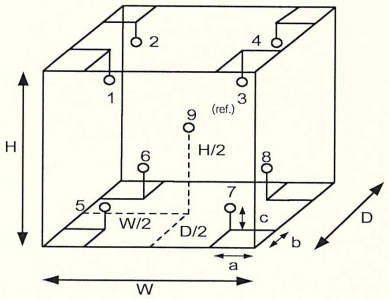
1. Reference standard instrument:-

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

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

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

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



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

Probe Installation Details :

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

Dimension of Chamber :

D = 0.50 m
W = 0.64 m
H = 0.80 m
Capacity = 0.26 m^3

เอกสารไม่ควบคุม

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

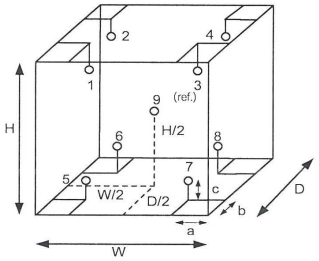
1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013823	22LM24	26 Feb 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	25
REL.Humid. (%)	56	62
AC Supply (Volt)	219	223



Position :	Ref. Std. ID No.:
1	21-17RTD-01
2	21-17RTD-02
3	17RTD-03
4	17RTD-04
5	17RTD-05
6	17RTD-06
7	17RTD-07
8	17RTD-08
9 (ref.)	17RTD-09

Probe Installation Details :

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

Dimension of Chamber :

D =	0.40	m
W =	0.33	m
H =	0.40	m
Capacity =	0.053	m^3

เอกสารไม่ควบคุม

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

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Equipment : Incubator

Manufacturer : Memmert

Model : INB 400

Serial No. : E411.1325

ID No. : UAE.MIC.003/2555

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

Location : Microbiology Laboratory

Received Order : 11 July 2022
Calibration Date : 11 July 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by : [redacted]
Approved Signatory

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

Issue Date : 18 July 2022

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

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

NSC-TISI-TIS17025
CALIBRATION 0008

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) ℃
Relative Humidity : (50 ± 30) %

Calibrated by : Suwit Imjai

Approved by : [redacted]
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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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2207-0245OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor *k*
36.0	35.5	35.5	0.10	0.63	0.88	0.30	2

Calibration Point	Measured Temperature (°C)								
	Position								
(°C)	1	2	3	4	5	6	7	8	9 (ref.)
36.0	35.896	35.803	35.846	35.766	36.272	35.561	36.212	35.519	35.687

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

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

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เอกสารไม่ควบคุม

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

Cert. No.: 23TM193

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 %.

-o0o-

เอกสารไม่ควบคุม

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

Cert. No.: 23TM193

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

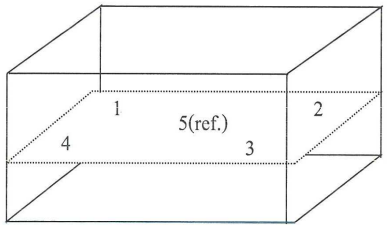
1. Reference standard instrument:-

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-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

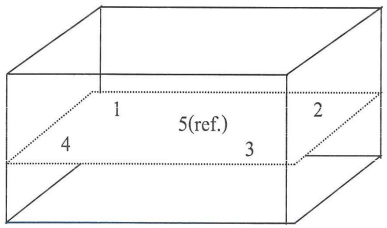
1. Reference standard instrument:-

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	22	63	230



Front

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

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000-29 FAX. 0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

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

เอกสารไม่ควบคุม

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

METTLER TOLEDO

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

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:	*0332553613*		

Weighing Device

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

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

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

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

As Found Calibration Date: 23-Sep-2022
As Left Calibration Date: N/A
Issue Date: 26-Sep-2022

Calibrator: [redacted]
Suwicha Choykamchu

Approved Signatory: [redacted]
Technical Manager / Head of Calibration Center

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เอกสารไม่ควบคุม

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

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

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

Average* : The average of 30 values in each position.
Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Stability : One-half of the greatest maximum difference of measured temperature at any one probe.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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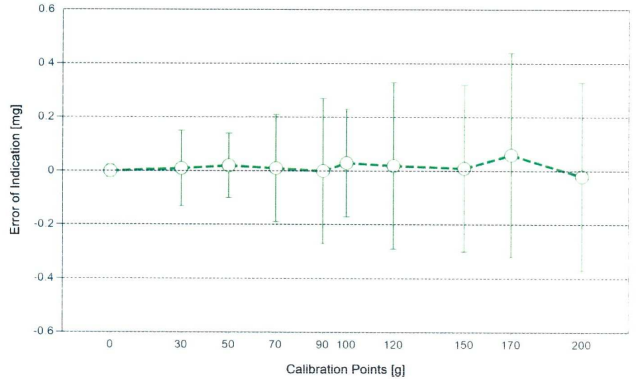
เอกสารไม่ควบคุม

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.023 mg	2
2	9.99997 g	9.99997 g	0.00000 g	0.063 mg	2
3	29.99998 g	29.99999 g	0.00001 g	0.14 mg	2
4 [1]	49.99998 g	50.00000 g	0.00002 g	0.12 mg	2
5 [1]	69.99999 g	70.00000 g	0.00001 g	0.20 mg	2
6	90.00002 g	90.00002 g	0.00000 g	0.27 mg	2
7 [1]	100.00002 g	100.00005 g	0.00003 g	0.20 mg	2
8 [1]	120.00003 g	120.00005 g	0.00002 g	0.31 mg	2
9 [1]	150.00001 g	150.00002 g	0.00001 g	0.31 mg	2
10	170.00001 g	170.00007 g	0.00006 g	0.38 mg	2
11	200.00002 g	200.00000 g	-0.00002 g	0.35 mg	2

[1]The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capabilities) value because the calculated uncertainty was smaller than the CMC value.



○ As Found

◆ As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

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.

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เอกสารไม่ควบคุม

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

METTLER TOLEDO Service

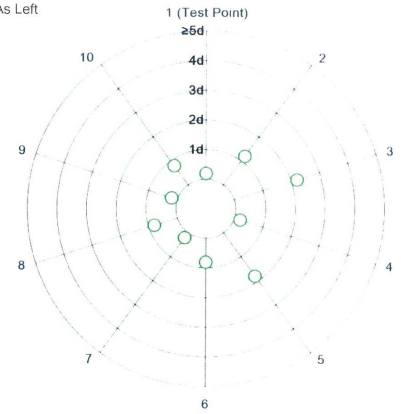
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.00003 g	N/A
2	100.00002 g	N/A
3	100.00001 g	N/A
4	100.00003 g	N/A
5	100.00005 g	N/A
6	100.00004 g	N/A
7	100.00003 g	N/A
8	100.00004 g	N/A
9	100.00003 g	N/A
10	100.00004 g	N/A
Standard Deviation	0.000011 g	N/A

○ As Found
◆ As Left



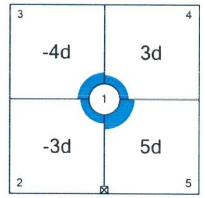
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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	100.00000 g	N/A
2	99.99997 g	N/A
3	99.99996 g	N/A
4	100.00003 g	N/A
5	100.00005 g	N/A
Maximum Deviation	0.00005 g	N/A



As Found

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

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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: $1.0 \cdot 10^{-6}$ / K

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

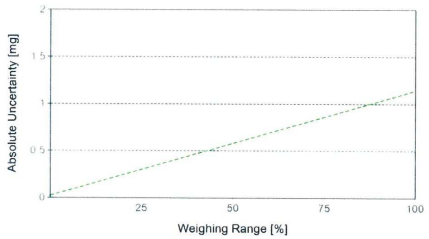
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.00001 g	220 g	U_I = 0.024 mg + 0.00509 mg/g · R	N/A

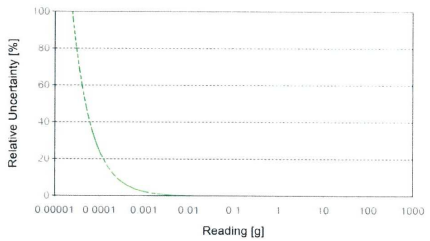
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

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

Net Indication	As Found		As Left	
0.00220 g	0.024 mg	1.1%	N/A	N/A
0.02200 g	0.024 mg	0.11%	N/A	N/A
0.22000 g	0.025 mg	0.011%	N/A	N/A
2.20000 g	0.035 mg	0.0016%	N/A	N/A
220.00000 g	1.1 mg	0.00052%	N/A	N/A



As Found



As Left

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เอกสารไม่ควบคุม

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

METTLER TOLEDO Service

Test Equipment

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

Weight Set 1: OIML E2

Weight Set No.:	WS03	Date of Issue:	21-Sep-2021
Certificate Number:	175498	Calibration Due Date:	14-Mar-2023

Weight Set 2: OIML E2

Weight Set No.:	WS66	Date of Issue:	21-Oct-2021
Certificate Number:	C142784709	Calibration Due Date:	17-Apr-2023

Weight Set 3: OIML E2

Weight Set No.:	WS70	Date of Issue:	21-Oct-2021
Certificate Number:	C142784702	Calibration Due Date:	19-Mar-2023

Thermo Hygrometer

Equipment No.:	IN281	Date of Issue:	23-May-2022
Certificate Number:	22H1057	Calibration Due Date:	15-May-2023

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory.

End of Accredited Section

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

Software Version: 1.23.0.314
Report Version: 2.16.25
Form Number: F103C

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Minimum Weight

As Found Minimum Weight Table

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

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

As Left Minimum Weight Table

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

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

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

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

Notes on minimum weight values in above table:

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.

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As Found ✓

The weighing device meets the given process requirements.

As Left ✓

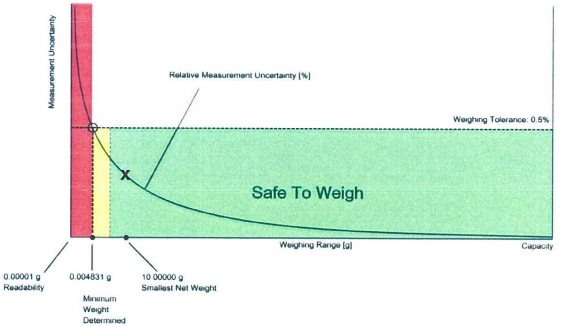
The weighing device meets the given process requirements.

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

Process Requirements

Weighing Tolerance: 0.5% | Smallest Net Weight: 10.00000 g | Safety Factor: 2

Safe Weighing Range



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

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Error of Indication

As Found

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

As Left

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

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

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Measurement Results

Results Summary

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

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

Repeatability

Test Load: 100 g

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

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

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.05000 g	0.00005 g	✓	0.00005 g	✓
0.2%	0.10000 g		✓		✓
0.5%	0.25000 g		✓		✓
1%	0.50000 g		✓		✓
2%	1.00000 g		✓		✓
5%	2.50000 g		✓		✓

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

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Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2304-0461OC-2

Cert. No.: 23TM763

Procedure Used :-

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

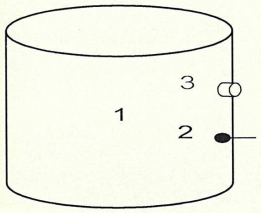
Condition of this result of calibration

1. Reference standard instrument:-

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

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

[redacted]

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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

NSC-TISI-TIS17025
CALIBRATION 0008

Cert. No.: 23TM763

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 : [redacted]
Approved Signatory

( ) 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.

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

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

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

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

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

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

Average* : The average of 30 values in each position.
Stability : One-half of the greatest maximum difference of measured temperature at any one probe.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-o0o-

[redacted]

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