

ภาคผนวก ช

เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์



SCIMET Co., Ltd.
818/124 Udomsuk Rd., Bangna-Nuea,
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Email: scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Page: 2 of 3

Certificate No.: C17250374

Certificate No. C17250374

Condition of reference standards instruments:

Instruments	Model	S/N or ID	Certificate No.	Due Date
Datalogger 4	34972A	MY49012108	C23240091	18-Sep-2025

Condition of Calibration Item :

Equipment	Cooled Incubator
Model	SMART 1250
Serial No.(or ID):	0410-0423-0017 (LAB-0004)
Manufacturer:	Accuplus
Ventilation Valve:	None
Shelves(pc.):	4

Customer

WE Environment CO., Ltd.
28019 Moo. 9 Bang Toei, Sam Khok, Pathum Thani, 12160

Standard Installation Locations

Volume (Calibration Zone)= 138 (Liters)

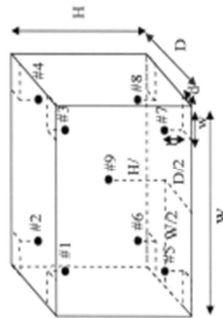
Inside chamber:

W = 49 (cm) D = 49 (cm) H = 118 (cm)

Standard Locations (#1, #2, #3, #4): w = 5 (cm) d = 5 (cm) h = 15 (cm)

Standard Locations (#5, #6, #7, #8): w = 5 (cm) d = 5 (cm) h = 12 (cm)

#9: Geometric center of the chamber



Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.**Measured Temperature:** The average reading of standards at any positions or location.**Measured Uniformity:** The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.**Measured Stability:** The one-half of greatest maximum difference of measured temperatures at any one probe.**Overall Variation:** The difference of maximum and minimum measured temperatures throughout observation time.

บริษัท เอสเทลล์ ฟรอมฟองซ์ (SCIMET CO., LTD.)
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Email: scimet2022@gmail.com, Tel: 02 460 9239

FC17-03: 27 JAN 2025

Calibration Certificate

Job No.: KSMT2502672
Received Date: 01 July 2025
Issued Date: 02 July 2025
Page: 1 of 3

Calibration Place

WE Environment CO., Ltd. (Laboratory)
28019 Moo. 9 Bang Toei, Sam Khok, Pathum Thani, 12160

Calibration Date

01 July 2025

Environment Condition

Temperature: 20.2 °C ± 1.1 °C
Humidity: 58.9 %RH ± 3.0 %RH

The Method used

In-house method, WI17, based on G-20-102-08 (E)

Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co., Ltd. Certificate No. C23240091

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 provided by the reference standard (GUM) procedure. The 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 SCIMET Co., Ltd.



(Mr. Chansachol Mochammudrosol)
Person in charge

(Mr. Thallengkeat Pongngam)
Authorized signatory

FC17-03: 27 JAN 2025

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : pH METER WITH TEMPERATURE
MANUFACTURER : EUTECH INSTRUMENTS
MODEL / TYPE : PH700
SERIAL NO. : 3150127[LAB-0001]
CLID. NO. : 372400303
JOB CONTROL NO. : 250620071640
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE
CUSTOMER : WE ENVIRONMENT CO., LTD.
28819 MOO 9 BANGTOEI SAM KHOK
PATHUM THANI 12160 THAILAND

DATE OF RECEIVED : 20 June 2025 DATE OF ISSUED : 27 June 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Sukgaseem Sechanart

Wenick Inchaistri

Calibration Engineer



Approved By : Mongkol Yotsontorn

Authorized Signatory

27 June 2025

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q25071640

F3-011-0512-23

page 1 of 4



cclabco



Certificate No.: C17250374 Page: 3 of 3

Calibration Results:
Without adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	20.20	0.20	0.46
#2	20.20	0.20	0.49
#3	20.03	0.03	0.61
#4	20.13	0.13	0.48
#5	20.10	0.10	0.66
#6	20.11	0.11	0.56
#7	19.84	-0.16	0.74
#8	19.97	-0.03	0.49
#9	19.95	-0.05	0.61

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	#1	#2	#3	#4	#5	#6	#7	#8	#9	Uncertainty (± °C)*
20.0	20.0	20.0	20.20	20.20	20.03	20.13	20.10	20.11	19.84	19.97	19.95	0.74

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
20.0	0.50	0.53	1.28

Note: * Maximum uncertainty of the each position

The End of Certificate

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88/124 อุทุมพร ถ. บางนา, กรุงเทพฯ 10260 Thailand
Email: scimet2023@gmail.com, Tel. 02-460-9129

FC17-03, 27 JAN 2025



REPORT OF CALIBRATION

FOR

NOMENCLATURE : pH METER WITH TEMPERATURE
MANUFACTURER : EUTECH INSTRUMENTS
MODEL / TYPE : PH700
SERIAL NO. : 3150127[LAB-0001]
LOCATION SITE : ANALYTICAL LABORATORY 1
DATE OF CALIBRATION : 25 June 2025

ENVIRONMENT CONDITIONS :

Temperature : 23°C to 25°C
Relative Humidity : 59% to 66%

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPCH-01 (pH Meter). The calibration was performed by direct measurement with Certified Reference Material (CRM).
This instrument was calibrated under procedure No. CLC-CPTH-03 (Temperature) based on ASTM E 644-04 as calibration guideline. The calibration was performed by using Micro Calibration Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

- pH Standard Solution, NIMT TRM CODE TRM-S-2002, TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
- pH Standard Solution, Control Company Catalog Number 06664263, 11784256, Lot Number CC788789.
- Micro Calibration Bath, Kambic Model OBM-LT S/N: 18015718.
- Precision Thermometer, Wika Model CTH 7000 S/N: 014471/18.
- IPRT, ASL Model T100-250-1D S/N: L0193A-1-1.

Certificate No. Q25071640
F3-011-05/12-23



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TRACEABILITY :

- The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Lot Number: 260124, 080124, 120124. Due Date 23 January 2026.
- The measurements are traceable to International System of Units (SI), through Control Company. Certificate No. 4288-14548619, Due Date 17 October 2025.
- The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q24121000, Due Date 21 November 2025.
- The measurements are traceable to International System of Units (SI), through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 1043/67, Due Date 16 October 2025.
- The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. TT-0169-24, Due Date 11 December 2025.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95%. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)".

Certificate No. Q25071640
F3-011-05/12-23

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Certificate No. C-17250373

Calibration Certificate

Equipment: Hot Air Oven
Model: XUE112
Serial No.(or ID): Y0137 (LAB-0002)
Manufacturer: France Etuves
Ventilation Valve: Closed
Shelves(pc.): 2

Customer:
WE Environment CO., Ltd.
280/19 Moo. 9 Bang Toei, Sam Khok, Pathum Thani, 12160

Calibration Place
WE Environment CO., Ltd. (Laboratory)
280/19 Moo. 9 Bang Toei, Sam Khok, Pathum Thani, 12160

Calibration Date
01 July 2025

Environment Condition
Temperature: 31.1 °C ± 0.9 °C
Humidity: 58.6 %RH ± 3.4 %RH

The Method used
In-house method, W117, based on G-20-102-08 (E)

Traceability
This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd. Certificate No. C23240091



(Mr. Chansakol Mochamudrosol)
Person in charge

(Mr. Thalengkeat Pongngam)
Authorized signatory

FC17-03 27 JUN 2025



CALIBRATION LABORATORY CO., LTD.

27/15-11-14, 35 Soi Phrasart Manakul 29 Yotha 4, Phrasart Manakul Rd., Ladphram, Bangkok 10230
Tel: 02-579-6553-4 Fax: 02-579-2672 www.calibration-lab.co.th Email: info@calibration-lab.co.th

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties
of pH meter with temperature.

CALIBRATION DATA

1. pH METER RESULT @ 25 °C

Standard pH Buffer Solution (pH)	pH Meter Reading (pH)	pH Meter Reading (mV)	Correction (pH)	Uncertainty of pH Measurement (± pH)	k Factor
1.684	1.68	369	+0.004	0.013	2.20
4.003	4.00	174.2	+0.003	0.013	2.15
7.005	7.00	-1.5	+0.005	0.015	2.06
10.015	10.01	-172.5	+0.005	0.016	2.05

Technical Note: Setting function CAL 3 point (4,7,10).

Note: The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 4 of 68

2. TEMPERATURE RESULT

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
115	25.00	25.1	-0.10	0.12

Technical Note: Type of sensor : Thermistor

Probe Ø 3 mm

Materials: Stainless Steel.

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of k= 2.00.

Note: The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 56 of 68

This report is valid for the above stated instrument's only.

#00 End of Certificate #00

Certificate No. Q25071640
F3-011-0512-23

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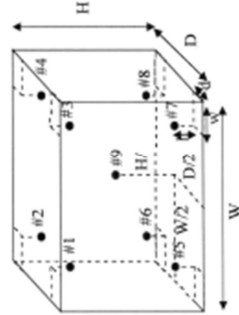
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Certificate No.: C17250373

Condition of reference standards instruments:

Instruments	Model	S/N or ID.	Certificate No.	Due Date
Datalogger 4	34972A	MY49012108	C23240091	18-Sep-2025

Condition of Calibration item : In Condition



Standard Installation Locations

Volume (Calibration Zone)= 39 (Liters)

Inside chamber: W = 50 (cm) D = 45 (cm) H = 50 (cm)

Standard Locations (#1, #2, #3, #4): w = 5 (cm) d = 5 (cm) h = 12 (cm)

Standard Locations (#5, #6, #7, #8): w = 5 (cm) d = 5 (cm) h = 10 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	201	202	203	204	205	206	207	208	209

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.**Measured Temperature:** The average reading of standards at any positions or location.**Measured Uniformity:** The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.**Measured Stability:** The one-half of greatest maximum difference of measured temperatures at any one probe.**Overall Variation:** The difference of maximum and minimum measured temperatures throughout observation time.

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FC17-03: 27 JAN 2025



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Certificate No.: C17250373

Calibration Results:

Before adjustment

Desired (°C)	Setting (°C)	Indicating (°C)	#1 (°C)	#2 (°C)	#3 (°C)	#4 (°C)	#5 (°C)	#6 (°C)	#7 (°C)	#8 (°C)	#9 (°C)
104.0	104.0	104.0	104.48	104.44	104.19	104.27	105.00	104.81	104.44	104.36	104.65

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	85.06	0.06	0.26
#2	85.02	0.02	0.26
#3	84.84	-0.16	0.26
#4	84.88	-0.12	0.26
#5	85.40	0.40	0.26
#6	85.24	0.24	0.26
#7	85.01	0.01	0.26
#8	84.95	-0.05	0.26
#9	85.14	0.14	0.26

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
85.0	85.0	85.0	85.06	85.02	84.84	84.88	85.40	85.24	85.01	84.95	85.14	0.26

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
85.0	0.35	0.08	0.71

Note: * Maximum uncertainty of the each position

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Certificate No.: C17250373

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After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 180.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	179.93	-0.07	0.43
#2	180.14	0.14	0.43
#3	179.34	-0.66	0.43
#4	179.50	-0.50	0.43
#5	181.17	1.17	0.43
#6	180.71	0.71	0.43
#7	179.65	-0.35	0.43
#8	179.75	-0.25	0.43
#9	180.44	0.44	0.43

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
180.0	180.0	180.0	179.93	180.14	179.34	179.50	181.17	180.71	179.65	179.75	180.44	0.43

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
180.0	1.18	0.12	2.05

Note: * Maximum uncertainty of the each position

The End of Certificate

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FC17-03: 27 JAN 2025



Certificate No.: C17250373

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After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	103.87	-0.13	0.39
#2	103.87	-0.13	0.39
#3	103.60	-0.40	0.39
#4	103.69	-0.31	0.39
#5	104.41	0.41	0.39
#6	104.20	0.20	0.39
#7	103.85	-0.15	0.39
#8	103.80	-0.20	0.39
#9	104.04	0.04	0.39

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.0	104.0	103.87	103.87	103.60	103.69	104.41	104.20	103.85	103.80	104.04	0.39

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.0	0.49	0.10	0.98

Note: * Maximum uncertainty of the each position

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FC17-03: 27 JAN 2025



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Certificate No. C1250752

Calibration Certificate

Equipment: Balance
Model: BSA224S-CW
Serial No. (or ID): 3143517467 (LAB-0003)
Manufacturer: Sartorius
Condition: In condition
Job No.: KSMT2502671
Received Date: 01 July 2025
Issued Date: 02 July 2025
Page: 1 of 3

Customer
WE Environment CO., Ltd.
280/19 Moo. 9 Bang Toei, Sam Khok, Pathum Thani, 12160

Calibration Place
WE Environment CO., Ltd. (Laboratory)
280/19 Moo. 9 Bang Toei, Sam Khok, Pathum Thani, 12160

Calibration Date
01 July 2025

Environment Condition
Temperature: 21.1 °C ± 0.5 °C
Humidity: 53.7 %RH ± 4.7 %RH

The Method used
In-house method, W12, based on UKAS Lab 14

Traceability
This certificate is traceable to the SI Units maintained by National
Institute of Metrology (NIMT), Thailand through SCIMET Co., Ltd.
Certificate No. C13250243, C13250171

This certificate is issued in the units of measurement of the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard. The uncertainty stated in the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence that the true value lies within the stated uncertainty. The uncertainty is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from the conditions of the calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.



(Mr. Thalerngkeat Pounngam)
Authorized signatory

FC12-03: 27 JAN 2025



Certificate No.: C1250752 Page: 2 of 3

Condition of reference standards Instruments:

Instruments	Model	Serial No. or ID	Certificate No.	Due date
Standard Weight Set 1mg - 500mg / E2	8.XE-HM-711	2100211	C13250243	18 Apr 27
Standard Weight Set 1 g - 200 g / E2	8303EJ	1620403	C13250171	06 Mar 26

Calibration Results:

Before Adjustment (Use Internal calibration adjustment)

Excentric 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
-	0.0001	-0.0001	0.0000	0.0001	0.0001

Repeatability: Determination of the standard deviation of weighing balance., Repeatability 0.0001 (g)

Nominal test value (g)	Standard Deviation
20	0.00004
200	0.00006

Error of Indication from nominal or conventional mass value., Repeatability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
0.1	0.10000	0.1000	0.0000	0.00011	2.04
0.2	0.20000	0.2000	0.0000	0.00011	2.04
0.5	0.49998	0.5000	0.0000	0.00011	2.04
1	1.00000	1.0000	0.0000	0.00011	2.04
2	2.00000	2.0000	0.0000	0.00011	2.04
5	4.99999	5.0000	0.0000	0.00011	2.04
10	9.99999	10.0000	0.0000	0.00011	2.04
20	20.00000	20.0000	0.0000	0.00012	2.03
50	49.99994	50.0000	0.0001	0.00013	2.02
100	99.99990	99.9998	-0.0001	0.00017	2.01
200	199.99987	199.9987	-0.0003	0.00030	2.00

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FC12-03: 27 JAN 2025



Certificate No.: C1250752 Page: 3 of 3

After Adjustment (Overwrite or Adjustment internal calibration weight)

Scientific 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
100		-	0.0000	-0.0001	0.0000	0.0001

Repeatability: Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
20	0.00004
200	0.00006

Error of Indication from nominal or conventional mass value., Readability 0.0001 (g)

Nominal Value	Conventional Mass	Displayed Value	Error of Indication	Uncertainty	k
(g)	(g)	(g)	(g)	(g)	
0.1	0.10000	0.1000	0.0000	0.00011	2.04
0.2	0.20000	0.2000	0.0000	0.00011	2.04
0.5	0.49998	0.5000	0.0000	0.00011	2.04
1	1.00000	1.0000	0.0000	0.00011	2.04
2	2.00000	2.0000	0.0000	0.00011	2.04
5	4.99999	5.0000	0.0000	0.00011	2.04
10	9.99999	10.0000	0.0000	0.00011	2.04
20	20.00000	20.0000	0.0000	0.00012	2.03
50	49.99994	50.0000	0.0001	0.00013	2.02
100	99.99990	100.0000	0.0001	0.00017	2.01
200	199.99987	200.0000	0.0000	0.00030	2.00

The End of Certificate

บริษัท ชานันท์ จำกัด (SCIMET CO., LTD.)
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Email: scimet2022@gmail.com, Tel: 02-460 9239

FC12-03_27 JAN 2025



CERTIFICATE OF CALIBRATION

Customer: WE ENVIRONMENT CO., LTD.
280/19 Moo.9 Bangpoo,
Sam Khok., Pathum Thani 12160

Manufacturer: Elite Lab Instrument

Model Number: JRX-205X

Description: Curve Hosting Digestion System

Asset Number: 205X-23 0007-0071

Serial #: 205X-23 0007-0071

P.O. #: N/A

Procedure: CPTD-06 (Sep. 2020)

Certificate Number: TTH-136610

Temperature: 28 °C

Relative Humidity: 45 %RH

Calibration Location: On-Site

Calibrated By: CHAIYAPONG KONGKAMUT

Calibration Date: 16/DEC/2024

Next Due Date: 16/DEC/2025

Condition Received: IN TOLERANCE

Condition Returned: IN TOLERANCE

This certifies that the above instrument was calibrated in compliance with the Calibration System Requirements of ISO/IEC 17025:2017, ANNEX C, 2.40.1-1994 (2002) in accordance with referenced procedures. Standards used to perform this calibration are traceable to SI units; their source of traceability derives from a National Metrology Institute such as NIST, CENAM, NPL, DIN, from national physical constants, consensus standards or derived by the ratio type of calibration. Collective uncertainty are determined as required with a distribution that corresponds to a probability of approximately 95% (k=2). Unless otherwise noted, calibrations are performed to manufacturer's specifications. Compliance statements are in conformance with ILAC-G8-2019 sample acceptance decision rule. This form shall not be reproduced, except in full, without the expressed written consent of Technostar. Contact our customer service representative for clarification of this document.

Standard #	Description	Manufacturer	Model #	Due Date	Test Report #
3680	Digital Multimeter	Hiweltek Pocket	3458A	MAR/29/2025	TTH-6-99062
3755	Standard PRTs	FLUKE	5626	OCT/01/2025	TTH-6-135316-R1

Remarks:

W. Chaetian

P. Manmuan

N. Hanta

Wanlisa Chorlun
Quality Assurance

Porathee Manmuan
Technical Manager

Supattat Hanta
Approved By

Issued on: 2024-12-16 01:45:19:5470000-08:00

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Page 1 of 2



TTH-136610



BI TAGNO	INCUBATOR
Instrument Name:	Harish
Man/Version:	Harish, Ver 403
Model:	0002156
Serial No.:	B-IN-32
IO No.:	12-Mar-25
Calibration Date:	ANALC
Calibration by:	25-037537
Certificate No.:	38 ± 1 °C
Symbolic:	± 1 °C (35.0 - 38.0)
Comments:	



Figure. Example of server installation positions

UAC Setting	UAC Reading	Calibration point (T2)	Uncertainty	Position	Actual temp. [T ₂] (°C)	Error [E ₂ -T ₂] [Δ]	E-U	E-U	Uncert. [E ₂] [Δ]
(°C)	(°C)	(°C)	[Δ]	(°C)	(°C)	(°C)	(°C)	(°C)	$S \pm 1.0 \text{ } ^\circ\text{C}$ Pg. 1 / Pg. 1
				1	26.83	-0.11	0.13	-0.05	P995
				2	26.98	-0.02	0.22	-0.26	P995
				3	26.96	-0.02	0.22	-0.26	P995
				4	35.69	-0.01	0.33	-0.25	P995
38.0	38.0	38.0	0.24	5	35.96	-0.04	0.20	-0.26	P995
				6	36.02	0.02	0.26	-0.22	P995
				7	35.95	-0.05	0.19	-0.20	P995
				8	35.96	-0.04	0.20	-0.23	P995
				9	35.95	-0.05	0.19	-0.20	P995

Journal of Management Inquiry

Error	Correlation		UCC Rating: [18]	Significance level: [19]
	Enter A (-1)	Enter B ₀		
Min	-0.11	35.0	0.00	35.1
Max	0.02	37.0		37.0

[illegible]

Name: Pratik Singh
 (Date: 17 JUN 2025)

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 (၂၀၂၀ ခုနှစ် ဖွဲ့စည်းပုံ)
 ၂၀၂၀ ခုနှစ်

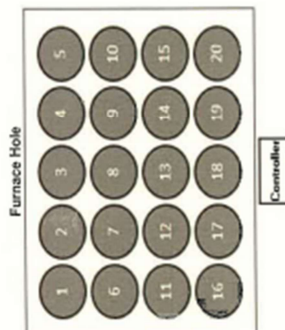
Signature:  Date: 12 JUN 2025
(Signature of Designated Person)

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Global Leader in Test Equipment Solutions

Calibration Results Number: TTH-136610



Temperature Accuracy

Furnace Hole		UUT Displayed	STD Reading	Error	Result	Uncertainty	Tolerance	
							Min	Max
1	300 °C	378.9 °C	1.1 °C	Pass	0.1 °C	375 °C	385 °C	
2	300 °C	378.5 °C	1.5 °C	Pass	0.1 °C	375 °C	395 °C	
3	300 °C	377.8 °C	2.4 °C	Pass	0.1 °C	375 °C	395 °C	
4	300 °C	378.4 °C	1.6 °C	Pass	0.1 °C	375 °C	395 °C	
5	300 °C	378.1 °C	1.9 °C	Pass	0.1 °C	375 °C	395 °C	
6	300 °C	378.4 °C	1.8 °C	Pass	0.1 °C	375 °C	395 °C	
7	300 °C	378.0 °C	2.0 °C	Pass	0.1 °C	375 °C	395 °C	
8	300 °C	378.1 °C	1.9 °C	Pass	0.1 °C	375 °C	395 °C	
9	300 °C	378.5 °C	1.5 °C	Pass	0.1 °C	375 °C	395 °C	
10	300 °C	378.9 °C	1.1 °C	Pass	0.1 °C	375 °C	395 °C	
11	300 °C	378.1 °C	1.9 °C	Pass	0.1 °C	375 °C	395 °C	
12	300 °C	377.9 °C	2.1 °C	Pass	0.1 °C	375 °C	395 °C	
13	300 °C	378.7 °C	1.3 °C	Pass	0.1 °C	375 °C	395 °C	
14	300 °C	378.0 °C	2.0 °C	Pass	0.1 °C	375 °C	395 °C	
15	300 °C	378.6 °C	1.4 °C	Pass	0.1 °C	375 °C	395 °C	
16	300 °C	377.9 °C	2.1 °C	Pass	0.1 °C	375 °C	395 °C	
17	300 °C	378.2 °C	1.8 °C	Pass	0.1 °C	375 °C	395 °C	
18	300 °C	378.1 °C	1.9 °C	Pass	0.1 °C	375 °C	395 °C	
19	300 °C	378.6 °C	1.4 °C	Pass	0.1 °C	375 °C	395 °C	
20	300 °C	378.4 °C	1.6 °C	Pass	0.1 °C	375 °C	395 °C	

Notes :

- 1) The calibration results are verified its balance with the customer's specification.
- 2) The instrument was calibrated for the parameter and at the points specified by the customer.
- 3) This result of calibration was found accurate as show on date and place of calibration only.

End of Certificate

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TTH-136610



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REPORT OF CALIBRATION

Certificate No. : 25-037337
Sample Code : 25-15766-010

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C) reading (°C)	Measured temperature at each positions (°C)								Uncertainty ± (°C)	Coverage factor k
		#1	#2	#3	#4	#5	#6	#7	#8		
36	36.0	35.89	35.98	35.98	35.99	35.96	36.02	35.95	35.95	0.24	2.00

2. Characterization results

Calibration point (°C)	36	Stability ± (°C)	0.04	Uniformity (°C)	0.09	Overall variation (°C)	0.16
------------------------	----	------------------	------	-----------------	------	------------------------	------

Notes

* UUC* = Unit Under Calibration

CERTIFICATE OF CALIBRATION

Certificate No. : 25-037337
Sample Code : 25-15766-010

Customer : Betagro Science Center Co., Ltd.
136 Moo 8, Klong Nueng, Klong Luang,
Pathumthani 12120

Location of Calibration : Betagro Science Center Co., Ltd.
(10471 Incubator room)

Equipment : Temperature controlled enclosures (Incubator)
Manufacturer : Hettich
Model : Hettich 400
Serial No. : 0002138
ID No. : 8-IN-32
Date of Receipt : 12 March 2025
Date of Calibration : 12 March 2025

Condition of Calibration

1. Environment	1.1 Ambient temperature	Maximum : 25.4 °C	Minimum : 24.7 °C
	1.2 Relative humidity	Maximum : 56.6 %	Minimum : 56.4 %
	1.3 Line voltage supplied	Maximum : 232.1 VAC	Minimum : 227.2 VAC

2. Calibration method

TLS-6-20. Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data acquisition with sensor (RTD-P100)	UB-DA-19 (RTD-302 to RTD-303, RTD-311, RTD-305 to RTD-310)	25-010559	04 February 2026

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by

Mr. Sarut Sa-nguanin

Approved by

(Mr. Somchai Neamrunt)

Issue date

13 March 2025

Signed for Director

The accreditation is for a confidence probability of approximately 95%.

This calibration result is applied only to the above calibrated items and was found accurate as shown on date and place of calibration only.

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 unit of measurement related at the corresponding national standards laboratory. This certificate may not be reproduced other than in full extent with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

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Effective Date: 15/03/21

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CERTIFICATE OF CALIBRATION

Customer : Betagro Science Center Co., Ltd.
136 Moo 9, Klong Nueng, Klong Luang,
Pathumthani 12120

Location of Calibration : Betagro Science Center Co., Ltd.
(INCUBATION)

Equipment : Temperature controlled enclosures (Incubator)
Manufacturer : Henschel
Model : Henschel 400
Serial No. : 0002152
ID No. : MLJN.47
Date of Receipt : 09 April 2025
Date of Calibration : 09 April 2025

Condition of Calibration
1. Environment
1.1 Ambient temperature : Maximum 23.0 °C ; Minimum 20.9 °C
1.2 Relative humidity : Maximum 57.7 % ; Minimum 48.3 %
1.3 Line voltage supplied : Maximum 247.8 VAC ; Minimum 238.9 VAC

2. Calibration method
TAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument
Instrument ID No. Certificate No. Due Date
Data acquisition with sensor LB-DA-19 (RTD-302 to RTD-303, RTD-304, RTD-305 to RTD-310) 25-010559 04 February 2026
(RTD-PT100)

4. This certificate is traceable to the international system of unit (SI Unit).
The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of calibration item : Normal

Calibrated by : Mr. Petrasapong Pulingam
Scientist
Approved by : (Mr. Somchai Niamrump)
Signed for Director

Issue date : 11 April 2025

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 system which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement related to the corresponding national standards. This certificate may not be reproduced other than in full, except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

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REPORT OF CALIBRATION

Certificate No. : 25-037337
Sample Code : 25-15786-010

Results of Calibration

- Notes
1. Sensor installation locations
1.1 All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
1.2 The reference sensor is preferably located of the geometric center of the chamber.
 2. Interior dimensions approx of chamber :
W = 54 cm ; D = 69 cm ; H = 85 cm
3. Air valve or fresh air level : OFF
4. Fan level : N/A
5. The quoted uncertainty includes stability of chamber and loading effect in chamber at 20% of uniformity.
6. 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.
7. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
8. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
9. UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
10. Calibration results without adjustment.

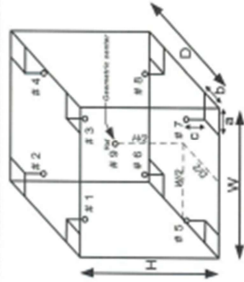


Figure: Example of sensor installation Positions

The result expanded uncertainty of measurement (U) is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with ISO 9000.

End of Report

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REPORT OF CALIBRATION

Certificate No. : 25-054691
Sample Code : 25-23097-001

Page 3 of 3

Results of Calibration

Notes

- Sensor installation locations
 - All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
 - The reference sensor is preferably located of the geometric center of the chamber.
- Interior dimensions approx of chamber :
W = 54 cm ; D = 69 cm ; H = 85 cm
- Air valve or fresh air level : Off
- Fan level : N/A
- The quoted uncertainty includes "Stability of chamber and loading effect in chamber at 20% of uniformity".
- 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.
- Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
- Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
- UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
- Calibration results without adjustment.

The stated expanded uncertainty of measurement of a standard against which the measurement is made, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with ISO 17025.

- End of Report -

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REPORT OF CALIBRATION

Certificate No. : 25-054691
Sample Code : 25-23097-001

Page 2 of 3

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C) reading (°C)	Measured temperature at each position (°C)										Uncertainty ± (°C)	Coverage factor k
#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12		
35	35.0	34.94	34.95	34.99	34.98	34.97	34.96	34.95	34.94	34.93	34.92	0.24	2.00
37	37.0	36.93	36.95	36.99	36.97	36.95	36.94	36.93	36.92	36.91	36.90	0.24	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
35	0.05	0.08	0.13
37	0.05	0.09	0.12

Notes

UUC* = Unit Under Calibration

1	Temperature controlled enclosures (incubator)	Hatch	Hatch 400	000252	ML/JN.47	35.37 °C	0.1 °C	25-054691
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1. สรุปการประเมินผลทดสอบเทียบ (Certificate of Calibration) ผู้ควบคุมคุณภาพและภาคีความโปร่งใสตามผลการสอบเทียบ

เอกสารประเมิน(Certificate of Calibration)ได้ทราบค่าอุณหภูมิ ใช้ในและการวัด Measured temperature (°C) at spread location สำหรับสถานีวัดที่ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 และ the uncertainty แล้วใช้ค่าอุณหภูมิที่ได้มาทำการปรับแก้กับค่า "ไม่ผ่าน" และไม่สามารถใช้จากจุดนี้ไม่ได้ดำเนินการอีกด้วยที่มีบริเวณอื่นๆการใช้สามารถใช้งานได้ และผลการวิเคราะห์ค่าความไม่ผ่าน ค่า "ไม่ผ่าน" และไม่สามารถใช้จากจุดนี้ไม่ได้ดำเนินการอีกด้วยที่มีบริเวณอื่นๆการใช้

หน้า ๑๖

[illegible]

ตารางที่ 1. แผนผลการสอบเทียบ (Certificate of Calibration) ด้วยความถูกต้องแม่นยำและผลการประเมิน

[illegible]

Calibration Point	Location (#)	#1	#2	#3	#4	#5	#6	#7	#8	#9 ^{a,c}	Uncertainty
37 °C	Kernforschungszentrum Karlsruhe	35.83	36.96	36.99	36.97	36.95	36.97	36.95	36.04	36.92	0.24
	Kernforschungszentrum Karlsruhe	35.83	36.96	36.99	36.97	36.95	36.97	36.95	36.04	36.92	

*เกณฑ์การยอมรับ $\pm 0.5, 1^{\circ}\text{C}$

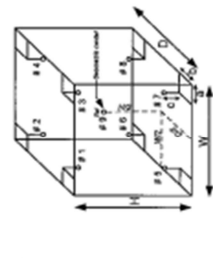


Figure: Example of sensor installation locations

2. ข้อเสนอแนะ จากผลการตอบแบบสอบถาม

- 2.1 ความยาวทางที่ติดตั้งเครื่องวัดอุณหภูมิเป็นไปตามข้อกำหนดของอุปกรณ์ (Checkbook) ที่เคยใช้งาน
2.2 ความยาวทางที่ติดตั้งเครื่องวัดอุณหภูมิเป็นไปตามข้อกำหนดของอุปกรณ์ (Checkbook) ที่เคยใช้งาน
2.3 ความยาวทางที่ติดตั้งเครื่องวัดอุณหภูมิเป็นไปตามข้อกำหนดของอุปกรณ์ (Checkbook) ที่เคยใช้งาน
2.4 ความยาวทางที่ติดตั้งเครื่องวัดอุณหภูมิเป็นไปตามข้อกำหนดของอุปกรณ์ (Checkbook) ที่เคยใช้งาน