

เอกสารแนบ 6

เอกสารสอบเทียบเครื่องมือที่ใช้ในการ
ตรวจวิเคราะห์



Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-400216-6

Submitted by : HVE Co., Ltd.

603 Soi Jarunsanitwong 46, Jarunsanitwong Road, Bangyeekun, Bangkok 10700

Equipment : Temperature controlled enclosure (Incubator)

Manufacturer : Lovibond

Model : ET636-6

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 9982523-03

ID No. : 011

Environment : On site calibration was carried out at the Laboratory, HVE Co., Ltd.

Ambient Temperature : (27.0 to 28.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (229.0 to 230.0) V

Date of Received : 17 April 2024

Date of Calibration : 18 April 2024

Date of Issue : 19 April 2024

Calibrated by : Kittisak Kokaco

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Digital Thermometer with RTD Probe

ID No. Cert. No.

400046 & 400047 67-400047-2

Traceability

Due Date

26 Jul 2024 National Institute of Metrology Thailand (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co., Ltd.

Certificate of Calibration

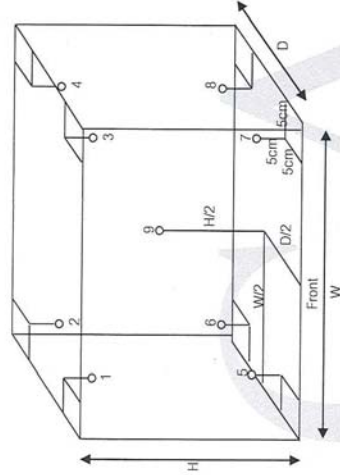
Certificate No. : 67-400216-6

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber
W = 0.53 m
D = 0.43 m
H = 1.40 m
Capacity = 0.32 m³

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
20.0	21.0	21.0	20.24	20.19	20.28	20.16	20.15	20.08	19.95	19.87	19.98	0.36

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured		Overall Variation (°C)
			Uniformity (°C)	Stability (°C)	
20.0	21.0	21.0	0.3	0.1	0.6

Remark The uncertainty is not combine uniformity of the air chamber

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

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

-o0o-

Certificate of Calibration

Certificate No. : 67-430050-1

Page : 1 of 2

Submitted by :

HVE Co., Ltd.

603 Soi Jarunsaniwong 46, Jarunsaniwong Road, Bangyeckun, Bangplad, Bangkok 10700

Equipment :

Digital Conductivity meter with probe

Manufacturer : Ohaus

Model : STARTER3000C

Serial No. : B207710458

ID No. : N/A

Electrode

Model : STCON3

Serial No. : 8333079641

Environment :

Ambient Temperature (25 ± 2) °C

Relative Humidity (50 ± 15) %

Date of Received :

24 October 2024

Date of Calibration :

26 October 2024

Date of Issue :

26 October 2024

Calibrated by :

Permpon Chanpu

Calibration Method :

This instrument was calibrated by In-house method direct measurement by conductivity buffer solution

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Buffer Solution

Material Lot No. Exp. Date Traceability

84 µS/cm 7824 16 June 2025 National Institute of Standards and Technology (NIST), U.S.A., S.R.M.

1413 µS/cm 7781 01 May 2027 National Institute of Standards and Technology (NIST), U.S.A., S.R.M.

12.88 mS/cm 7455 18 February 2027 National Institute of Standards and Technology (NIST), U.S.A., S.R.M.

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.

Certificate of Calibration

Certificate No. : 67-430050-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Conductivity measurement

Before Adjustment

Standard	UUC Reading	Correction	Uncertainty (±)	Unit
Conductivity Solution				
84.00	84.3	-0.3	1.1	µS/cm
1413	1545	-132	5.0	µS/cm
12.88	11.15	1.73	0.051	mS/cm

After Adjustment : at 84,1413 µS/cm, 12.880 mS/cm

Standard	UUC Reading	Correction	Uncertainty (±)	Unit
Conductivity Solution				
84.00	84.0	0.0	1.1	µS/cm
1413	1413	0	5.0	µS/cm
12.88	12.88	0.00	0.051	mS/cm

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

-o0o-



Certificate of Testing

Cert.No.: 25TW66
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : Digicon
Model : DO-552SD
Serial No. : AG.35318
ID No. : -
Received Date : 01 April 2025
Test Date : 02 April 2025
Reference : 2504-0013DN-1
Submitted by : HVE Co.,Ltd
603 Soi Jarransanitwong 46, Jarransanitwong Road,
Bang Yi Khan, Bang Phlat Bangkok 10700
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

Issue Date :

3 April 2025



Cert.No.: 25TW66
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	25CG1126	18 Mar 2027
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 07-07

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.1	0.045

This report was certified only for the instrument we tested. It is allowable to use for study
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced
other in full, without written approval of the laboratory

-o0o-



Certificate of Calibration

Certificate No. : 67-400222-2 Page : 1 of 2

Submitted by : HVE Co.,Ltd.
603 Soi Jarunsanitwong 46 Jarunsanitwong Road, Bangyeekun Bangplad Bangkok 10700

Equipment : Digital Thermometer with Thermistor Probe (Temp pH)

Temperature Indicator

Manufacturer :	Hanna	Model :	HI 2211
Range :	N/A	Resolution :	0.1 °C
Serial No. :	08376721	ID No. :	N/A
Thermistor Probe			
Model :	N/A	Sheath Material :	Stainless
Diameter :	3.5 mm.	Length :	100 mm.
Serial No. :	N/A	ID No. :	08376721

Environment : On site calibration was carried out at the Laboratory, HVE Co., Ltd.

Ambient Temperature :	(25.0 to 26.0) °C
Relative Humidity :	(40 to 45) %
Line Voltage :	(229.0 to 230.0) VAC

Date of Received : 18 April 2024
Date of Calibration : 18 April 2024
Date of Issue : 19 April 2024
Calibrated by : Pernpon Chanpu

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400002	TT-0074-22	20 Jun 2024	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400033	24E633	21 Feb 2026	National Institute of Metrology Thailand (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co., Ltd.

Certificate of Calibration

Certificate No. : 67-400222-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
100	25.002	24.8	0.2	0.19

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

-000-

Certificate of Calibration

Certificate No. : 67-420044-2

Page : 1 of 2

Submitted by : HVE Co., Ltd.

603 Soi Jarunsanitwong 46 Jarunsanitwong Road, Bangyeekum, Bangplad, Bangkok 10700

pH Meter with electrode

pH meter

Manufacturer : Hanna Model : HI 2211

Range : N/A pH Resolution : 0.01 pH

Serial No. : 08376721 ID No. : N/A

Electrode

Model : HI 1131 Serial No. : 084809EN

Environment : On site calibration was carried out at the Laboratory, HVE Co., Ltd.

Ambient Temperature : (25.0 to 26.0)°C

Relative Humidity : (40 to 45) %

Date of Received : 18 April 2024

Date of Calibration : 18 April 2024

Date of Issue : 19 April 2024

Calibrated by : Permpoon Chanpu

Calibration Method : In-house method CAL-M4201 direct measurement by using standard voltage calibrator and using certified reference material (CRM)

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	SG-E-00307/66	23 Aug 2025	National Institute of Metrology Thailand (NIMT)

2. Certified Reference Material (CRM)

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61293328	944535	27 Nov 2025	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.986	61281486	944537	17 Nov 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
9.997	61281073	944536	17 Nov 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co., Ltd.

Certificate of Calibration

Certificate No. : 67-420044-2

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Electrical measurement

pH meter

Performing standard curve by Multiproduct Calibrator at pH (4,7) and (7,10)

Adjustment Curve at nominal pH	Applied Voltage (mV)	Nominal Value (pH)	UUC Reading		Correction (mV)	Uncertainty (± mV)
			(pH)	(mV)		
4, 7	177.4800	4	4.00	177.3	0.2	0.12
	0.0000	7	7.00	0.0	0.0	0.086
7,10	0.0000	7	7.00	0.0	0.0	0.086
	-177.4800	10	10.00	-177.4	-0.1	0.12

Function :

pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7) and (7,10)

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (± pH)
4, 7	4.008	4.01	0.00	0.010
	6.986	7.01	-0.02	0.011
7, 10	6.986	7.01	-0.02	0.011
	9.997	10.01	-0.01	0.014

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%

-000-



DIGITAL CALIBRATION CO.,LTD.
103, Soi Ekachai 132, Ekachai Rd.,
Bang Bon Nuea, Bang Bon, Bangkok 10150
Phone : 02-862-5225-7 Email : Calibration@digitalscale.co.th



CALIBRATION CERTIFICATE

Certificate No. : 24EB 542
Job No. : C12412-043

Issue Date : 26 December 2024
Location : Lab Calibration

Customer Name : HVE CO., LTD.
603 Soi Jarunsanitwong 46 Jarunsanitwong Road
Bangyeekhan Bangplad Bangkok 10700

Equipment Name : Electronic Balance
Manufacturer : SHIMADZU
Model : ATX224R
Serial No. : D326005191
ID No. : -
Weighing Capacity : 220 g
Resolution : 0.0001 g
Received Date : 25 December 2024
Condition of calibrated item : Good

Calibration Date : 26 December 2024
Ambient Temperature : (22 - 28) °C
Relative Humidity : (30 - 70) %
Atmospheric Pressure : (990 - 1030) mbar
Procedure Used : This calibration was conducted by using in-house calibration procedure number CP-B01-01 based on UKAS LAB14 Edition 7 November 2022

Reference Standard : Weight Set E2 (1 mg to 1 kg)
Instrument : M2306115S
ID No. : DCC 0001-13
Due date : 21-Jun-2026

This certification is traceable to the International System of Unit

Calibrated by

Approved by

() Mr. Chaivapatt (Laboratory Manager)
() Mr. Boonchuay Muenchaisit (Technician)
(✓) Mr. Pisut Nantipawan (Quality Manager)

The Uncertainties are for a Confidence Probability of Approximately 95%.
This certificate may not be reproduced other than in full except with the prior written approval of the head of Calibration Laboratory Department.

PAGE 1/2



DIGITAL CALIBRATION CO.,LTD.
103, Soi Ekachai 132, Ekachai Rd.,
Bang Bon Nuea, Bang Bon, Bangkok 10150
Phone : 02-862-5225-7 Email : Calibration@digitalscale.co.th



CALIBRATION CERTIFICATE

Certificate No. : 24EB 542
Job No. : C12412-043

Result of calibration : Before Adjustment

Nominal Value (g)	True Value (g)	Average Balance Reading (g)	Correction Value (g)	Uncertainty (± g)	Coverage Factor (k)
0	0.00000	0.00000	0.00000	0.00025	2.00
20	20.00000	20.00000	0.00000	0.00025	2.00
100	100.00001	100.00000	0.00001	0.00025	2.00
200	200.00010	200.00000	0.00010	0.00035	2.00

Adjustment By : Without Calibration

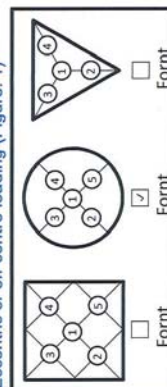
Result of calibration : After Adjustment
1. Repeatability (n = 10 number of measurement)

Nominal Value (g)	Standard deviation of reading (g)
200	0.000042

2. Departure of indication

Nominal Value (g)	True Value (g)	Average Balance Reading (g)	Correction Value (g)	Uncertainty (± g)	Coverage Factor (k)
0	0.00000	0.00000	0.00000	0.00025	2.00
20	20.00000	20.00000	0.00000	0.00025	2.00
40	39.99999	40.00000	-0.00001	0.00025	2.00
60	59.99997	60.00000	-0.00003	0.00025	2.00
80	79.99996	80.00000	-0.00004	0.00025	2.00
100	100.00001	100.00000	0.00001	0.00025	2.00
120	120.00001	120.00000	0.00001	0.00030	2.00
140	140.00001	140.00000	0.00001	0.00030	2.00
160	159.99998	160.00000	-0.00002	0.00030	2.00
180	179.99998	180.00005	-0.00007	0.00035	2.00
200	200.00010	200.00000	0.00010	0.00035	2.00

3. Eccentric or off-centre loading (Figure. 1)



Nominal Value	Position 1	Position 2	Position 3	Position 4	Position 5	Maximum difference between off-centre loading
100 g	Off-Centre	0.00000	-0.00010	0.00000	0.00000	0.00010 g

Approved by :

This result of calibration is based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95%.

-End of report-
PAGE 2/2



Certificate No. : CAL-24-567

Page : 1 of 4

CERTIFICATE OF CALIBRATION

Equipment : Spectrophotometer
Manufacturer : Thermo Scientific
Model : Genesys 10S UV-VIS
Serial No. : 2L9Q310003
ID No. : 071
Customer : HVE CO., Ltd.
: 603 Soi Jarunsanitwong 46, Jarunsanitwong Road,
Bangyeekun, Bangplad, Bangkok 10700
Location : แผนกน้ำบริโภคน้ำ
Date of Receipt : 18 November 2024
Date of Calibration : 18 November 2024
Date of Issue : 19 November 2024
Ambient Temperature : (25±10) °C
Relative Humidity : (60±20) %
Condition As-Received : Used Item

Calibrated by

Mr.Somphop Duangguan

Calibration Engineer

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

This certificate may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Indicated values are valid for the state of the Spectrophotometer at the time of calibration only.



Certificate No. : CAL-24-567

Page : 2 of 4

CALIBRATION REPORT

Conditions of this result of calibration

1. Reference Standard Material :

Material	Model	Serial No.	Cert.No.	Due date
Holmium Glass Filter	RM-HG	24563	109211	13 February 2025
Didymium Glass Filter	RM-DG	24562	109212	13 February 2025
Neutral Density Filter	RM-1N2N3N	24568	109249	14 February 2025
Potassium Dichromate Solution	RM-06	24567	109222	13 February 2025

2. Traceability : This certification is traceable to the International System of Unit maintained at;
The Starna Scientific Ltd. Accredited Calibration Laboratory No. 0659.

3. Method of calibration :

The calibration procedure was carried out according to ASTM E275-08 (2022) and ASTM E925-09 (2014).

4. Result of calibration :

(✓) without adjustment () after adjustment

5. Equipment Specifications:

Spectral Bandwidth : 1.8 nm
Data Interval : 0.1 nm
Scan Speed : Slow nm/min



BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.
CALIBRATION LABORATORY

99/9 Moo 2, Maha Sawat, Phuthamonthon, Nakhon Pathom 73170, Thailand. Tel: +66 3424 5299 Fax: +66 3424 5250
E-mail: bkk@becthai.com Website: www.becthai.com



NSC-TIS-17035
CALIBRATION 9111

Certificate No. : CAL-24-567

Page : 3 of 4

CALIBRATION REPORT

Wavelength Calibration

Certified Values of Reference Material	Nominal Value (nm)	UUC*Reading (nm)	Error (nm)	Uncertainty of Measurement (\pm nm)	k Factor
361.00	361.00	360.7	-0.27	0.13	2.00
536.66	536.66	536.6	-0.09	0.13	2.00
879.27	879.27	879.8	0.51	0.13	2.00

Photometric Calibration for Visible

Wavelength (nm)	Certified Values of Reference Material (A)	UUC* Reading (A)	Error (A)	Uncertainty of Measurement (\pm A)	k Factor
420.0	Zero	0.000	0.0000	0.0028	2.00
	0.5835	0.588	0.0045	0.0045	2.00
	0.725	0.726	0.0010	0.0045	2.00
	1.0367	1.038	0.0013	0.0045	2.00
440.0	Zero	0.000	0.0000	0.0028	2.00
	0.5662	0.567	0.0008	0.0045	2.00
	0.7106	0.709	-0.0016	0.0045	2.00
	1.0159	1.014	-0.0019	0.0045	2.00
465.0	Zero	0.000	0.0000	0.0028	2.00
	0.5257	0.529	0.0033	0.0045	2.00
	0.6682	0.669	0.0008	0.0045	2.00
	0.9547	0.955	0.0003	0.0045	2.00
546.1	Zero	0.000	0.0000	0.0028	2.00
	0.5226	0.524	0.0014	0.0045	2.00
	0.6939	0.693	-0.0009	0.0045	2.00
	0.9919	0.991	-0.0009	0.0045	2.00
590.0	Zero	0.000	0.0000	0.0028	2.00
	0.5567	0.558	0.0013	0.0045	2.00
	0.7502	0.749	-0.0012	0.0045	2.00
	1.0732	1.071	-0.0022	0.0045	2.00
635.0	Zero	0.000	0.0000	0.0028	2.00
	0.5643	0.565	0.0007	0.0045	2.00
	0.7299	0.729	-0.0009	0.0045	2.00
	1.0437	1.043	-0.0007	0.0045	2.00

Remark : Each individual filter is measured against the empty filter holder (blank) used to zero the Spectrophotometer.

Note:



BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.
CALIBRATION LABORATORY

99/9 Moo 2, Maha Sawat, Phuthamonthon, Nakhon Pathom 73170, Thailand. Tel: +66 3424 5299 Fax: +66 3424 5250
E-mail: bkk@becthai.com Website: www.becthai.com



NSC-TIS-17035
CALIBRATION 9111

Certificate No. : CAL-24-567

Page : 4 of 4

CALIBRATION REPORT

Photometric Calibration for UV

Wavelength (nm)	Certified Values of Reference Material (A)	UUC* Reading (A)	Error (A)	Uncertainty of Measurement (\pm A)	k Factor
235.0	Zero	0.000	0.0000	0.0050	2.00
	0.7385	0.738	-0.0005	0.0081	2.00
257.0	Zero	0.000	0.0000	0.0050	2.00
	0.8556	0.851	-0.0046	0.0081	2.00
313.0	Zero	0.000	0.0000	0.0050	2.00
	0.2882	0.286	-0.0022	0.0081	2.00
350.0	Zero	0.000	0.0000	0.0050	2.00
	0.6346	0.632	-0.0026	0.0081	2.00

Remark : The Potassium Dichromate Filled cells are measured against a Perchloric acid blank.

Note:

UUC* : Unit Under Calibration

- End of Report -

Certificate No. C17240066

Calibration Certificate

Equipment: Hot Air Oven
Model: UF 110
Serial No.(or ID): B415.0081 (115)
Manufacturer: Memmert
Condition: In Condition
Ventilation Valve: Closed Shelves(pc.): 2
Job No.: KSMT2400664
Received Date: 25 March 2024
Issued Date: 27 March 2024
Page: 1 of 4

Customer

HVE Co., Ltd.
603 Soi Charansanitwong 46, Charansanitwong Road Bang Yi Khan, Bang Phlat, Bangkok 10700

Calibration Place

HVE Co., Ltd. (Laboratory)
603 Soi Charansanitwong 46, Charansanitwong Road Bang Yi Khan, Bang Phlat, Bangkok 10700

Calibration Date

25 March 2024

Environment Condition

Temperature: 28.7 °C ± 0.6 °C
Humidity: 60.0 %RH ± 3.3 %RH

The Method used

In-house method, WI17, based on TLAS-G20

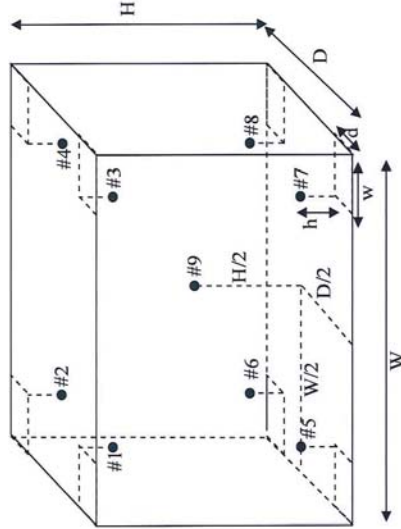
Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co., Ltd.Certificate No. C23240006

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

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



Standard Installation Locations

Volume (Calibration Zone)= 50 (Liters)

Inside chamber:

W = 48 (cm) D = 40 (cm) H = 56 (cm)

Standard Locations (#1, #2, #3, #4):

w = 5 (cm) d = 5 (cm) h = 6 (cm)

Standard Locations (#5, #6, #7, #8):

w = 5 (cm) d = 5 (cm) h = 6 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	101	102	103	104	105	106	107	108	109

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.

**Calibration Results:
Without adjustment**

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

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	104.54	0.54	0.39
#2	104.00	0.00	0.39
#3	104.52	0.52	0.39
#4	104.30	0.30	0.39
#5	104.06	0.06	0.39
#6	104.27	0.27	0.39
#7	103.84	-0.16	0.39
#8	104.15	0.15	0.39
#9	104.19	0.19	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	104.54	104.00	104.52	104.30	104.06	104.27	103.84	104.15	104.19	0.39

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.0	0.46	0.16	0.90

Note: * Maximum uncertainty of the each position

Without adjustment (Cont.)

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

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	181.06	1.06	0.43
#2	179.62	-0.38	0.43
#3	181.09	1.09	0.43
#4	180.17	0.17	0.43
#5	179.91	-0.09	0.43
#6	180.40	0.40	0.43
#7	179.25	-0.75	0.43
#8	179.85	-0.15	0.43
#9	180.09	0.09	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	181.06	179.62	181.09	180.17	179.91	180.40	179.25	179.85	180.09	0.43

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
180.0	1.03	0.15	2.11

Note: * Maximum uncertainty of the each position

The End of Certificate

Statements of conformity:

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

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not

Tolerance and Decision rules:

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

Decision rule : ☒ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.

☐ Choice B Non-binary statement with guard band ($w = 1$ U), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.

☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r$ U).

- PFA: Probability of False Accept

Without adjustment

Desired Temperature : 104.0°C

Tolerances : 1.0 °C

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

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	104.54	0.54	0	1.0	Pass
#2	104.00	0.00	0	1.0	Pass
#3	104.52	0.52	0	1.0	Pass
#4	104.30	0.30	0	1.0	Pass
#5	104.06	0.06	0	1.0	Pass
#6	104.27	0.27	0	1.0	Pass
#7	103.84	-0.16	0	1.0	Pass
#8	104.15	0.15	0	1.0	Pass
#9	104.19	0.19	0	1.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

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

Statements of conformity:(Cont.)

Without adjustment (Cont.)

Desired Temperature : 180.0°C Tolerances : 2 °C

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

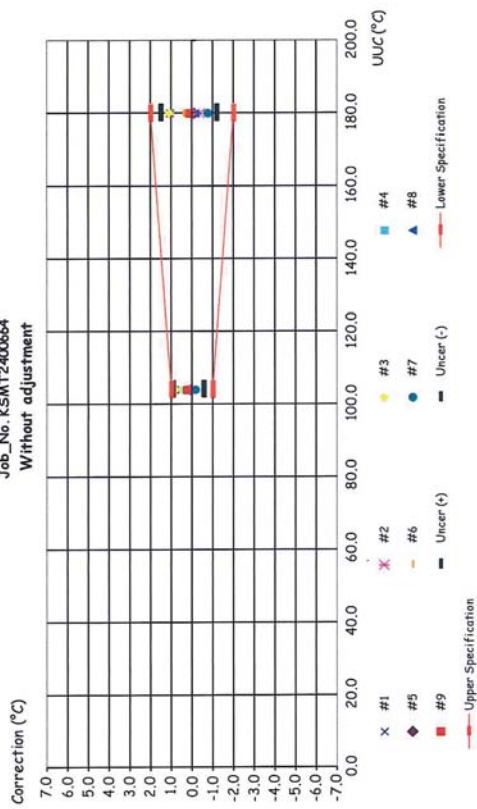
Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	181.06	1.06	0	2	Pass
#2	179.82	-0.38	0	2	Pass
#3	181.09	1.09	0	2	Pass
#4	180.17	0.17	0	2	Pass
#5	179.91	-0.09	0	2	Pass
#6	180.40	0.40	0	2	Pass
#7	179.25	-0.75	0	2	Pass
#8	179.85	-0.15	0	2	Pass
#9	180.09	0.09	0	2	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

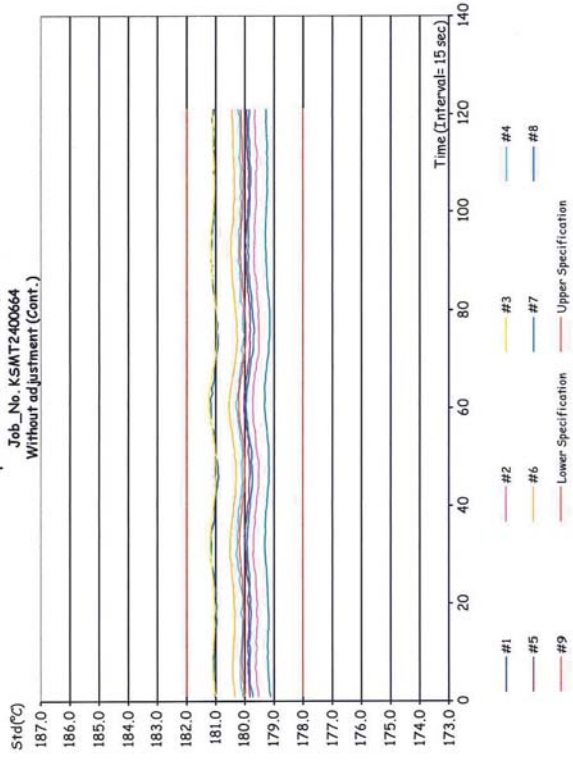
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

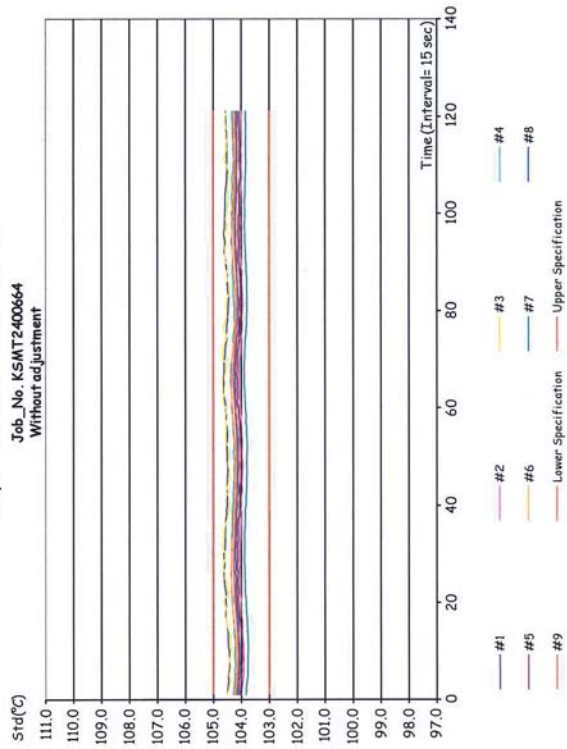
Corr_Distribution & Max_Measurement Uncertainty
 Job_No. KSWT2400664
 Without adjustment



Temperature Distribution @ 180.0°C
 Job_No. KSWT2400664
 Without adjustment (Cont.)



Temperature Distribution @ 104.0°C
 Job_No. KSWT2400664
 Without adjustment





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

ชนิดเครื่องมือ: Hot Air Oven
หมายเลขเครื่อง: B415.0081 (115)

เลขที่ใบงาน: KSMT2400664

รุ่น: UF 110

ตรวจสอบ (รับ)	รายการตรวจเช็ค		ตรวจสอบ (ส่ง)		หมายเหตุ
	25 Mar 2024	25 Mar 2024	25 Mar 2024	25 Mar 2024	
ปกติ	ไม่ปกติ	ปกติ	ไม่ปกติ	ปกติ	ไม่ปกติ
General					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน ฟัดลม	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สลัก Lever of Ventilation valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สลัก Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สลัก Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความร้อน	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สลักตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อเสนอแนะ :

