

ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



right solutions.
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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

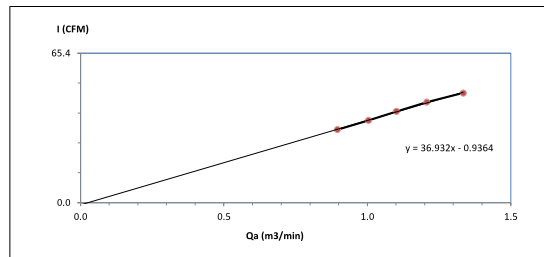
Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient Ambient	Particulate Matter (PM-10)	High Volume Digital Balance	SGK_FS0121	-	-	On site Calibration 12
Ambient Ambient	Total Suspended Particulate	High Volume Digital Balance	SGK_FS0060	30-May-25	30-May-26	On site Calibration 12
Songkhla Lab	Arsenic	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Arsenic	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Cadmium	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Cadmium	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Chromium	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Chromium	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Copper	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Copper	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Iron	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Iron	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Lead	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Lead	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Manganese	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Manganese	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Zinc	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Zinc	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Mercury	ICP-MS Cold Room	SGK_CL0048	4-Feb-25	3-Aug-26	18
Songkhla Lab	Mercury	ICP-MS Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	pH at 25 °C	pH meter	SGK_CL0030	31-Mar-26	1-Oct-27	18
Songkhla Lab	Total Dissolved Solids 180°C	Electronic Top-Loading Balance Oven	SGK_CL0045	15-Dec-25	15-Dec-26	12
Songkhla Lab	Total Dissolved Solids 180°C	Oven	SGK_CL0024	31-Mar-26	1-Oct-27	18
Songkhla Lab	Turbidity	Turbidity Meter	PHK_FS0036	26-Nov-25	26-Nov-26	12
Songkhla Lab	BOD	Incubator	SGK_CL0028	10-Jan-25	10-Jul-26	18
Songkhla Lab	BOD	DO Meter With Sensor	SGK_CL0101	24-Feb-26	24-Feb-27	12
Songkhla Lab	Oil & Grease	Electronic Top-Loading Balance Oven	SGK_CL0045	15-Dec-25	15-Dec-26	12
Songkhla Lab	Oil & Grease	Water Bath	SGK_CL0024	31-Mar-26	1-Oct-27	18
Songkhla Lab	Oil & Grease	Water Bath	SGK_CL0035	16-Dec-25	16-Dec-26	12
Songkhla Lab	Sulfide	Cold Room	SGK_CL0065	15-Dec-25	15-Jun-27	18
Songkhla Lab	Total Suspended Solids	Electronic Top-Loading Balance Oven	SGK_CL0045	15-Dec-25	15-Dec-26	12
Songkhla Lab	Total Suspended Solids	Oven	SGK_CL0024	31-Mar-26	1-Oct-27	18
Songkhla Lab	Total Kjeldahl Nitrogen	KJELDAETHERM@BLOCK-DIGESTION	SGK_CL0092	14-Jan-26	14-Jan-27	12
Songkhla Lab	Total Coliform	Autoclave	SGK_ML0001	15-Dec-25	15-Jun-27	18
Songkhla Lab	Total Coliform	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Songkhla Lab	Total Coliform	pH Meter	SGK_ML0045	17-Nov-25	17-Nov-26	12
Songkhla Lab	Total Coliform	Water Bath	SGK_ML0021	16-Dec-25	16-Jun-27	18
Songkhla Lab	Escherichia coli	Autoclave	SGK_ML0002	15-Dec-25	15-Jun-27	18
Songkhla Lab	Escherichia coli	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Songkhla Lab	Escherichia coli	pH Meter	SGK_ML0045	17-Nov-25	17-Nov-26	12
Songkhla Lab	Escherichia coli	Water Bath	SGK_ML0021	16-Dec-25	16-Jun-27	18
Songkhla Lab	Fecal Coliform	Autoclave	SGK_ML0001	15-Dec-25	15-Jun-27	18
Songkhla Lab	Fecal Coliform	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Songkhla Lab	Fecal Coliform	pH Meter	SGK_ML0045	17-Nov-25	17-Nov-26	12
Songkhla Lab	Fecal Coliform	Water Bath	SGK_ML0021	16-Dec-25	16-Jun-27	18
Water Lab	Fluoride	Ion Chromatography	BKK_EN0427	1-Dec-25	30-Nov-26	12
Water Lab	Nitrate	Ion Chromatography	BKK_EN0427	1-Dec-25	30-Nov-26	12
Water Lab	Chloride	Ion Chromatography	BKK_EN0427	1-Dec-25	30-Nov-26	12
Water Lab	Sulfate	Ion Chromatography	BKK_EN0427	1-Dec-25	30-Nov-26	12



High Volume Air Sampler Calibration Worksheet

Project Site :	Southern Star Hotel Co.,Ltd	Barometric Pressure (mm Hg) :	759.8
Calibrate Location :	บริเวณพื้นที่โครงการ	Temperature (°C) :	31.5
Calibrate Date :	18-Feb-26	High Volume ID :	SGK_FS0121
CalibrationSheet No.:	C-180226-SGK_FS0121	High Volume Model :	TE-5009X
Calibrator ID:	SGK_FS0083	High Volume S/N :	1088
Calibrator Model :	TE-5028A	Calibrator Slope :	1.02098
Calibrator S/N :	3888	Calibrator Intercept :	-0.06367

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.896	32	Slope : 36.9317
2	2.3	1.004	36	Intercept : -0.9364
3	2.8	1.101	40	Correlation Coefficient : 0.9989
4	3.4	1.207	44	
5	4.2	1.334	48	



Calibrated by *you R*

(Mr.Yongsil Rangsee)
SGK Field Services Scientist (2)

Approved by *Supt S*

(Mr.Supt Salameh)
Field Services Section Head

FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23

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Accredited by

NSC-TISI-TIS 17025
Calibration 0426

Calibration certificate

Calibration Certificate No. 25BCI0197

Object	Electronic non-automatic weighing instrument	This calibration certificate documents the traceability to national standards.
Manufacturer	Ohaus	Uncertainties of measurements are taken into account when only statements of compliance are made.
Type	EX225D/AD	This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP WI 08.
Serial QM Ident. no.	C309774648 BKK_EN0403	This certificate relate and apply this equipment only.
Customer	ALS Laboratory Group (Thailand)Co., Ltd.	
	104 Phatthanakarn 40,Phattanakarn Rd.,Khwaeng Phatthanakarn ,Khet Suan Luang,Bangkok 10250	
Order no.	261969	
Number of pages	6	
Date of calibration	30 May 2025	

REVIEW BY *Junda K*
APPROVED BY *Suk P*
NEXT CAL DATE: 30/05/26

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Date	30 May 2025	Approval of the Calibration Certificate	Person in charge
		<i>Chonchai</i>	<i>Chonchai</i>
		Mr. Chonchai Inthana	Chonchai Inthana

Calibration certificate No.: 25BCI0197

Calibration Certificate

Calibration object

Multi range instrument

Model	EX225D/AD
Serial Number	C309774648
QM Ident. no Inventory no.	BKK_EN0403 —
Range	1 2
Maximum capacity (Max. load)	120.00000 g 220.0000 g
Measured range	120.00000 g 220.0000 g
Scale interval	0.00001 g 0.0001 g

Place of calibration

Address	According to page 1
Department Cost center	Environment Department. —
Building Floor	— 1st Floor.
Room	Laboratory Room.
Maximum temperature variation at place of calibration	5 K

Calibration procedure

EURAMET cg-18, V4.0 - Guidelines on the Calibration of Non-Automatic Weighing Instruments

Test equipment

Test equipment type	Test equipment ID	Valid until
Thermometer	Testo 174(Traceable to Si unit through ENTECH)	11 Nov 2025
Test weight set OIML R111 E2	Certificate No.M2308197S ,E2(Traceable to SI unit through TCS)	23 Aug 2025

Range 1

Adjustment Status

The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions

Date of calibration	30 May 2025
Temperature at place of calibration Temp. diff. <i>T</i> _{weights} - <i>T</i> _{place}	21,7 °C 0,5 K
Measuring conditions	The installation site is suitable, The device was leveled, Balance was loaded up to Max before test.
Comments	Humidity 60,0 %RH.

Measurement results | Measurement uncertainties

Repeatability		Eccentricity	
Test load (nominal): 1 g 100 g		Test load (nominal): 50 g	
1 g	100 g	Center	49,99996 g
1	0,99993 g	Front left	49,99993 g
2	0,99991 g	Back left	49,99993 g
3	0,99992 g	Back right	49,99994 g
4	0,99993 g	Front right	49,99990 g
5	0,99992 g	Maximum deviation from centric loading indication	
6	0,99991 g	Δ <i>f</i> _{ecc} max = 0,00006 g	
7	0,99993 g		
8	0,99994 g		
9	0,99995 g		
10	0,99995 g		
<i>s</i> = 0,000014 g		<i>s</i> = 0,000017 g	

Error of indication					
Testload <i>L</i>	Indication <i>I</i>	Error <i>E</i>	Expansion factor <i>k</i>	Uncertainty <i>U</i> (<i>E</i>)	Uncertainty relative <i>U</i> _{rel} (<i>E</i>)
0,00000 g	0,00000 g	0,00000 g	2,00	0,000030 g	--
0,01000 g	0,00995 g	-0,00005 g	2,00	0,000037 g	0,37 %
0,10000 g	0,09991 g	-0,00009 g	2,00	0,000038 g	0,038 %
0,50000 g	0,49985 g	-0,00015 g	2,00	0,000040 g	0,0080 %
1,00000 g	0,99991 g	-0,00009 g	2,00	0,000041 g	0,0041 %
5,00002 g	4,99997 g	-0,00005 g	2,00	0,000050 g	0,0010 %
10,00002 g	10,00003 g	0,00001 g	2,00	0,000069 g	0,00069 %
50,00002 g	49,99972 g	-0,00030 g	2,00	0,000091 g	0,00018 %
70,00004 g	69,99975 g	-0,00029 g	2,00	0,00017 g	0,00024 %
100,00001 g	99,99958 g	-0,00043 g	2,00	0,00017 g	0,00017 %
115,00006 g	114,99966 g	-0,00040 g	2,00	0,00028 g	0,00024 %
Maximum error of indication		<i>E</i> _{max} = 0,00043 g			

*U*_{rel}(*E*) is the quotient of *U*(*E*) and test load *L*. The uncertainty of measurement *U*(*E*) is valid only if error *E* is considered. You will find reference notes on the uncertainty of measurement in use under: Appendix to the calibration certificate | Interpretation of measurement results.
Reference note: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the documented Expansion factor, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Range 1

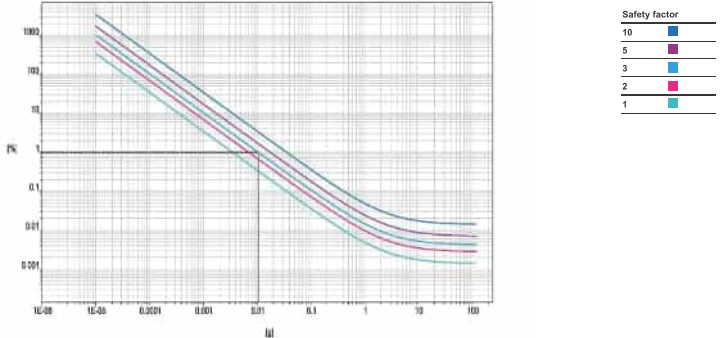
Device adjusted before measurement	Yes
Temperature deviation considered	5 K
Temperature coefficient considered	2 · 10 ⁻⁴ /K

Uncertainty of the weighing result *U*_G(*W*)*U*_G(*W*) = 0.000035 g + 1.38 · 10⁻⁵ · *R*

Reference note: The current uncertainty of measurement is calculated by entering of the reading *R* into this formula. In relation to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied with an Expansion factor of 2, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

Indication in % from max load	Net indication <i>R</i>	Uncertainty <i>U</i> _G (<i>W</i>)	Uncertainty relative <i>U</i> _G (<i>W</i>) _{rel}
1 %	1,20000 g	0,000052 g	0,0043 %
25 %	30,00000 g	0,00045 g	0,0015 %
50 %	60,00000 g	0,00086 g	0,0014 %
75 %	90,00000 g	0,0013 g	0,0014 %
100 %	120,00000 g	0,0017 g	0,0014 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

Process accuracy	1,00 %
Safety factor	3
Minimum sample weight	0,01045 g

Range 2

Adjustment Status

The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions

Date of calibration	30 May 2025
Temperature at place of calibration Temp. diff. <i>T</i> _{weights} - <i>T</i> _{place}	21,7 °C 0,5 K
Measuring conditions	The installation site is suitable, The device was leveled, Balance was loaded up to Max before test.
Comments	Humidity 60,0 %RH.

Measurement results | Measurement uncertainties

Repeatability		Eccentricity	
Test load (nominal): 200 g		Test load (nominal): 100 g	
200 g		Center	99,99984 g
1	199,9998 g	Front left	99,99990 g
2	199,9998 g	Back left	99,99983 g
3	199,9998 g	Back right	99,99979 g
4	200,0000 g	Front right	99,99979 g
5	199,9998 g	Maximum deviation from centric loading indication	
6	199,9999 g	Δ <i>f</i> _{ecc} max = 0,00006 g	
7	199,9999 g		
8	200,0000 g		
9	199,9998 g		
10	199,9999 g		
<i>s</i> = 0,00008 g			

Error of indication					
Testload <i>L</i>	Indication <i>I</i>	Error <i>E</i>	Expansion factor <i>k</i>	Uncertainty <i>U</i> (<i>E</i>)	Uncertainty relative <i>U</i> _{rel} (<i>E</i>)
0,00000 g	0,00000 g	0,00000 g	2,00	0,000030 g	--
20,00002 g	19,99986 g	-0,00016 g	2,00	0,000069 g	0,00034 %
50,00002 g	49,99978 g	-0,00024 g	2,00	0,000091 g	0,00018 %
70,00004 g	69,99981 g	-0,00023 g	2,00	0,00017 g	0,00024 %
90,00007 g	89,99976 g	-0,00031 g	2,00	0,00018 g	0,00020 %
110,00003 g	109,99986 g	-0,00017 g	2,00	0,00028 g	0,00025 %
130,00011 g	129,9999 g	-0,0002 g	2,00	0,00028 g	0,00022 %
150,0000 g	149,9999 g	-0,0001 g	2,00	0,00028 g	0,00019 %
170,0000 g	170,0000 g	0,0000 g	2,00	0,00028 g	0,00016 %
200,0000 g	199,9998 g	-0,0002 g	2,00	0,00028 g	0,00014 %
220,0000 g	219,9999 g	-0,0001 g	2,00	0,00029 g	0,00013 %
Maximum error of indication		<i>E</i> _{max} = 0,0003 g			

*U*_{rel}(*E*) is the quotient of *U*(*E*) and test load *L*. The uncertainty of measurement *U*(*E*) is valid only if error *E* is considered. You will find reference notes on the uncertainty of measurement in use under: Appendix to the calibration certificate | Interpretation of measurement results.
Reference note: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the documented Expansion factor, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

End of calibration certificate

Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Range 2

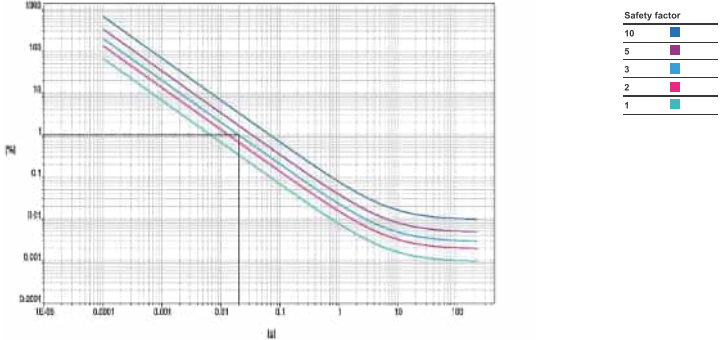
Device adjusted before measurement	Yes
Temperature deviation considered	5 K
Temperature coefficient considered	2 · 10 ⁻⁴ /K

Uncertainty of the weighing result *U*_G(*W*)*U*_G(*W*) = 0.000067 g + 9.52 · 10⁻⁶ · *R*

Reference note: The current uncertainty of measurement is calculated by entering of the reading *R* into this formula. In relation to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied with an Expansion factor of 2, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

Indication in % from max load	Net indication <i>R</i>	Uncertainty <i>U</i> _G (<i>W</i>)	Uncertainty relative <i>U</i> _G (<i>W</i>) _{rel}
1 %	2,20000 g	0,000088 g	0,0040 %
25 %	55,00000 g	0,00059 g	0,0011 %
50 %	110,00000 g	0,0011 g	0,0010 %
75 %	165,0000 g	0,0016 g	0,00099 %
100 %	220,0000 g	0,0022 g	0,00098 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

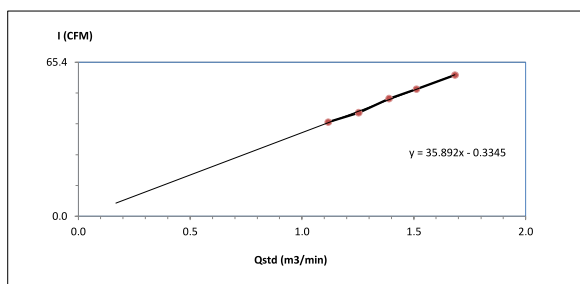
Process accuracy	1,00 %
Safety factor	3
Minimum sample weight	0,02019 g



High Volume Air Sampler Calibration Worksheet

Project Site :	Southern Star Hotel Co.,Ltd	Barometric Pressure (mm Hg) :	759.8
Calibrate Location :	บริเวณพื้นที่โครงการ	Temperature (°C) :	31.5
Calibrate Date :	18-Feb-26	High Volume ID :	SGK_FS0060
CalibrationSheet No.:	C-180226-SGK_FS0060	High Volume Model :	TE-5170D
Calibrator ID:	SGK_FS0083	High Volume S/N :	5586
Calibrator Model :	TE-5028A	Calibrator Slope :	1.63052
Calibrator S/N :	3888	Calibrator Intercept :	-0.10231

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.8	1.1174	40	Slope : 35.8924 Intercept : -0.3345 Correlation Coefficient : 0.9986
2	3.6	1.2533	44	
3	4.5	1.3892	50	
4	5.4	1.5120	54	
5	6.8	1.6842	60	



Calibrated by Yong R
(Mr. Yongsil Rangsee)
SGK Field Services Scientist (2)

Approved by : Supot S
(Mr. Supot Salamteh)
Field Services Section Head

FORM NO.: F 06-073 REVISION NO.:2 ISSUE DATE: 20/11/23



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Website: www.agilent.com/chem

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tanyatorn.mongkonjirawut@alsglobal.com
027603077

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Khwaeng Phatthanakan Khet Suan

Payer:

ALS Laboratory Group (Thailand) Co
Ltd Branch Number 0002
114/1 Moo8 Banplu Subdistrict Hat
Yai District

SOMKHA 90350

Delivery Site:

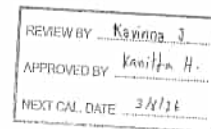
ALS Laboratory Group (Thailand) Co
Ltd Branch Number 0002
114/1 Moo8 Banplu Subdistrict Hat
Yai District

Location:

Room
Bldg
Lab
Dept

SERVICE REPORT

Customer Purchase Order Number:	Customer Number: 70371013
Service Request:	Service Request Date:
Service Order: 8007493912	Service Confirmation: 6906126918



Direct Inquiries to:

Contact Name: Customer Contact Center
Contact E-mail: ccc-smt@agilent.com
Contact Telephone: +662 637 6363
Contact Fax: +662 632 4334

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Acc. No: 012-4452-307
THB Krung Thai Bank PCL
Siam Square Bldg. 416/1-2 Rama 1 Rd. Pathumwan, BKK 10330
Thailand

ORIGINAL

Page 1 of 3

Service Confirmation Number: 6906126918
Service Confirmation Date: 04.02.2025

Service Confirmation Number: 6906126918
Service Confirmation Date: 04.02.2025

Service Instrument:

Model Number	Model Description	Serial Number	System Handle	Parent Asset
SYS-IM-7900	ICP-MS 7900 System			
G7201C	ICP-MS MassHunter SW only (excludes PC)	US43709575	ICP MS 7900	SYS-IM-7900
G8403A	Agilent 7900 ICP-MS	JP16511069	ICP MS 7900	SYS-IM-7900
G8411A	ISIS 3 for Agilent 7900/7900/8900	JP16510379	ICP MS 7900	SYS-IM-7900

Service Items:

Item	Service/Part #	Description	Qty	Entitlement	Service Start	Service End
1000	EDD	Enterprise Operational Qualification	1.00	Agreement Entitlement 100 % covered	03.02.2025	04.02.2025
1010	5185-51850	ICP-MS Checkout Solutions	1.00	Agreement Entitlement 100 % covered		

Additional Information:

Service Information:

Problem Description: *PR-QC-ICP MS 7900 5001391286		
Service Provided: OQ, SGK, CL0048 Perform oq test. Sensitivity, resolution background both He and H2 mode. Stability test all pass. Sent oq report to customer. Let's customer test run sample.		
Service Overview Code: Reason Code: Scheduled Service Diagnosis Code: Scheduled Service Resolution Code: Scheduled Service		
Reported Hours: 7.0	Travel Hours: 2.0	
Customer Field Service Representative Name: Worawit Timakul	Customer Field Service Representative Signature: 	Date: 04 Feb 2025
Customer Name: TANYATORN MONGKONJIRAWUT	Customer Signature: 	Date: 04 Feb 2025
Additional Comments:		

CALIBRATION CERTIFICATE

Issued Date : 18-Dec-2025

Certificate No. : 25TH5497

CSR No. : A230/11460

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
Instrument Name : Cold Room
Manufacturer : N/A
Model : N/A
Serial No. : N/A
ID No. : SGK_CL0065
Resolution : 0.1 °C
Received Date : 15-Dec-2025
Calibrated Date : 15-Dec-2025
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY : *Kanitta H.*
APPROVED BY : *Kanitta H.*
NEXT CAL. DATE : 15/01/2027

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and /or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Ibrorhim Saleemin

Approved by :

Imron Rattanayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH5497

CSR No. : A230/11460

Page : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition Switch Unit with Sensor	DAQ870A	MY58036254	QR25-2036	1-Jul-2026

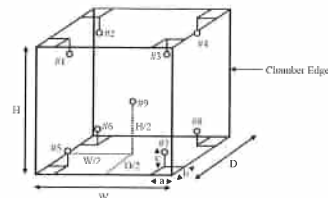
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : [✓] Without Adjustment [] After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

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

Dimension of the chamber

W = 40.0 cm
H = 40.0 cm
D = 33.0 cm

SCAL.FO.018/WI.012

Certificate No. : 25TH5497

CSR No. : A230/11460

Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Cold Room and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)								Uncertainty (±°C)	
	#1	#2	#3	#4	#5	#6	#7	#8		Ref. 9
4	3.95	4.10	4.10	4.02	4.10	3.95	3.90	3.99	3.95	0.38

3. Temperature Performance Result

The performance of the Cold Room are reported as shown below

UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
4.0	4.0	0.05	0.86	0.86

UUC = Unit Under Calibration

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

... End ...

SCAL.FI.010/ISO17025

CARIBRATION CERTIFICATE

Issued Date : 22-Oct-2024

Certificate No. : 24CH0526

CSR No. : A163/08133

Page : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
Instrument Name : pH meter
Manufacturer : Mettler Toledo
Model : S220
Serial No. : B625631849
ID No. : SGK_CL0030
Electrode No. : 2281592
Received Date : 19-Oct-2024
Calibrated Date : 19-Oct-2024
Ambient Temperature : (25 ± 3) °C
Relative Humidity : (55 ± 15) %

REVIEW BY : *Ananta B.*
APPROVED BY : *Kanitta H.*
NEXT CAL. DATE : 19/10/26

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.008 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and /or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- CPAchem : CPAchem Ltd
- WK : WK Electric Co., Ltd.
- SCAL : Southern Calibration Service Co., Ltd.

Calibrated by : Ailsara Ma

Approved by :

Imron Rattanayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 24CH0526
 CSR No. : A163J08133
 Page : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.000	61310674	1042701	26-Oct-2025
Standard Solution	7.000	61314184	1042700	26-Oct-2025
Standard Solution	10.01	61313804	1042702	26-Oct-2025
Temperature/Electrical Calibrator	MC2-TE	14967	WK2106-299-223	31-May-2025
Digital Thermometer With Sensor	DP-77	1.360896	24SDTH005	7-Aug-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration :

1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading		Correction (mV)	Uncertainty (± mV)
	(mV)	(pH)		
177.48	177.5	4.00	-0.02	0.17
0.00	0.0	7.00	0.00	0.13
-177.48	-177.5	10.00	0.02	0.17

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)
	(pH)	(mV)		
4.007	3.99	178.1	0.017	0.0062
6.976	7.02	1.7	-0.044	0.019
10.009	9.96	-169.6	0.049	0.038

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)
	(pH)	(mV)		
4.007	3.99	177.7	0.017	0.0092
6.976	7.01	3.7	-0.034	0.019
10.009	10.00	-169.0	0.009	0.038

4. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
25	25.021	25.0	0.02	0.060

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

... End ...



Southern Calibration Service Co., Ltd.

669/35 Kanjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand
 Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal.co.th



CALIBRATION CERTIFICATE

Issued Date : 3-Apr-2026

Certificate No. : 26CH0181

CSR No. : A247/12304

Page : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd
 114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
 Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory
 Instrument Name : pH meter
 Manufacturer : Mettler Toledo
 Model : S220
 Serial No. : B62531849
 ID No. : SGK_CL0030
 Electrode No. : 30014096
 Received Date : 31-Mar-2026
 Calibrated Date : 31-Mar-2026
 Ambient Temperature : (25 ± 3) °C
 Relative Humidity : (55 ± 15) %

REVIEW BY : *[Signature]*
 APPROVED BY : *[Signature]*
 NEXT CAL DATE : 1/10/27

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.062 based on direct measurement with certified reference material (CRM)

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- CPChem : CPChem Ltd
 - WK : WK Electric Co., Ltd.

Calibrated by : Alisara Ma

Approved by :

Alisara Ma / Supervisor Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 26CH0181
 CSR No. : A247/12304
 Page : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.000	61333215	1176852	24-Dec-2026
Standard Solution	6.999	C03337	S11M004	24-Dec-2026
Standard Solution	10.01	61325050	1176853	24-Dec-2026
Temperature/Electrical Calibrator	MC2-MF	23642	WK2502-402-32	5-Feb-2027

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration :

1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading		Correction (mV)	Uncertainty (± mV)	Coverage factor k
	(mV)	(pH)			
177.48	177.5	4.00	-0.02	0.17	2.00
0.00	0.1	7.00	-0.10	0.13	2.00
-177.48	-177.4	10.00	-0.08	0.17	2.00

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)	Coverage factor k
	(pH)	(mV)			
4.008	4.01	159.8	-0.002	0.0092	2.00
6.999	7.07	-14.0	-0.071	0.020	2.00
10.011	10.11	-187.4	-0.099	0.042	2.00

3. After Sample Test Measurement (Performing buffer standard curve by using buffer nominal pH4, 7, 10)

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)	Coverage factor k
	(pH)	(mV)			
4.008	4.00	169.8	0.008	0.0092	2.00
6.999	7.00	-4.2	-0.001	0.019	2.00
10.011	10.01	-177.6	0.001	0.042	2.00

4. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
25	25.024	25.1	-0.076	0.06

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

... End ...



Southern Calibration Service Co., Ltd.

669/35 Kanjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand
 Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal.co.th



CALIBRATION CERTIFICATE

Issued Date : 18-Dec-2025

Certificate No. : 25MA2641

CSR No. : A230/11462

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
 114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
 Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
 Instrument Name : Electronic Balance
 Manufacturer : Sartorius
 Model : MSE224S-100-DU
 Serial No. : 34705158
 ID No. : SGK_CL0045
 Resolution : 0.0001 g
 Received Date : 15-Dec-2025
 Calibrated Date : 15-Dec-2025
 Ambient Temperature : (30 ± 10) °C
 Relative Humidity : (50 ± 20) %

REVIEW BY : *[Signature]*
 APPROVED BY : *[Signature]*
 NEXT CAL DATE : 15/12/26

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.001 based on UKAS LAB 14 : 2022

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- SCAL : Southern Calibration Service Co., Ltd.,

Calibrated by : Hedbordee Dettawee

Approved by :

Innon Rattanayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25MA2641
CSR No. : A230/11462
Page. : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Weight Set	2mg to 1kg	11119514/01	25SWS001	2-Jul-2026

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : [✓] Without Adjustment [] After Adjustment

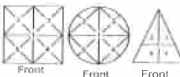
1. Repeatability

Nominal Value (g)	Standard Deviation (g)
20	0.00000
200	0.00000

2. Off-center loading

A mass approximately 100g was placed on a pan and moved to various position .
The balance reading obtained are given in the table.

Position					Maximum Error from Center (g)
1	2	3	4	5	
100.0000	100.0001	100.0000	100.0001	100.0000	0.0001



3. Effect of tare

Nominal Value (g)	Standard Value (g)	Balance Reading (g)	UUC Error (g)
20	19.9999	20.0000	0.0001
40	39.9999	40.0000	0.0001
60	60.0001	60.0000	-0.0001
80	80.0000	80.0001	0.0001
100	100.0000	100.0000	0.0000

SCAL.T0.01850.0023



Certificate No. : 25MA2641
CSR No. : A230/11462
Page. : 3 of 3

Result of Calibration : cont.

4. Departure from nominal value

Nominal Value (g)	Standard Value (g)	UUC Reading (g)	Correction (g)	Uncertainty (±g)	Coverage Factor (k)
0	0.0000	0.0000	0.0000	0.00008	2.0
0.01	0.0100	0.0100	0.0000	0.00008	2.0
0.1	0.1000	0.1000	0.0000	0.00008	2.0
0.5	0.5000	0.5000	0.0000	0.00008	2.0
1	1.0000	1.0000	0.0000	0.00008	2.0
2	2.0000	2.0000	0.0000	0.00008	2.0
5	5.0000	5.0000	0.0000	0.00009	2.0
10	10.0000	10.0000	0.0000	0.00009	2.0
20	19.9999	20.0000	-0.0001	0.00009	2.0
40	39.9999	40.0000	-0.0001	0.00012	2.0
60	60.0001	60.0000	0.0001	0.00013	2.0
80	80.0000	80.0000	0.0000	0.00017	2.0
100	100.0000	100.0000	0.0000	0.00016	2.0
120	119.9999	120.0000	-0.0001	0.00024	2.0
140	139.9999	140.0001	-0.0002	0.00024	2.0
160	160.0001	160.0001	0.0000	0.00026	2.0
180	180.0000	180.0001	-0.0001	0.00030	2.0
200	199.9998	200.0000	-0.0002	0.00029	2.0

- UUC = Unit Under Calibration

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

...End...

SCAL.T0.01850.0023

Southern Calibration Service Co., Ltd.

669/35 Karnjanavanit Rd., Banpru, Hatgoi, Songkha 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 22-Oct-2024

Certificate No. : 24TH4295
CSR No. : A163/08133
Page. : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanwanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
Instrument Name : Hot Air Oven
Manufacturer : Memmert
Model : UF110
Serial No. : B416.3387
ID No. : SGK_CL0024
Resolution : 0.1 °C
Received Date : 19-Oct-2024
Calibrated Date : 19-Oct-2024
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY : Ananta B.
APPROVED BY : Kamitta H.
NEXT CAL. DATE : 19/04/2026

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.012 based on GLA - 20
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through :
- TISTR : Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrahim Salemin

Approved by : Imron Rattanyilum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 24TH4295
CSR No. : A163/08133
Page. : 2 of 3

Details of Calibration

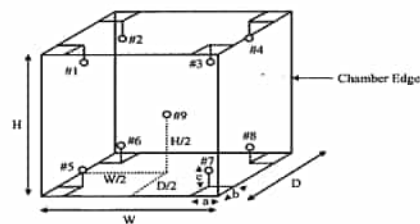
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY5800813	PSL-T0707-1/57	22-May-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

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

Dimension of the chamber

W = 55.0 cm
H = 48.0 cm
D = 40.0 cm



Certificate No. : 24TH4295
CSR No. : A16308133
Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Hot Air Oven and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
40	40.35	40.40	40.51	40.43	40.05	40.24	40.09	40.14	39.75	0.38
70	70.27	70.30	70.45	70.24	70.24	70.43	70.20	70.30	69.95	0.35
103	102.94	102.90	103.55	102.96	103.22	103.14	103.10	103.01	102.88	0.35
104	104.15	103.99	104.27	104.08	104.09	104.23	104.26	104.15	103.90	0.35
105	105.04	104.90	105.05	104.87	104.91	104.80	104.82	104.98	104.70	0.35
180	179.19	178.93	179.82	179.10	179.27	179.68	179.12	179.73	179.12	0.41

3. Performance Result

The performance of the Hot Air Oven are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
40	40.0	40.0	0.20	0.84	0.84
70	70.0	70.0	0.10	0.59	0.59
103	103.0	103.0	0.20	0.73	0.74
104	104.0	104.0	0.20	0.47	0.56
105	105.0	105.0	0.20	0.44	0.46
180	180.0	180.0	0.50	0.85	1.11

- UUC = Unit Under Calibration

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

... End ...



Southern Calibration Service Co., Ltd.

669/35 Kanjanavanit Rd., Banpru, Hatgoi, Songkhla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal.co.th



CALIBRATION CERTIFICATE

Issued Date : 3-Apr-2026

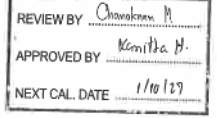
Certificate No. : 26TH1563

CSR No. : A247/12304

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory
Instrument Name : Hot Air Oven
Manufacturer : Memmert
Model : UF110
Serial No. : B416.3387
ID No. : SGK.CL0024
Resolution : 0.1 °C
Received Date : 31-Mar-2026
Calibrated Date : 31-Mar-2026
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %



Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co., Ltd.

Calibrated by : Ibrorhim Salesmin

Approved by :

Aisara Ma / Supervisor Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 26TH1563
CSR No. : A247/12304
Page : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition Switch Unit with Sensor	DAQ970A	MY58036254	QR25-2036	1-Jul-2026

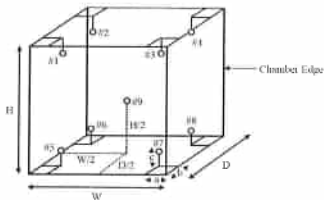
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : ☒ Without Adjustment ☐ After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

Dimension of the chamber

a = 5.0 cm W = 40.0 cm
b = 5.0 cm H = 40.0 cm
c = 5.0 cm D = 33.0 cm



Certificate No. : 26TH1563
CSR No. : A247/12304
Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Hot Air Oven and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
40	40.52	40.44	40.53	40.53	40.53	40.46	40.59	40.54	40.44	0.38
70	70.81	70.87	71.26	70.87	70.18	70.96	70.24	70.47	70.09	0.44
103	103.36	103.37	103.49	103.42	102.74	103.02	103.47	102.92	102.96	0.39
104	104.06	104.09	104.50	104.14	103.50	104.15	104.47	103.84	103.84	0.42
105	105.20	105.22	105.54	105.41	105.36	105.22	105.31	105.01	105.09	0.38
180	180.78	180.66	180.98	180.98	179.46	179.33	179.32	179.41	179.42	0.55

3. Temperature Performance Result

The performance of the Hot Air Oven are reported as shown below

UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
40.0	40.0	0.10	0.33	0.33
70.0	70.0	0.05	1.17	1.17
103.0	103.0	0.10	0.72	0.94
104.0	104.0	0.15	0.95	1.27
105.0	105.0	0.10	0.83	0.77
180.0	180.0	0.25	1.73	1.85

UUC = Unit Under Calibration

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

... End ...



Certificate of Testing

Cert.No.: 25TW242
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : Mettler Toledo
Model : Seven2Go S9
Serial No. : C343002019
ID No. : PHK_FS0036
Received Date : 25 November 2025
Test Date : 26 November 2025
Reference : 2511-0730DSC-9
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

Tested by : Walalak Sirithean

Approved by :
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 28 November 2025

REVIEW BY
APPROVED BY
NEXT CAL DATE.....26/11/26



Cert.No.: 25TW242
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :
This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

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.: 1069301

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.23	0.0055

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

-00-



Certificate of Calibration

Cert. No.: 26LM7
Page.: 1 of 2

Equipment : Do Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2Go S9
Serial No. : C343002019
ID No. : PHK_FS0036
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand
Location : TPA On Site Calibration Laboratory

Received Order : 06 January 2026
Calibrated Date : 08 January 2026
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngatrakul

Approved by :
Approved Signatory

() Chakrit Waewwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 09 January 2026

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Do Meter with Sensor
Condition As-Received : Used Item
Reference : 2601-0087DSC-1
Procedure Used :-

Cert. No.: 26LM7
Page.: 2 of 2

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with
Industrial Platinum Resistance Thermometer (IPT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	25I953	TPA	05 Sep 2026

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

3. This measurement result is traceable to the International System of Unit maintained through :

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

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 1069301

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	80	20.003	20.1	0.097	0.16	2.00

UUC* : Unit Under Calibration

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

-00-

CARIBRATION CERTIFICATE

Issued Date : 13-Jan-2025

Certificate No. : 25TH0226

CSR No. : A101/05028

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory
Instrument Name : Incubator
Manufacturer : Memmert
Model : ICP750
Serial No. : F816.0053
ID No. : SGK_CL0028
Resolution : 0.1 °C
Received Date : 10-Jan-2025
Calibrated Date : 10-Jan-2025
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY : Ananta B.
APPROVED BY : Kunchit H.
NEXT CAL. DATE : 10/1/26

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

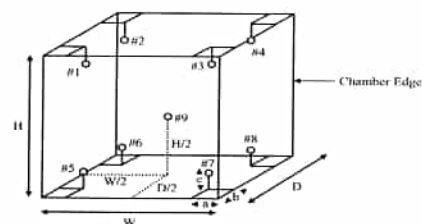
This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- TISTR : Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrahim Saleemin

Approved by :

Ibrahim Rattanasaylum / Technical Manager



Sensor Installation Details

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

Dimension of the chamber

W = 104.0 cm
H = 120.0 cm
D = 60.0 cm



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 Southern Calibration Service Co., Ltd.

Certificate No. : 25TH0226

CSR No. : A101/05028

Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Incubator and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
20	20.03	20.23	20.37	20.34	20.32	20.03	20.19	20.31	20.06	0.38

3. Performance Result

The performance of the Incubator are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20	20.0	20.0	0.10	0.31	0.40

- UUC = Unit Under Calibration

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

... End ...



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



Certificate of Calibration

Cert. No.: 25LM26

Page: 1 of 2

Equipment : DO Meter with Sensor

Manufacturer : YSI

Model : 4010-1W

Serial No. : 24200618

ID No. :

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Songkhla Branch.
114/1 Moo 8 Karnchanawanich Rd.,
T.Ban Phru, A.Hat Yai,
Songkhla 90250 Thailand

Location : TPA Calibration Laboratory

Received Order : 21 February 2025

Calibrated Date : 24 February 2025

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lernagatrakul

Approved by :

() Chakrit Waewwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 25 February 2025

REVIEW BY : Ananta B.
APPROVED BY : Kunchit H.
NEXT CAL. DATE : 10/1/26

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : DO Meter with Sensor
 Condition As-Received : Used Item
 Reference : 2502-0715WC-2
 Procedure Used :-

Cert. No.: 25LM26
 Page.: 2 of 2

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	241022	TPA	17 Sep 2025
2. This certificate is valid only to the item calibrated on date and place of calibration.				
3. This certification is traceable to the International System of Unit.				

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

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N: 24F102419

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	60	20.003	20.0	-0.003	0.16	2.00

UUC* : Unit Under Calibration

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

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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 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 25TW32
 Page.: 1 of 2

Equipment : DO Meter

Manufacturer : YSI

Model : 4010-1W

Serial No. : 24200618

ID No. : -

Received Date : 21 February 2025

Test Date : 24 February 2025

Reference : 2502-0715WC-1

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
 Songkhla Branch,
 114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,
 A.Hat Yai, Songkhla 90250 Thailand

Laboratory Condition :

Temperature (25 ± 5) °C

Humidity (50 ± 20) %

In - house method : CP-CH9

by Comparison Technique with Azide Modification Method

Tested by :

Walalak Sirithean

Approved by :

Saithip

Approved Signatory

() Chakrit Waewwanjua

() Ponpan Paipim

(x) Saithip Meangmai

Issue Date :

25 February 2025

REVIEW BY	Ananta B.
APPROVED BY	Kanpha H.
NEXT CAL DATE	24/2/26



Cert.No.: 25TW32
 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	23CG1172	22 Mar 2025
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.: 24F102419

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.28	0.0089

This report was certified only for the instrument we tested. It is allowable to use for study
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Southern Calibration Service Co., Ltd.

669/35 Karnjanavanit Rd., Banphru, Hatyai, Songkla 90250 Thailand

Tel: 08 1599 0417 Fax: 0 7480 5133 Email: s.calibration@gmail.com www.scal-tcb.com

CALIBRATION CERTIFICATE

Issued Date : 27-Feb-2026

Certificate No. : 26CH0116

CSR No. : A240/11995

Page. : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
 114/1 Moo 8, Kamchanawanich Rd., Tambon, Ban Phru,
 Amphoe Hat Yai, Songkhla, 90250

Calibration Place : SCAL Laboratory

Instrument Name : DO meter

Manufacturer : YSI

Model : 4010-1W

Serial No. : 24200618

ID No. : SGK_CL0101

Receipt Date : 20-Feb-2026

Calibration Date : 24-Feb-2026

Ambient Temperature : (25 ± 3) °C

Relative Humidity : (55 ± 15) %

REVIEW BY	Changchorn H.
APPROVED BY	Kanpha H.
NEXT CAL DATE	24/2/27

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.062 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and for national standards which realize the units of measurement according to the International System of Unit (SI) through :

- HANNA : Hanna Instruments.

Calibrated by : Alisara Ma

Approved by : Sakornreem Heemhad / Laboratory Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 26CH0116
CSR No. : A240/11995
Page. : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Zero Oxygen Solution	HI7040L	C02374	S0032/21	12-Apr-2026

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
3. This certificate is not certified any commercial transaction
4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

Sample Test Measurement

Serial Probe No. : 24F102419

Standard Buffer Solutions	UUC Reading	Correction	Uncertainty (±)
8.26 mg/L	8.26 mg/L	0.00 mg/L	0.16 mg/L

- UUC = Unit Under Calibration

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

--- End ---

SCAL.F041604010723



Southern Calibration Service Co., Ltd.

669/35 Kanjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal.co.th



CALIBRATION CERTIFICATE

Issued Date : 27-Feb-2026

Certificate No. : 26TH0817

CSR No. : A240/11995

Page. : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : SCaL Laboratory
Instrument Name : DO Meter with probe
Manufacturer : YSI
Model : 4010-1W
Serial No. : 24200618
ID No. : SGK_CL0101
Resolution : 0.1 °C
Received Date : 20-Feb-2026
Calibrated Date : 24-Feb-2026
Ambient Temperature : (25 ± 3) °C
Relative Humidity : (55 ± 15) %

REVIEW BY	<i>Chandana M</i>
APPROVED BY	<i>Kampha B.</i>
NEXT CAL. DATE	24/2/27

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.011 by comparison technique with standard thermometer

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and /or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co.,Ltd.

Calibrated by : Ibrohim Saleemin

Approved by : *Sakoreen*
Sakoreen Heemhad / Laboratory Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 26TH0817
CSR No. : A240/11995
Page. : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Digital Thermometer With Sensor (PRT)	1529	B4C223	QR25-2862	25-Sep-2026

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
3. This certificate is not certified any commercial transaction
4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

Sensor Type : RTD Channel : OUT Serial Probe No. : 24F102419
Length : 6.8 cm. Diameter : 0.2 cm. Immersion : 6.8 cm.

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20	20.007	20.2	-0.193	0.077

- UUC = Unit Under Calibration

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

...End...

SCAL.F041604010723



Southern Calibration Service Co., Ltd.

669/35 Kanjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal.co.th



CALIBRATION CERTIFICATE

Issued Date : 19-Dec-2025

Certificate No. : 25TH5535

CSR No. : A230/11460

Page. : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
Instrument Name : Liquid Bath
Manufacturer : Memmert
Model : WNE29
Serial No. : L616.0538
ID No. : SGK_CL0035
Resolution : 0.1 °C
Received Date : 16-Dec-2025
Calibrated Date : 16-Dec-2025
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY	<i>Chandana M</i>
APPROVED BY	<i>Kampha B.</i>
NEXT CAL. DATE	16/12/26

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.014 based on ASTM E 715 : 1980 (reapproved 2001)

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and /or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co.,Ltd.

Calibrated by : Ibrohim Saleemin

Approved by : *Imron*
Imron Rattanayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH5535
CSR No. : A230/11460
Page. : 3 of 3

Result of Calibration:

2. Temperature Measurement Accuracy Test

The measurement results of the Liquid Bath and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)					Uncertainty (±°C)
	#1	#2	#3	#4	Ref.5	
63	62.92	62.94	63.06	63.05	63.02	0.14

3. Performance Result

The performance of the Liquid Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
63	63.5	63.5	0.05	0.17	0.20

- UUC = Unit Under Calibration

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

... End ...

SCaL-RT3/16/04/07/1



Certificate No. : 25TH5535
CSR No. : A230/11460
Page. : 2 of 3

Details of Calibration

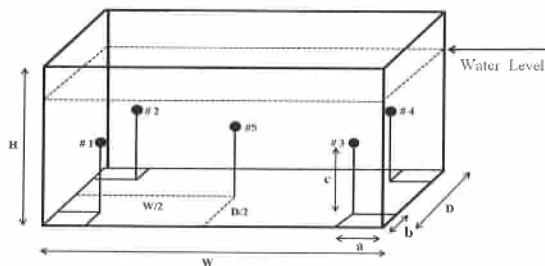
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	DAQ870A	MY58036254	QR25-2036	1-Jul-2026

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

a = 5 cm
b = 5 cm
c = 5 cm

Dimension of the chamber

W = 45 cm
H = 30 cm
D = 35 cm

SCaL-RT3/16/04/07/1



Southern Calibration Service Co., Ltd.
669/35 Karnjanavanit Rd., Banpru, Hatyai, Songkla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scol-lab.com

CALIBRATION CERTIFICATE

Issued Date : 28-Feb-2025

Certificate No. : 25TH1073

CSR No. : A185/09219

Page. : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory

Instrument Name : Digester Block

Manufacturer : Gerhardt

Model : KT-L205BS

Serial No. : 5770230038

ID No. : SGK-CL0092

Receipt Date : 25-Feb-2025

Calibration Date : 25-Feb-2025

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY : *Imron Rattanaylum*
APPROVED BY : *Kaninda H.*
NEXT CAL. DATE : 25/2/26

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SC.WI.12.016 based on G-20

The Southern Calibration Service Co.,Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement

according to the International System of Unit (SI) through :

- ScaL : Southern Calibration Service Co., Ltd.,

Calibrated by : Ibrorhim Saleemin

Approved by :

Imron Rattanaylum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH1073
CSR No. : A185/09219
Page. : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY58009813	PSL-T0707-1/67	22-May-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration :

Sensor Installation Diagram



Measurement for Heating Block

Position	UUC Reading (°C)	Standard Temperature (°C)	Correction (°C)	Uncertainty (± °C)
No.1	383	380.24	-2.76	0.32
No.2	383	379.87	-3.13	0.32
No.3	383	379.92	-3.08	0.32
No.4	383	379.94	-3.06	0.32
No.5	383	379.88	-3.12	0.32



Certificate No. : 25TH1073
CSR No. : A185/09219
Page : 3 of 3

Result of Calibration : (Cont.)

Measurement for Heating Block

Position	UUC Reading (°C)	Standard Temperature (°C)	Correction (°C)	Uncertainty (± °C)
No.6	383	379.97	-3.03	0.32
No.7	383	380.42	-2.58	0.32
No.8	383	380.47	-2.53	0.32
No.9	383	380.21	-2.79	0.32
No.10	383	380.44	-2.56	0.32
No.11	383	379.24	-3.76	0.32
No.12	383	380.27	-2.73	0.32
No.13	383	380.28	-2.72	0.32
No.14	383	379.93	-3.07	0.32
No.15	383	379.92	-3.08	0.32
No.16	383	379.98	-3.02	0.32
No.17	383	379.84	-3.16	0.32
No.18	383	379.82	-3.18	0.32
No.19	383	379.81	-3.19	0.32
No.20	383	380.21	-2.79	0.32

Remark : Calibration Points : 380 °C
UUC Setting : 383 °C

- UUC = Unit Under Calibration

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

...End...



Southern Calibration Service Co., Ltd.

669/35 Karnjanavanit Rd., Bonpru, Hatyai, Songkla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal-lab.com

CALIBRATION CERTIFICATE

Issued Date : 17-Jan-2026

Certificate No. : 26TH0164

CSR No. : A224/11200

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory

Instrument Name : Digester Block

Manufacturer : Gerhardt

Model : KT-L205BS

Serial No. : 5770230038

ID No. : SGK_CL0092

Receipt Date : 14-Jan-2026

Calibration Date : 14-Jan-2026

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	Chankarn M.
APPROVED BY	Kampha H.
NEXT CAL. DATE	14/01/27

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SC.WI.12.016 based on G-20

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the international and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- SCaL : Southern Calibration Service Co., Ltd.,

Calibrated by : Ibrorhim Saleem

Approved by :

Imron Rattanayul / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 26TH0164
CSR No. : A224/11200
Page : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition Switch Unit with Sensor	DAQ670A	MY58036254	QR25-2036	1-Jul-2026

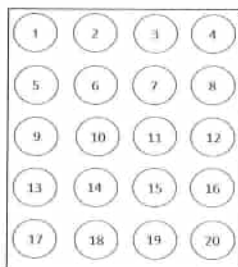
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration :

Sensor Installation Diagram



1.Measurement for Left Heating Block

Position	UUC Reading (°C)	Standard Temperature (°C)	Correction (°C)	Uncertainty (± °C)
No.1	380	380.21	0.21	0.32
No.2	380	379.52	-0.48	0.32
No.3	380	379.78	-0.22	0.32
No.4	380	379.31	-0.69	0.32
No.5	380	380.47	0.47	0.32



Certificate No. : 26TH0164
CSR No. : A224/11200
Page : 3 of 3

Result of Calibration :

Position	UUC Reading (°C)	Standard Temperature (°C)	Correction (°C)	Uncertainty (± °C)
No.6	380	380.42	0.42	0.32
No.7	380	380.56	0.56	0.32
No.8	380	379.42	-0.58	0.32
No.9	380	380.06	0.06	0.32
No.10	380	379.92	-0.08	0.32
No.11	380	379.21	-0.79	0.32
No.12	380	380.12	0.12	0.32
No.13	380	380.93	0.93	0.32
No.14	380	379.86	-0.14	0.32
No.15	380	379.63	-0.37	0.32
No.16	380	379.41	-0.59	0.32
No.17	380	379.87	-0.13	0.32
No.18	380	379.81	-0.19	0.32
No.19	380	379.63	-0.37	0.32
No.20	380	379.14	-0.86	0.32

Remark : Calibration Points : 380 °C

UUC Setting : 380 °C

- UUC = Unit Under Calibration

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

...End...

CALIBRATION CERTIFICATE

Issued Date : 18-Dec-2025

Certificate No. : 25TH5452

CSR No. : A230/11461

Page. : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : Autoclave

Manufacturer : TOMY

Model : SX-700

Serial No. : 52134079

ID No. : SGK_ML0001

Resolution : 1 °C

Received Date : 15-Dec-2025

Calibrated Date : 15-Dec-2025

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %



Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.013 based on BS 2646 : 1993 (part 5)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and /or national standards which realize the units of measurement

according to the International System of Unit (SI) through :

- ScaL : Southern Calibration Service Co., Ltd.,

Calibrated by : Ibrohim Saleemin

Approved by :

Imron Rattanaylum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	GL240	C90432223	25SDAT005	16-Apr-2026

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration

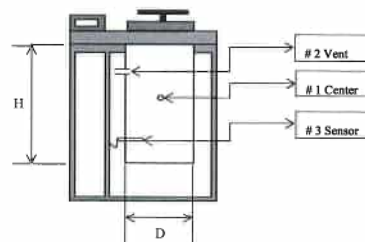
and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Chamber Diameter (D) : 30 cm

Chamber Height (H) : 70 cm

SCAL.FO.013/M/01723

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Autoclave and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)			Pressure Reading	Uncertainty (±°C)
	Center #1	Vent #2	Sensor #3		
121	121.9	121.8	121.9	0.11 MPa	0.76

3. Performance Result

The performance of the Autoclave are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
121	121	121	0.50	0.69	0.83

- Operating Time = 1800.06 sec

- UUC = Unit Under Calibration

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

--- End ---

SCAL.FO.013/M/01723

CALIBRATION CERTIFICATE

Issued Date : 6-Jul-2025

Certificate No. : 25TH3013

CSR No. : A202/10083

Page. : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory

Instrument Name : Incubator

Manufacturer : Memmert

Model : ICP750

Serial No. : F816.0061

ID No. : SGK_ML0013

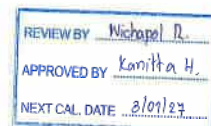
Resolution : 0.1 °C

Received Date : 3-Jul-2025

Calibrated Date : 3-Jul-2025

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %



Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and /or national standards which realize the units of measurement according to

the International System of Unit (SI) through :

- TISTR : Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrohim Saleemin

Approved by :

Imron Rattanaylum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH3013
CSR No. : A202/10083
Page. : 2 of 3

Details of Calibration

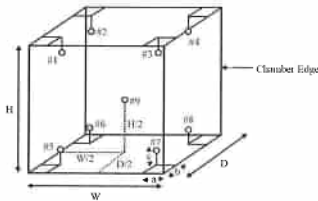
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY58009813	PSL-T0707-2/67	22-Nov-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
3. This certificate is not certified any commercial transaction
4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration : [✓] Without Adjustment [] After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details	Dimension of the chamber
a = 5.0 cm	W = 104.0 cm
b = 5.0 cm	H = 120.0 cm
c = 5.0 cm	D = 80.0 cm



Certificate No. : 25TH3013
CSR No. : A202/10083
Page. : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Incubator and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
35	34.97	35.05	35.09	35.04	35.02	34.91	34.99	35.01	34.98	0.38

3. Temperature Performance Result

The performance of the Incubator are reported as shown below

UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	0.10	0.24	0.31

- UUC = Unit Under Calibration

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

... End ...



Southern Calibration Service Co., Ltd.

669/35 Kanjanavanit Rd., Banpru, Hatyoi, Songkhla 90250 Thailand
Tel: 08 1599 0417 Fax: 0 7480 5133 Email: s.calibration@gmail.com www.scal.co.th



CALIBRATION CERTIFICATE

Issued Date : 20-Nov-2025

Certificate No. : 25CH0552
CSR No. : A222/11083
Page. : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanch Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory
Instrument Name : pH meter
Manufacturer : Mettler Toledo
Model : Seven Direct SD20
Serial No. : C431515609
ID No. : SGK_ML0045
Electrode No. : 4253467
Received Date : 17-Nov-2025
Calibrated Date : 17-Nov-2025
Ambient Temperature : (25 ± 3) °C
Relative Humidity : (55 ± 15) %



Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.008 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- CPChem : CPChem Ltd
- WK : WK Electric Co., Ltd.

Calibrated by : Aisara Ma

Approved by :

Imron Rattanaylum / Technical Manager

SCAL-PO.016/010723



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25CH0552
CSR No. : A222/11083
Page. : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.000	61333215	1116005	15-Jun-2026
Standard Solution	7.000	61328150	1112965	8-Jun-2026
Standard Solution	10.01	61325050	1112967	8-Jun-2026
Temperature/Electrical Calibrator	MC2-TE	14987	WK2506-402-27	4-Jun-2027

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
3. This certificate is not certified any commercial transaction
4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration :

1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading		Correction (mV)	Uncertainty (± mV)
	(mV)	(pH)		
177.48	177.5	4.00	-0.02	0.17
0.00	0.0	7.00	0.00	0.13
-177.48	-177.6	10.00	0.12	0.17

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)
	(pH)	(mV)		
4.008	3.93	181.9	0.078	0.0092
6.988	6.87	7.9	0.118	0.019
10.011	9.71	-160.5	0.301	0.042

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)
	(pH)	(mV)		
4.008	4.01	183.1	-0.002	0.0092
6.988	7.00	8.0	-0.012	0.019
10.011	10.03	-161.8	-0.019	0.042

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

... End ...

SCAL-FCAL186/010723

CALIBRATION CERTIFICATE

Issued Date : 19-Dec-2025

Certificate No. : 25TH5450

CSR No. : A230/11461

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : Liquid Bath

Manufacturer : Memmert

Model : WPE45

Serial No. : L716.0558

ID No. : SGK_ML0021

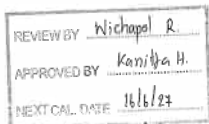
Resolution : 0.1 °C

Received Date : 16-Dec-2025

Calibrated Date : 16-Dec-2025

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %



Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.014 based on ASTM E 715 : 1980 (reapproved 2001)

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- Q Reborn : Quality Reborn Co.,Ltd.

Calibrated by : Ibrorhim Saleemin

Approved by :

Imron Rattanyulim / Technical 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 Southern Calibration Service Co., Ltd.

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	DAQ970A	MY58036254	QR25-2036	1-Jul-2026

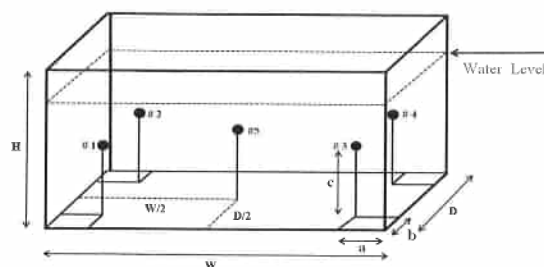
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

a = 5 cm
b = 5 cm
c = 5 cm

Dimension of the chamber

W = 45 cm
H = 30 cm
D = 35 cm

SCAL.FO.0116/010723

Certificate No. : 25TH5450

CSR No. : A230/11461

Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Liquid Bath and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)					Uncertainty (±°C)
	#1	#2	#3	#4	Ref.5	
44.5	44.48	44.45	44.49	44.47	44.48	0.14

3. Performance Result

The performance of the Liquid Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.5	44.5	44.5	0.10	0.25	0.36

- UUC = Unit Under Calibration

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

... End ...

CALIBRATION CERTIFICATE

Issued Date : 18-Dec-2025

Certificate No. : 25TH5453

CSR No. : A230/11461

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Microbiological Laboratory

Instrument Name : Autoclave

Manufacturer : TOMY

Model : SX-700

Serial No. : 52134080

ID No. : SGK_ML0002

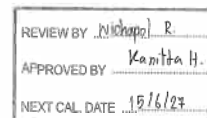
Resolution : 1 °C

Received Date : 15-Dec-2025

Calibrated Date : 15-Dec-2025

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %



Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.013 based on BS 2646 : 1993 (part 5)

The Southern Calibration Service Co.,Ltd.calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- SCaL : Southern Calibration Service Co., Ltd.,

Calibrated by : Ibrorhim Saleemin

Approved by :

Imron Rattanyulim / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH5453
CSR No. : A230/11461
Page. : 2 of 3

Details of Calibration

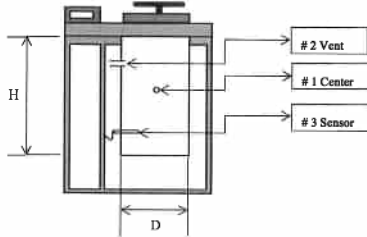
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	GL240	C80432223	25SDAT005	16-Apr-2026

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
3. This certificate is not certified any commercial transaction
4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Chamber Diameter (D) : 30 cm

Chamber Height (H) : 70 cm

SCAL-FO-018/a010723



Certificate No. : 25TH5453
CSR No. : A230/11461
Page. : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Autoclave and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)			Pressure Reading	Uncertainty (±°C)
	Center #1	Vent #2	Sensor #3		
115	115.8	115.7	115.9	0.07 MPa	0.76
118	118.9	118.9	118.7	0.09 MPa	0.76
121	121.8	121.7	121.9	0.11 MPa	0.76

3. Performance Result

The performance of the Autoclave are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
115	115	115	0.40	0.69	0.71
118	118	118	0.50	0.82	1.00
121	121	121	0.30	0.50	0.89

- Operating Time = 900.02 sec

- UUC = Unit Under Calibration

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

--- End ---

SCAL-FO-018/a010723



Bara Scientific

Certificate of Calibration

Shimadzu LC-HIC

This certificate is to verify that instrument below are calibrated
by Bara Scientific Co., Ltd

Instrument	Serial No.
DGU-403	L22166050657
SIL-20AC	L20176012374
CTO-40S	L22236003442
LC-20ADSP	L20106096217
SPD-40	L22256002616
CDD-10Avp	C21346004484
CBM-40lite	L22126103139

For

ALS Laboratory Group (Thailand) Co., Ltd.

Operator Signature: Date: 01 December 2025

(Mr.Thanathat Pattaphong)

Service Engineer



Bara Scientific Co., Ltd.
17 Chit Lom Building Floor 7, Mid Town & Road Science Bangkok Bangkok 10990
Thailand Tel : 02-6324350 (ext. 29 lines) Fax : 02-6379486-7 www.barascientific.com