

ภาคผนวก จ

ใบรับรองการสอบเทียบเครื่องมือ

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Songkhla Lab	BOD	Incubator	SGK_CL0028	25-Jan-22	26-Jul-23	18
Songkhla Lab	BOD	DO/BOD Analyser	SGK_CL0073	21-Nov-22	21-May-24	18
Songkhla Lab	Iron	ICP-MS	SGK_CL0048	8-Feb-22	8-Aug-23	18
Songkhla Lab	Iron	Cold Room Water	SGK_CL0065	31-Jan-23	31-Jul-24	18
Songkhla Lab	pH at 25 °C	pH meter	SGK_CL0030	28-Apr-23	28-Oct-24	18
Songkhla Lab	Oil & Grease	Electronic Top-Loading Balance	SGK_CL0045	25-Jan-23	25-Jan-24	12
Songkhla Lab	Oil & Grease	Oven	SGK_CL0024	28-Apr-23	28-Oct-24	18
Songkhla Lab	Oil & Grease	Water Bath	SGK_CL0035	5-Feb-22	6-Aug-23	18
Songkhla Lab	Sulfide	Cold Room Water	SGK_CL0065	31-Jan-23	31-Jul-24	18
Songkhla Lab	Total Dissolved Solids 103-105°C	Electronic Top-Loading Balance	SGK_CL0045	25-Jan-23	25-Jan-24	12
Songkhla Lab	Total Dissolved Solids 103-105°C	Oven	SGK_CL0024	28-Apr-23	28-Oct-24	18
Songkhla Lab	Total Dissolved Solids 180°C	Electronic Top-Loading Balance	SGK_CL0045	25-Jan-23	25-Jan-24	12
Songkhla Lab	Total Dissolved Solids 180°C	Oven	SGK_CL0024	28-Apr-23	28-Oct-24	18
Songkhla Lab	Total Suspended Solids	Electronic Top-Loading Balance	SGK_CL0045	25-Jan-23	25-Jan-24	12
Songkhla Lab	Total Suspended Solids	Oven	SGK_CL0024	28-Apr-23	28-Oct-24	18
Songkhla Lab	Turbidity	Turbidity Meter	SGK_FS0045	20-Jun-22	20-Jun-23	12
Songkhla Lab	Turbidity	Turbidity Meter	SGK_FS0046	30-May-23	30-May-24	12
Songkhla Lab	Total Coliform	Autoclave	SGK_ML0001	5-Jan-23	5-Jul-24	18
Songkhla Lab	Total Coliform	Incubator	SGK_ML0013	6-Aug-22	6-Feb-24	18
Songkhla Lab	Total Coliform	pH Meter	SGK_ML0016	5-Jan-23	5-Jul-24	18
Songkhla Lab	Total Coliform	Water Bath	SGK_ML0021	30-Jan-23	30-Jul-24	18
Water Lab	Chloride	Ion Chromatography	BKK_EN0069	12-Jan-23	12-Jan-24	12
Water Lab	Total Kjeldahl Nitrogen	Digestion Unit	BKK_EN0366	17-May-23	17-May-24	12
Water Lab	Total Kjeldahl Nitrogen	Discrete analyzer	BKK_EN0037	5-Jan-23	5-Jan-24	12



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



Cert. No.: 22TM75

Page.: 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : ICP 750
Serial No. : F816.0063
ID No. : SGK_CL0028
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Songkhla Branch.
114/1 Moo 8, Kanjanavanij Rd., Banphru,
Hatyai, Songkhla 90250, Thailand
Location : BOD Room
Received Order : 24 January 2022
Calibration Date : 25 January 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Kunchit Promprat

REVIEW BY Ananta B.
APPROVED BY Kanitta H.
NEXT CAL. DATE 26/7/23

Approved by :

Malee
Approved Signatory

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

Issue Date :

7 February 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0037405



Equipment : Incubator
 Condition As-Received : Used Item
 Reference : 2201-0617OC-3
 Procedure Used :-

Cert. No.: 22TM75

Page.: 2 of 3

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013823	21LM3/1	26 Feb 2022

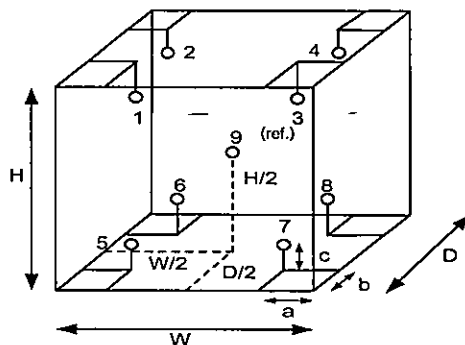
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	57	52
AC Supply (Volt)	231	231

Probe Installation Details :

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

Dimension of Chamber :

D = 0.60 m
 W = 1.0 m
 H = 1.2 m
 Capacity = 0.75 m³

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

Mulu.



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2201-0617OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 22TM75

Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor <i>k</i>
20.0	20.0	20.1	0.094	0.50	0.83	0.30	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.280	20.370	20.363	20.378	19.915	19.925	19.673	19.727	20.098

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

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

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

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

UUC* : Unit Under Calibration

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

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

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



Cert. No.: 22LM162

Page.: 1 of 2

Certificate of Calibration

Equipment : DO Meter with Sensor

Manufacturer : YSI

Model : 5000

Serial No. : 17B101473

ID No. : SGK_CL0073

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Songkhla Branch.
114/1 Moo 8, Kanjanavanij Rd., Banphru,

Location : TPA Chemistry Calibration Lab.2

Received Order : 18 November 2022

Calibrated Date : 21 November 2022

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngagtrakul

REVIEW BY	Ananta B.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	21 Nov 24.

Approved by :

Malu.

Approved Signatory

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

Issue Date :

22 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0047729



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2111-0663DSC-2

Cert. No.: 22LM162

Page.: 2 of 2

Procedure Used :-

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:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1) Digital Thermometer	1523	3240076	221249	02 Mar 2023

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

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

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 17B100103

<u>Calibration Point</u> (°C)	<u>Immersion Depth</u> (mm)	<u>Standard Temperature</u> (°C)	<u>UUC* Reading</u> (°C)	<u>Error</u> (°C)	<u>Uncertainty</u> (± °C)	<u>Coverage Factor</u> <i>k</i>
20.00	60	20.001	19.88	-0.121	0.15	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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Maku-



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

Cert.No.: 22TW259

Page.: 1 of 2

Certificate of Testing

Equipment :	DO Meter
Manufacturer :	YSI
Model :	5000
Serial No. :	17B101473
ID No. :	SGK_CL0073
Received Date :	18 November 2022
Test Date :	21 November 2022
Reference :	2211-0663DSC-1
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. Songkhla Branch. 114/1 Moo 8, Kanjanavanij Rd., Banphru, Hatyai, Songkhla 90250, 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
☒ Malee Butkruea ☐ Saithip Meangmai ☐ Warakorn Lerngagtrakul	
Issue Date :	22 November 2022



Cert.No.: 22TW259

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).

<u>Instruments</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Burette	-	130BU10	21CG1389	25 Mar 2023
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 17B100103

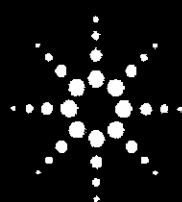
Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.12	8.12	0.0045

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency, The environmental impact control and present to organization it may concerned. 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

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Malu.

a 1136621



Agilent CrossLab Compliance Services

Agilent
CrossLab
From Insight to Outcome

EQUIPMENT QUALIFICATION REPORT (EQR)

Agilent CrossLab Compliance

Qualification Type: ICPMS-OQ

System ID: JP16511669

EQP Name: AgilentRecommended

EQP Revision: ICPMS.02.50

EQP Publish Date: March 2020

Date: February 8, 2022 11:47:17 AM

Report Type: Report

Org. Name: ALS laboratory Group (Thailand) Co.,Ltd.

Org. Location: 114/1 Moo8, Kanchanawanich Rd., T.Ban Phru,
A.Hatyai, Songkhla 90250

REVIEW BY	 Ananta B.
APPROVED BY	 Kantha H.
NEXT CAL. DATE	 8/8/23

Date: February 8, 2022 11:47:17 AM
System ID: JP16511669

Certificate of System Qualification

ICPMS-OQ

System ID: JP16511669

Organization Name: ALS laboratory Group (Thailand) Co.,Ltd.

Organization Location: 114/1 Moo8, Kanchanawanich Rd., T.Ban Phru, A.Hatyai, Songkhla 90250

Date: February 8, 2022 11:39:47 AM

EQP Name: AgilentRecommended

EQP Revision: ICPMS.02.50

Overall Qualification Status: Pass

Autosampler Check

Overall Autosampler Check Test Status

Pass

Integrated Sample Introduction System (ISIS) Check

Overall Integrated Sample Introduction System (ISIS) Check Test Status

Pass

Autotune

Peakwidth Mass 7	Pass
Peakwidth Mass 89	Pass
Peakwidth Mass 205	Pass
Mass Axis 7	Pass
Mass Axis 89	Pass
Mass Axis 205	Pass
Mass 7 Sensitivity No Gas	Pass
Mass 89 Sensitivity No Gas	Pass
Mass 205 Sensitivity No Gas	Pass
Mass 59 Sensitivity He	Pass
Mass 89 Sensitivity H2	Pass
Oxide Ratio 156/140	Pass
Doubly Charged Species Ratio 70/140	Pass

Date: February 8, 2022 11:39:47 AM

System ID: JP16511669

Overall Autotune Test Status

Pass

Background (No Gas Mode)

Setpoint Status:

Pass

Masses (AMU):

Measured Value:

Agilent Recommended:

Status:

	7	89	205		
	6.400	1.800	5.700	cps	
<=	6.9	<=	4.6	<=	11.5
Pass		Pass		Pass	

Overall Background (No Gas Mode) Test Status

Pass

Background (Gas Mode)

Gas Mode:

Helium

Setpoint Status:

Pass

Mass (AMU):

Measured Value:

Agilent Recommended:

Status:

	78	
	4.60	cps
<=	115	
Pass		

Gas Mode:

Hydrogen

Setpoint Status:

Pass

Mass (AMU):

Measured Value:

Agilent Recommended:

Status:

	78	
	1.45	cps
<=	4.6	
Pass		

Overall Background (Gas Mode) Test Status

Pass

Date:

February 8, 2022 11:39:47 AM

System ID:

JP16511669

20-Minute Stability (No Gas Mode)

Masses (AMU):

Stability RSD:

Agilent Recommended:

Status:

	7		89		205	
	1.26		0.28		0.43	%
<=	2.3	<=	2.3	<=	2.3	
Pass		Pass		Pass		

Overall 20-Minute Stability (No Gas Mode) Test Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

ICP-MS 1

Manufacturer	Agilent Technologies
Name	7900
Model Number	G8403A
Installed Options	#100H: Standard Package with Hydrogen option
Detector Type	SQ
Nebulizer	Mira Mist (G3161)
Spray Chamber	Quartz
Torch	Quartz
Sampling Cone	Ni
Skimmer Cone	Ni
Serial Number	JP16511669
Firmware Revision	4.00.02

ISIS 1

Manufacturer	Agilent Technologies
Name	ISIS3
Model Number	G8411A
Type	Peristaltic pump system
Serial Number	JP16510376

Autosampler 1

Manufacturer	Agilent Technologies
Name	SPS4
Model Number	G8410A
Serial Number	AU16351847

Chiller 1

Manufacturer	Agilent Technologies
Name	Chiller
Model Number	G3292A
Serial Number	701711328

Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and logon to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	Burin Ngamvijit
Logged On User Name:	Burin_ngamvijit@agilent.com
Signature Creation Date:	February 8, 2022
Reason for Signature:	Published this original version of document

Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

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Date:	February 8, 2022 11:39:47 AM
System ID:	JP16511669

User Name: burin_ngamvjit
 Hostname: ASSGKWX019

System Id: JP16511669
 Print Date: February 8, 2022 11:39:48 AM

OQ HW 7900ICPMS ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
February 8, 2022 9:19:05 AM	Audit	SessionCreated	Session	None
February 8, 2022 9:19:05 AM	Start	Configuration	Session	None
February 8, 2022 9:19:05 AM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
February 8, 2022 9:23:56 AM	Audit	EqpLoaded	Session	EQP details for primary technique [IcpMs] - File path: [ProtocolPacks/IcpMs/Configurations/02.50/IcpMs.02.50.eqp], EQP File Name: [IcpMs.02.50.eqp], EQP Name: [AgilentRecommended]
February 8, 2022 9:24:02 AM	End	Configuration	Session	None
February 8, 2022 9:24:09 AM	Start	Qualification	Session	OQ
February 8, 2022 9:24:09 AM	Start	Execution	Autosampler Check : SPS4: Autosampler Check	None
February 8, 2022 9:24:54 AM	End	Execution	Autosampler Check : SPS4: Autosampler Check	Run Count : 1
February 8, 2022 9:24:57 AM	Start	Execution	Integrated Sample Introduction System (ISIS) Check : ISIS3: Integrated Sample Introduction System (ISIS) Check	None
February 8, 2022 10:52:47 AM	End	Execution	Integrated Sample Introduction System (ISIS) Check : ISIS3: Integrated Sample Introduction System (ISIS) Check	Run Count : 1

User Name: burin_ngamvijit

System Id: JP16511669

Hostname: ASSGKWX019

Print Date: February 8, 2022 11:39:48 AM

OQ HW 7900ICPMS ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
February 8, 2022 10:52:50 AM	Start	Execution	Autotune : G8403A: Autotune 1	None
February 8, 2022 10:55:26 AM	End	Execution	Autotune : G8403A: Autotune 1	Run Count : 1
February 8, 2022 10:55:34 AM	Start	Execution	Background (No Gas Mode) : G8403A: No Gas Mode Background 1	None
February 8, 2022 10:55:56 AM	End	Execution	Background (No Gas Mode) : G8403A: No Gas Mode Background 1	Run Count : 1
February 8, 2022 10:56:00 AM	Start	Execution	Background (Gas Modes) : G8403A: Gas Mode Background :Helium	None
February 8, 2022 10:56:22 AM	End	Execution	Background (Gas Modes) : G8403A: Gas Mode Background :Helium	Run Count : 1
February 8, 2022 10:56:24 AM	Start	Execution	Background (Gas Modes) : G8403A: Gas Mode Background :Hydrogen	None
February 8, 2022 10:56:40 AM	End	Execution	Background (Gas Modes) : G8403A: Gas Mode Background :Hydrogen	Run Count : 1
February 8, 2022 10:56:43 AM	Start	Execution	20-Minute Stability (No Gas Mode) : G8403A: 20-Minute Stability (No Gas Mode) 1	None
February 8, 2022 11:01:33 AM	End	Execution	20-Minute Stability (No Gas Mode) : G8403A: 20-Minute Stability (No Gas Mode) 1	Run Count : 1
February 8, 2022 11:07:37 AM	End	Qualification	Session	OQ
February 8, 2022 11:07:37 AM	Start	Reporting	Session	None

Page 2 / 3

User Name: burin_ngamvjit
Hostname: ASSGKW019

System Id: JP16511669
Print Date: February 8, 2022 11:39:48 AM

OQ HW 7900ICPMS ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
February 8, 2022 11:38:19 AM	Audit	Reporting	Session	Report Generated : Certificate



Southern Calibration Service Co., Ltd.

669/35 Karnjanavanit Rd., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



NSC-TISI-TIS17025
CALIBRATION 0294

CALIBRATION CERTIFICATE

Issued Date : 19-Aug-2021

Certificate No. : 21OV449

CSR No. : A078/3892

Page : 1 of 3

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

Calibration Place : Chemical Laboratory

Instrument Name : Cold Room Water

Manufacturer : MODULAR

Model : N/A

Serial No. : N/N

ID No. : SGK_CL0065

Resolution : 0.1 °C

Received Date : 16-Aug-2021

Calibrated Date : 16-Aug-2021

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY Sutthirak T.

APPROVED BY Kanitta H.

NEXT CAL. DATE 14/02/2023

Calibration Method Used :

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

- Q Reborn : Quality Reborn Co.,Ltd.

Calibrated by : Ibrorhim Saleemin

Approved by :

Sakeereen Heemhad / 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	34970A	MY44064411	QR21-0314	9-Feb-2022

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

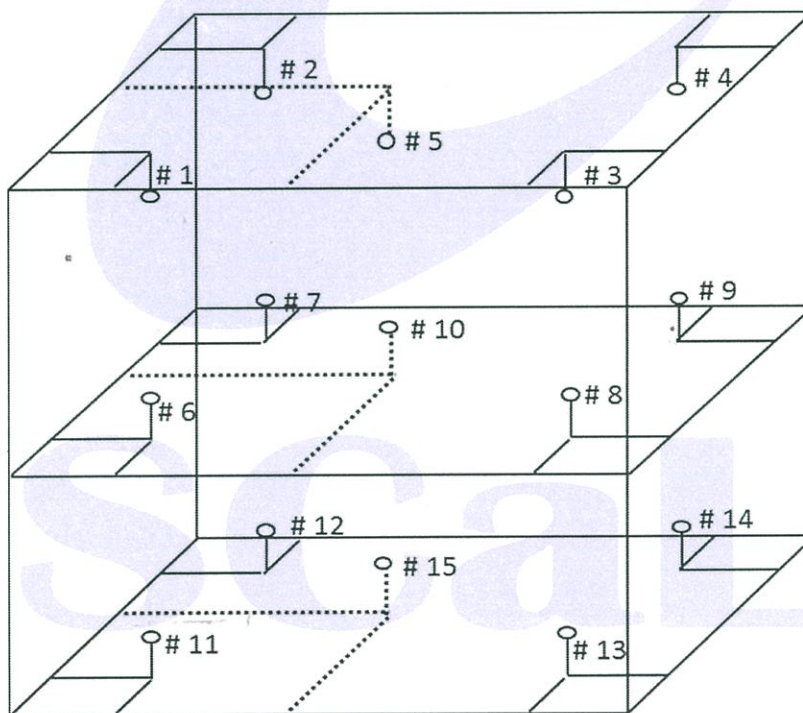
4. Condition of Item : normal condition , no indication for any damage or malfunction

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 = 370.0 cm
H = 250.0 cm
D = 540.0 cm

Result of Calibration :

2. Temperature Measurement Accuracy Test

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

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)														
	#1	#2	#3	#4	#5	#6	#7	#8	#9	Ref.10	#11	#12	#13	#14	#15
4	3.63	3.35	3.58	3.80	4.14	3.76	3.77	3.72	3.82	3.80	3.62	3.88	3.67	3.80	3.61

The uncertainty of measurement was ± 0.38 °C

3. Performance Result

The performance of the Cold Room Water are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability ($\pm$ °C)	Temperature Uniformity (°C)	Overall Variation (°C)
4	4.0	4.0	1.23	0.69	3.33

* 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



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.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 3-Feb-2023

Certificate No. : 23TH0527

CSR No. : A073/03634

Page. : 1 of 3

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

Calibration Place : Chemical Laboratory

Instrument Name : Cold Room Water

Manufacturer : MODULAR

Model : N/A

Serial No. : N/A

ID No. : SGK_CL0065

Resolution : 0.1 °C

Received Date : 31-Jan-2023

Calibrated Date : 31-Jan-2023

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	Ananta B.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	31/07/24

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.012 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 : Sounthern Calibration Service Co., Ltd.,

Calibrated by : Ibrorhim Saleemin

Approved by :


Imron Rattanaylum / 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	34970A	MY58009813	22SDAT004	24-May-2023

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

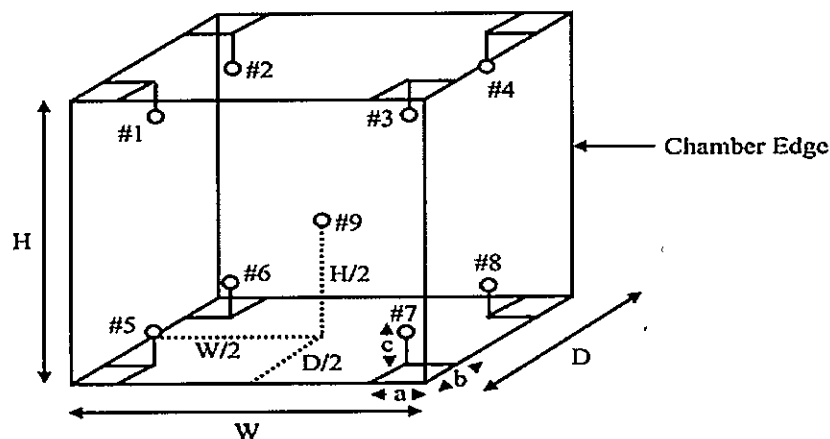
4. Condition of Item : normal condition , no indication for any damage or malfunction

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

Result of Calibration :

2. Temperature Measurement Accuracy Test

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

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)														
	#1	#2	#3	#4	#5	#6	#7	#8	#9	Ref.10	#11	#12	#13	#14	#15
4	3.18	3.39	3.54	3.77	3.99	3.86	3.85	3.92	4.02	3.86	3.78	3.84	3.85	4.09	3.91

The uncertainty of measurement was $\pm$ 0.38 °C

3. Performance Result

The performance of the Cold Room Water are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability ($\pm$ °C)	Temperature Uniformity (°C)	Overall Variation (°C)
4	4.0	4.0	1.23	0.50	0.84

- 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 : 12-Nov-2021

Certificate No. : 21PH192

CSR No. : A012/00583

Page. : 1 of 2

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

Calibration Place : Chemical Laboratory

Instrument Name : pH meter

Manufacturer : Mettler Toledo

Model : S220

Serial No. : B625631849

ID No. : SGK_CL0030

Electrode No. : 6404000

Received Date : 9-Nov-2021

Calibrated Date : 9-Nov-2021

Ambient Temperature : $(25 \pm 3) ^\circ\text{C}$

Relative Humidity : $(55 \pm 15) \%$

REVIEW BY	Suttharak T.
APPROVED BY	Kanitta H.
CAL. DATE	10/05/2023

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 :

- HACH : LANGE United For Water Quality
- WK : WK Electric Co., Ltd.
- Q Reborn : Quality Reborn Co.,Ltd.

Calibrated by : Jessadagon Lemhud

Approved by :


Sakeereen Heemhad / 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
Standard Solution	4.005	C02840	1617	24-Aug-2022
Standard Solution	7.000	C02841	1618	24-Aug-2022
Standard Solution	10.012	C02843	1619	24-Aug-2022
Temperature/Electrical Calibrator	MC2-MF	23642	WK2102-006-229	21-Feb-2022
Digital Thermometer With Sensor	1529	B4C223	QR21-2009	15-Sep-2022

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. Electrical Measurement

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

2. Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.007	3.99	0.017	0.011
6.999	7.02	-0.021	0.014
10.011	10.01	0.001	0.036

3. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
25	24.93	25.0	-0.07	0.11

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., Banpru, Hatyai, Songkla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.seal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 1-May-2023

Certificate No. : 23CH0203

CSR No. : A088/04367

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. : 1204613

Received Date : 28-Apr-2023

Calibrated Date : 28-Apr-2023

Ambient Temperature : (25 ± 3) °C

Relative Humidity : (55 ± 15) %

REVIEW BY	Ananta B.
APPROVED BY	Kamrta H.
NEXT CAL. DATE	28 / 10 / 2024

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 :

- HACH : HACH LANGE GmbH

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

- WK : WK Electric Co., Ltd.

Calibrated by : Alisara Ma

Approved by :

Imron Rattanaylum / 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
Standard Solution	4.005	C02994	1777	5-Sep-2024
Standard Solution	7.000	C03007	1787	17-Oct-2024
Standard Solution	10.012	C02953	1735	29-Apr-2024
Temperature/Electrical Calibrator	MC2-TE	14987	WK2106-299-223	5-Jun-2024
Digital Thermometer With Sensor	DP-77	I.360896	22SDTH005	8-Aug-2023

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	3.70	-0.02	0.17
0.00	0.0	6.70	0.00	0.13
-177.48	-177.4	9.80	-0.08	0.17

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)
	(pH)	(mV)		
4.005	3.97	159.2	0.035	0.0090
6.999	6.98	-15.4	0.019	0.013
10.012	9.95	-188.0	0.062	0.036

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading		Correction (pH)	Uncertainty (± pH)
	(pH)	(mV)		
4.005	3.97	158.9	0.035	0.0090
6.999	7.01	-17.5	-0.011	0.013
10.012	9.98	-187.6	0.032	0.036

4. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
25	25.032	25.1	-0.068	0.11

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., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 8-Feb-2022

Certificate No. : 22EB149

CSR No. : A023/01123

Page. : 1 of 3

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

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 : 5-Feb-2022
Calibrated Date : 5-Feb-2022
Ambient Temperature : (30 ±10) °C
Relative Humidity : (50 ±20) %

REVIEW BY	Ananta B.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	5/02/2023

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.001 based on UKAS LAB 14 : 2015

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 :

- Tcs : Thai Calibration Service Co.,Ltd.

Calibrated by : Imron Rattanaylum

Approved by :

Sakeereen Heemhad / Technical Manager

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



Certificate No. : 22EB149

CSR No. : A023/01123

Page. : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Weight Set	2mg-2kg	11119514/01	M2107051S	6-Jul-2022

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. Repeatability

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

2. Effect of tare

Nominal Value (g)	Standard Value (g)	Balance Reading (g)	Correction (g)
20	20.0000	20.0000	0.0000
40	40.0001	40.0000	0.0001
60	60.0000	60.0001	-0.0001
80	80.0001	80.0001	-0.0001
100	100.0000	100.0000	0.0000

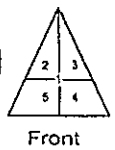
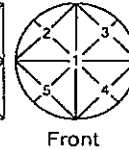
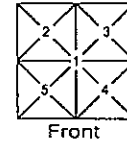
Result of Calibration :.

3. Off-centre loading

A mass approximately 50g was placed on a pan and moved to various position .

The balance reading obtained are given in the table.

Position					Maximum Difference (g)
1	2	3	4	5	
50.0000	50.0000	50.0000	50.0000	50.0000	0.0000



4. Departure from nominal value

Nominal Value (g)	Standard Value (g)	UUC Reading (g)	Correction (g)	Uncertainty ($\pm$ g)	Coverage Factor (k)
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	20.0000	20.0000	0.0000	0.00009	2.0
50	50.0000	50.0000	0.0000	0.00011	2.0
100	100.0000	100.0000	0.0000	0.00016	2.0
120	120.0000	120.0000	0.0000	0.00024	2.0
140	140.0001	140.0000	0.0001	0.00024	2.0
160	160.0000	160.0000	0.0000	0.00026	2.0
180	180.0000	180.0000	0.0000	0.00029	2.0
200	200.0000	200.0000	0.0000	0.00030	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...

Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310

Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com

**SARTORIUS**

Certificate

of Calibration

REVIEW BY Ananta B.
APPROVED BY Kanitta H.
NEXT CAL. DATE 25/1/23-24

Model Number : MSE224S-100-DUCertificate No. : 23BCI0044Description : Analytical BalanceIssued Date : Friday, January 27, 2023Serial Number : 0034705158Reference No. : 202361ID No. : SGK_CL0045Manufacturer : SartoriusPage No. : 1 of 2Customer Name : ALS Laboratory Group (Thailand) Co., Ltd.Songkhla Branch: 114/1 Moo 8 Karnchanawanich Rd., T. Ban Phru, A. Hat Yai, Songkhla. 90250.Calibrated Place : Balance Room.Calibrated By : Mr. Chonchai InthanaCalibration Date : Wednesday, January 25, 2023

Calibration

Procedure No. : This calibration was conducted byUsing in-house calibration procedure number (WI-003)Based on UKAS LAB 14 : 2019**Metrological data :**Capacity : 220 g Readability : 0.0001 g**Ambients Conditions:**Temperature : 22.4 °C ± 3.0 °CHumidity : 65.0 % RH ± 5.0 % RHPressure : ± **Reasons for calibration**☐ New Installation ☐ Service / Repaired ☒ Re-calibration/ MaintenanceEquipment Condition: ☒ Good Operate ☐ Fair**Measurement Method UKAS Publication Ref :Lab 14**

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). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 1kg E2 s/n 37929119	SPC-RT	C02212565	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19220444	5-Sep-2023

This certificate relate and apply this equipment only.

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Sartorius (Thailand) Co., Ltd.

Mr. Chonchai Inthana (Technical Manager)

S
T
A
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P

Certificate of Calibration

Model Number : MSE224S-100-DU

Certificate No. : 23BCI0044

Description : Analytical Balance

Issued Date : Friday, January 27, 2023

Serial Number : 0034705158

Reference No. : 202361

ID No. SGK_CL0045

Manufacturer : Sartorius

Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability

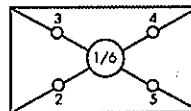
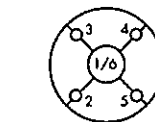
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	20.0000	200.0000
20 g	20.0001	200.0000
Tolerance	20.0000	200.0000
0.0001 g	20.0000	200.0000
	20.0000	200.0001
Nominal Value : (High Load)	20.0000	200.0000
200 g	20.0000	200.0001
Tolerance	20.0000	200.0000
0.0001 g	20.0000	200.0001
	20.0000	200.0001
Standard Deviation	0.00003	0.00005

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value : 50 g
Tolerance 0.0004 g



	Difference
1	—
2	0.0001
3	0.0000
4	0.0000
5	0.0000
6	—

Linearity

The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance 0.0002 g

Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00013
0.1	0.1000	0.1000	0.0000	0.00013
1	1.0000	1.0000	0.0000	0.00014
2	2.0000	2.0000	0.0000	0.00014
5	5.0000	5.0000	0.0000	0.00014
10	10.0000	10.0000	0.0000	0.00014
20	20.0000	20.0000	0.0000	0.00014
50	50.0000	50.0000	0.0000	0.00015
100	100.0000	100.0000	0.0000	0.00019
200	200.0000	200.0001	0.0001	0.00030

End of Report.



CALIBRATION CERTIFICATE

Issued Date : 12-Nov-2021

Certificate No. : 21OV733

CSR No. : A012/00583

Page. : 1 of 3

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

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 : 9-Nov-2021

Calibrated Date : 9-Nov-2021

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY Sutthirak O.
APPROVED BY Kanitta H.
NEXT CAL. DATE 10/05/2023

Calibration Method Used :

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

- Q Reborn : Quality Reborn Co.,Ltd.

Calibrated by : Ibrorhim Saleemin

Approved by :

Sakeereen Heemhad / 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 logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

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

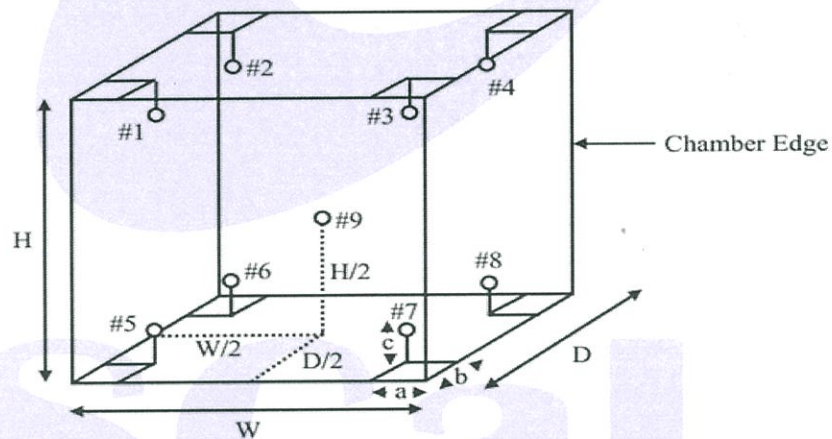
4. Condition of Item : normal condition , no indication for any damage or malfunction

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

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	39.85	39.81	39.68	39.57	39.94	39.80	39.81	39.93	39.69	0.36
70	70.53	70.23	70.08	69.74	70.51	70.37	70.43	69.79	70.15	0.36
103	103.47	102.96	102.95	102.77	103.40	103.46	103.33	102.73	102.83	0.36
104	104.47	103.92	103.95	103.77	104.33	104.46	104.30	103.73	103.80	0.36
105	105.34	104.85	104.85	104.67	105.16	105.27	105.07	104.81	105.06	0.36
180	180.04	180.03	179.99	179.86	180.11	180.28	180.27	180.16	180.26	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	0.10	0.34	0.47
70	70.0	70.0	0.10	0.48	0.82
103	103.0	103.0	0.10	0.71	0.74
104	104.0	104.0	0.10	0.71	0.74
105	105.0	105.0	0.20	0.39	0.70
180	180.0	180.0	0.20	0.53	0.62

- 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., Banpru, 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 : 1-May-2023

Certificate No. : 23TH1728

CSR No. : A088/04367

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 : Hot Air Oven

Manufacturer : Memmert

Model : UF110

Serial No. : B416.3387

ID No. : SGK_CL0024

Resolution : 0.1 °C

Received Date : 28-Apr-2023

Calibrated Date : 28-Apr-2023

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	 Ananta B.
APPROVED BY	 Kanitta H.
	10
NEXT CAL. DATE	 28/11/2024

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 :

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

Calibrated by : Ibrorhim Saleemin

Approved by :

Imron Rattanaylum / 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	34970A	MY58009813	22SDAT004	24-May-2023

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

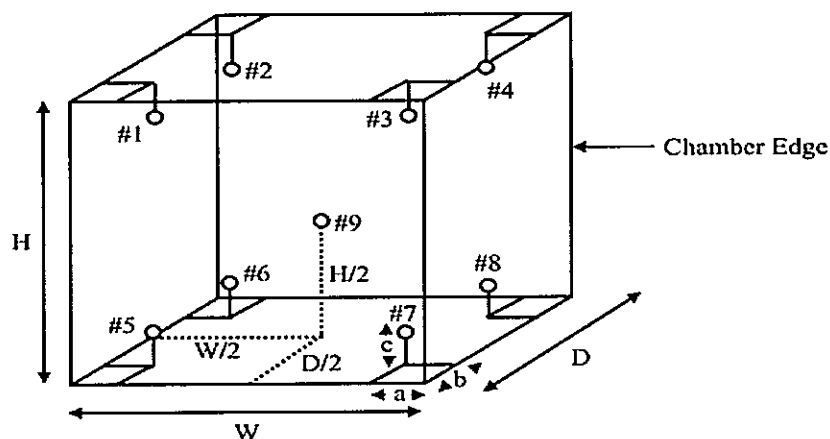
4. Condition of Item : normal condition , no indication for any damage or malfunction

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

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	40.48	40.28	40.28	39.91	40.17	40.09	39.93	40.27	39.89	0.36
70	70.36	70.23	70.58	69.74	69.99	69.92	69.86	70.13	70.04	0.36
103	103.19	103.12	103.46	103.37	103.10	103.54	103.43	103.06	103.40	0.36
104	104.31	104.23	104.62	103.77	104.12	104.06	103.90	104.20	104.56	0.36
105	105.07	105.03	105.48	105.27	105.12	105.01	105.01	105.00	104.96	0.36
180	180.31	180.00	180.00	180.07	180.18	180.05	180.01	180.10	180.24	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	0.70	0.72
70	70.0	70.0	0.20	0.60	0.94
103	103.0	103.0	0.20	0.43	0.54
104	104.0	104.0	0.10	0.79	0.88
105	105.0	105.0	0.10	0.59	0.69
180	180.0	180.0	0.10	0.38	0.38

- 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., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 8-Feb-2022

Certificate No. : 22WB004

CSR No. : A0223/01123

Page. : 1 of 3

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

Calibration Place : Chemical Laboratory
Instrument Name : Water Bath
Manufacturer : Memmert
Model : WNE29
Serial No. : L616.0538
ID No. : SGK_CL0035
Resolution : 0.1 °C
Received Date : 5-Feb-2022
Calibrated Date : 5-Feb-2022
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY	Ananta B.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	6/07/2023

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.W1.014 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 : Imron Rattanaylum

Approved by :

Sakeereen Heemhad / Technical Manager

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 logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

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

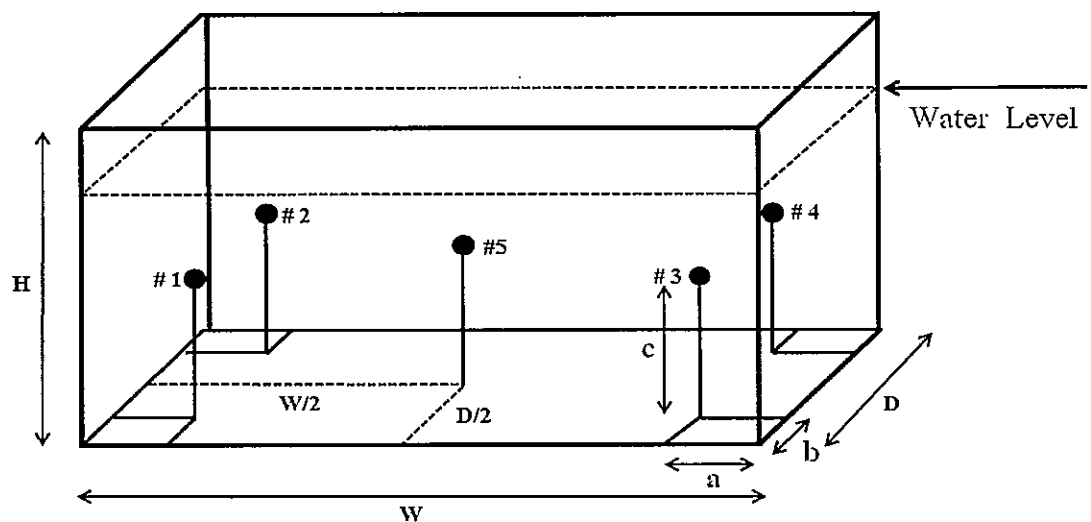
4. Condition of Item : normal condition , no indication for any damage or malfunction

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

Result of Calibration .:

2. Temperature Measurement Accuracy Test

The measurement results of the Water 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	
80	79.95	80.07	79.95	79.99	80.03	0.14

3. Performance Result

The performance of the Water Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (± °C)	Temperature Uniformity (°C)	Overall Variation (°C)
80	81.0	81.0	0.10	0.19	0.19

- 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 ...



Internal Calibration

REVIEWED BY	Somsak J.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	20/06/23

Equipment :	<u>Turbidity Meter</u>	Manufacture :	<u>HACH</u>
ID No. :	<u>SGK_FS0045</u>	Model :	<u>2100Q/QIS</u>
Calibrate Date :	<u>June 20, 2022</u>	Serial No. :	<u>19010C073443</u>

Calibration Point	1st (NTU)	2nd (NTU)	3rd (NTU)	AVG (NTU)	Specifications	Evaluate
Standard 20 NTU	20.0	20.2	20.1	20.1	19 to 21 NTU	Pass
Standard 100 NTU	99.6	99.8	99.8	99.7	95 to 105 NTU	Pass
Standard 800 NTU	791.0	793.0	794.0	792.7	760 to 840 NTU	Pass

Calibrated by Somsak J.
(Scientist 2)

Approved by : Kanitta H.
(Section Head)

Certificate of Analysis List

For request number 1568060

Catalog Number Entered	Lot Number Entered	Related Catalog Number	Related Lot Code	Description
2660501 STANDARD 800 NTU	1236R	2659405-TH	1291	STABLCAL sup TS sup0 FORMAZIN
2684701	1284	2659405-TH	1291	<0.1 NTU Calibration Solution
2684801 STANDARD 20 NTU	1265	2659405-TH	1291	STABLCAL sup TS sup0 FORMAZIN
2684901 STANDARD 100 NTU	1246	2659405-TH	1291	STABLCAL sup TS sup0 FORMAZIN

Total Enclosures: 4



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Certificate of Analysis***This is a Component of 2659405-TH lot A1291***

Page 1

COMMODITY: <0.1 NTU Calibration Solution

COMMODITY NUMBER: 2684701

MANUFACTURE DATE:

DATE OF ANALYSIS:

LOT NUMBER: A1284

10/21/2021

10/22/2021

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	0 to 0.1 NTU	0.06 NTU

The expiration date is Jan 2023

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NI does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by _____

Scott Als
Analytical Services Chemist



An ISO 9001 Certified Company

Certificate of Analysis***This is a Component of 2659405-TH lot A1291***

Page 1

COMMODITY: **STABLCAL|sup|TS|sup0 FORMAZIN STANDARD 20 NTU**
COMMODITY NUMBER: **2684801** MANUFACTURE DATE: DATE OF ANALYSIS:
LOT NUMBER: **A1265** 10/21/2021 10/28/2021

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	19 to 21 NTU	20.4 NTU

The expiration date is Jan 2023

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NI does not carry turbidity standards. However, the use of Formazin and StablCal® as us in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by _____

Scott Als
Analytical Services Chemist



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Certificate of Analysis***This is a Component of 2659405-TH lot A1291***

Page 1

COMMODITY: **STABLCAL|sup|TS|sup0 FORMAZIN STANDARD 100 NTU**
COMMODITY NUMBER: **2684901** MANUFACTURE DATE: DATE OF ANALYSIS:
LOT NUMBER: **A1246** **11/5/2021** **11/11/2021**

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	95 to 105 NTU	103.0 NTU

The expiration date is Feb 2023

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NI does not carry turbidity standards. However, the use of Formazin and StablCal® as us in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by _____

Scott Als
Analytical Services Chemist



An ISO 9001 Certified Company

Certificate of Analysis***This is a Component of 2659405-TH lot A1291***

Page 1

COMMODITY: STABLCAL|sup|TS|sup0 FORMAZIN STANDARD 800 NTU

COMMODITY NUMBER: 2660501

MANUFACTURE DATE:

DATE OF ANALYSIS:

LOT NUMBER: A1236R

9/10/2021

9/10/2021

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	760 to 840 NTU	819.0 NTU

The expiration date is Jan 2023

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NI does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by _____

Scott Als
Analytical Services Chemist



Internal Calibration

REVIEW BY	Somsak J.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	30/5/24

Equipment : Turbidity Meter
ID No. : SGK_FS0046
Calibrate Date : May30 ,2023

Manufacture : HACH
Model : 2100Q/QIS
Serial No. : 19030C074494

Calibration Point	1st (NTU)	2nd (NTU)	3rd (NTU)	AVG (NTU)	Specifications	Evaluate
Standard 20 NTU	20.1	20.0	20.1	20.1	19 to 21 NTU	Pass
Standard 100 NTU	100.0	100.0	101.0	100.3	95 to 105 NTU	Pass
Standard 800 NTU	800.0	800.0	800.1	800.0	760 to 840 NTU	Pass

Calibrated by Somsak J.
(Scientist 2)

Approved by : Kanitta H.
(Section head)

PC 14/02/23

HACH COMPANY



An ISO 9001 Certified Company

P.O.Box 389
Loveland, CO 80539
(970) 669-3050

Certificate of Analysis

This is a Component of 2659405-TH lot A2307

Page 1

COMMODITY: STABLCAL|sup|TS|sup0 FORMAZIN STANDARD 20 NTU
COMMODITY NUMBER: 2684801 MANUFACTURE DATE: DATE OF ANALYSIS:
LOT NUMBER: A2304 11/14/2022 11/18/2022

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	19 to 21 NTU	20.3 NTU

The expiration date is Feb 2024

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NIST does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by

A handwritten signature in cursive script that reads "Scott Als".

Scott Als
Analytical Services Chemist

12 17/02/23

HACH COMPANY



An ISO 9001 Certified Company

P.O.Box 389
Loveland, CO 80539
(970) 669-3050

Certificate of Analysis

This is a Component of 2659405-TH lot A2307

Page 1

COMMODITY: STABLCAL|sup|TS|sup0 FORMAZIN STANDARD 100 NTU
COMMODITY NUMBER: 2684901 MANUFACTURE DATE: DATE OF ANALYSIS:
LOT NUMBER: A2299 11/10/2022 11/17/2022

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	95 to 105 NTU	102.0 NTU

The expiration date is Feb 2024

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NIST does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

A handwritten signature in cursive script that reads "Scott Als".

Certified by

Scott Als
Analytical Services Chemist

PC 17/02/22

HACH COMPANY



An ISO 9001 Certified Company

P.O.Box 389
Loveland, CO 80539
(970) 669-3050

Certificate of Analysis

This is a Component of 2659405-TH lot A2307

Page 1

COMMODITY: STABLCAL|sup|TS|sup0 FORMAZIN STANDARD 800 NTU

COMMODITY NUMBER: 2660501

MANUFACTURE DATE:

DATE OF ANALYSIS:

LOT NUMBER: A2318

11/29/2022

12/5/2022

<i>TEST</i>	<i>SPECIFICATIONS</i>	<i>RESULTS</i>
Turbidity	760 to 840 NTU	817.0 NTU

The expiration date is Feb 2024

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NIST does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by

Scott Als
Analytical Services Chemist



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.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 8-Jan-2023

Certificate No. : 23TH0050

CSR No. : A047/02339

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. : 52134079

ID No. : SGK_ML0001

Resolution : 1 °C

Received Date : 5-Jan-2023

Calibrated Date : 5-Jan-2023

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	Nattawut P.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	Jul 05-May-2024

Nattawut P.

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.16.013 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 : Sounthern Calibration Service Co., Ltd.,

Calibrated by : Ibrorhim Saleemin

Approved by :


Kanyarat Chaipet / Technical Manager

The uncertainties are for a confidence probability of approximately 95%

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Details of Calibration

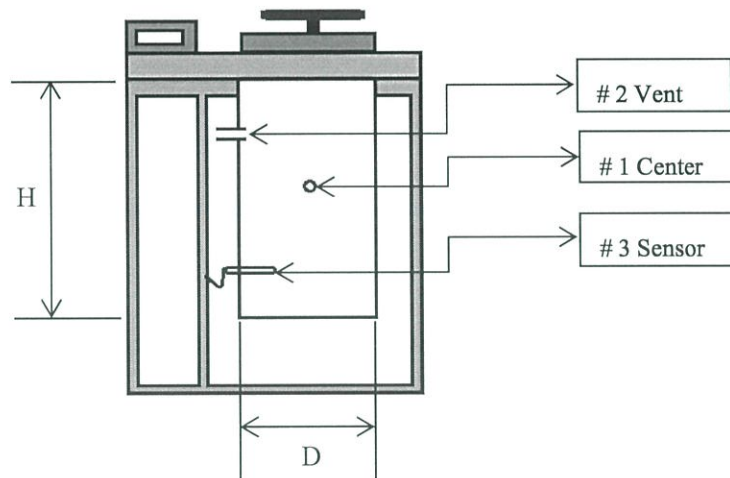
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	GL220	C90432223	22SDAT005	4-May-2023

- 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



Chamber Diameter (D) : 30 cm

Chamber Height (H) : 70 cm

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	115.5	115.4	115.5	0.07 MPa	0.76
118	118.7	118.9	119.1	0.09 MPa	0.76
121	122.0	122.1	122.1	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	0.20	0.30	0.30
118	118	118	0.70	0.70	0.90
121	121	121	0.50	0.40	0.60

- Operating Time = 1800.65 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 ...



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.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 9-Aug-2022

Certificate No. : 22OV529

CSR No. : A037/01847

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 : Incubator

Manufacturer : Memmert

Model : ICP750

Serial No. : F816.0061

ID No. : SGK_ML0013

Resolution : 0.1 °C

Received Date : 6-Aug-2022

Calibrated Date : 6-Aug-2022

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	APPROVED BY
APPROVED BY	APPROVED BY
NEXT CAL. DATE	06/02/2024

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.012 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 : Sounthern Calibration Service Co., Ltd.,

Calibrated by : Ibrorhim Saleemin

Approved by :

Kanyarat Chaipet / 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 Acquisition/Switch Unit	34970A	MY58009813	22SDAT004	24-May-2023

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

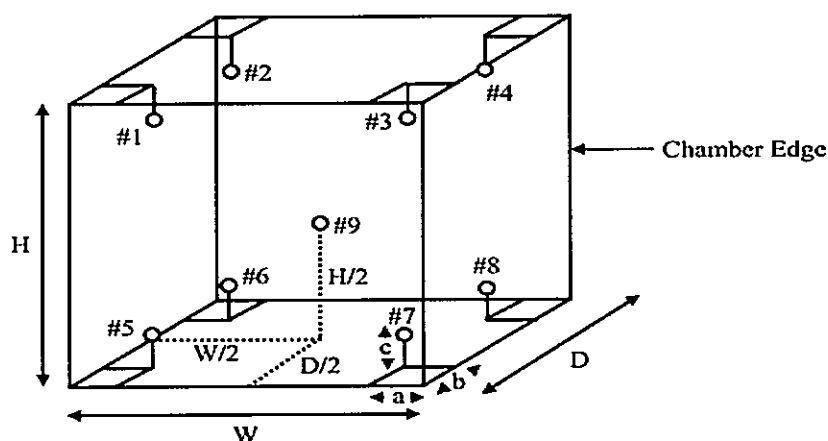
4. Condition of Item : normal condition , no indication for any damage or malfunction

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 = 104.0 cm

H = 120.0 cm

D = 60.0 cm



Certificate No. : 22OV529

CSR No. : A037/01847

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	34.99	34.92	34.95	34.88	34.96	35.00	34.94	34.94	34.94	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)
35	35.0	35.0	0.10	0.12	0.19

- 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 : 8-Jan-2023

Certificate No. : 23CH0016

CSR No. : A047/02339

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 : Microbiological Laboratory

Instrument Name : pH meter

Manufacturer : Sartorius

Model : Basic pH Meter PB-10

Serial No. : C70160695

ID No. : SGK_ML0016

Electrode No. : N/A

Received Date : 5-Jan-2023

Calibrated Date : 5-Jan-2023

Ambient Temperature : $(25 \pm 3) ^\circ\text{C}$

Relative Humidity : $(55 \pm 15) \%$

REVIEW BY	Nattawut P.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	05-Jul-24 Nattawut P.

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 :

- HACH : HACH LANGE GmbH
- WK : WK Electric Co., Ltd.

Calibrated by : Jessadagon Lemhud

Approved by :



Kanyarat Chaipet / 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
Standard Solution	4.005	C02950	1733	22-Apr-2024
Standard Solution	7.000	C03001	1783	23-Sep-2024
Standard Solution	10.013	C02953	1735	29-Apr-2024
Temperature/Electrical Calibrator	MC2-TE	14987	WK2106-299-223	5-Jun-2024

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. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV)	Correction (mV)	Uncertainty (± mV)
177.48	177.4	0.08	0.17
0.00	0.0	0.00	0.13
-177.48	-177.4	-0.08	0.17

2. Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)
4.004	4.02	-0.016	0.011
7.000	7.01	-0.010	0.013
10.013	10.02	-0.007	0.036

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., Banpru, Hatyai, Songkhla 90250 Thailand

Tel: 081 599 0417 Fax: 074 805 133 Email: s.calibration@gmail.com www.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 9-Aug-2021

Certificate No. : 21WB064

CSR No. : A047/2346

Page. : 1 of 3

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

Calibration Place : Microbiological Laboratory

Instrument Name : Water Bath

Manufacturer : Memmert

Model : WPE45

Serial No. : L716.0558

ID No. : SGK_ML0021

Resolution : 0.1 °C

Received Date : 6-Aug-2021

Calibrated Date : 6-Aug-2021

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	Nattawat P.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	4/02/2023

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 :

Sakeereen Heemhad / 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 logger With Sensor	34970A	MY44064411	QR21-0314	9-Feb-2022

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

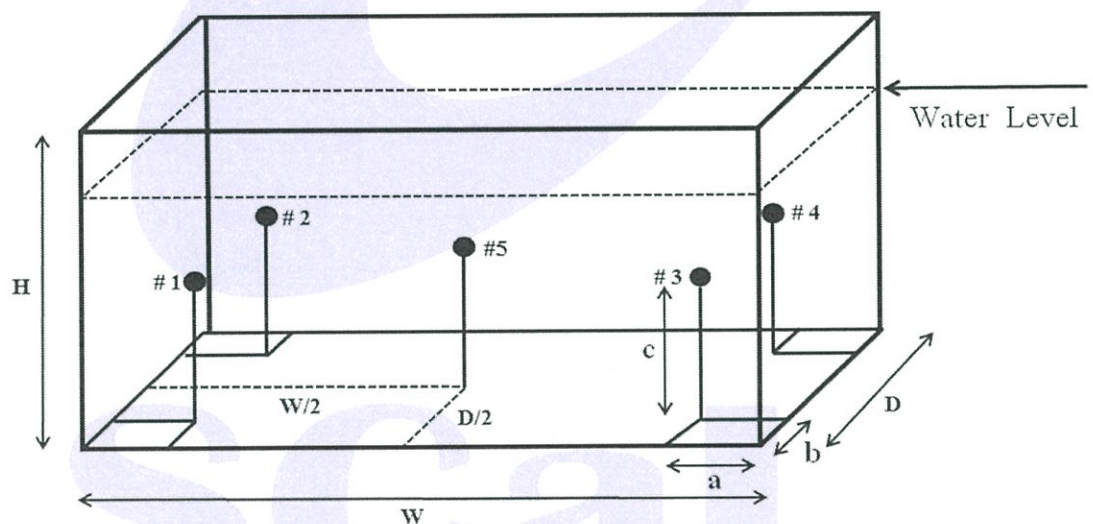
4. Condition of Item : normal condition , no indication for any damage or malfunction

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

Result of Calibration .:

2. Temperature Measurement Accuracy Test

The measurement results of the Water 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	44.49	44.55	44.48	44.51	44.47	0.14

3. Performance Result

The performance of the Water 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	44.6	44.6	0.20	0.24	0.24

- 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



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.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 2-Feb-2023

Certificate No. : 23TH0521

CSR No. : A075/03704

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 : Water Bath

Manufacturer : Memmert

Model : WPE45

Serial No. : L716.0558

ID No. : SGK_ML0021

Resolution : 0.1 °C

Received Date : 30-Jan-2023

Calibrated Date : 30-Jan-2023

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 30) %

REVIEW BY	Nattawut P.
APPROVED BY	Kanitta H.
NEXT CAL. DATE	30-Jul-24

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 :

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

Calibrated by : Ibrorhim Saleemin

Approved by :

Imron Rattanaylum / 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	34970A	MY58009813	22SDAT004	24-May-2023

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

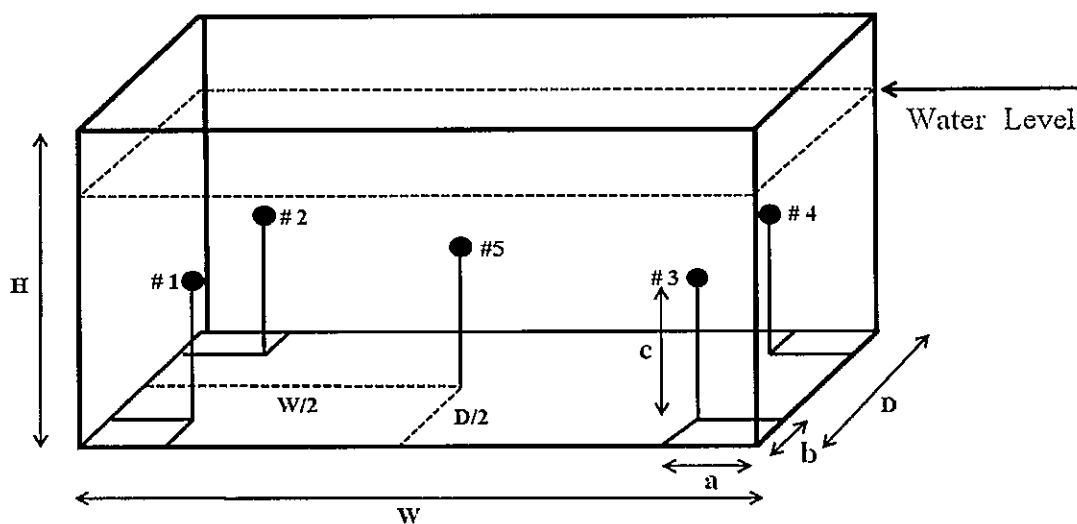
4. Condition of Item : normal condition , no indication for any damage or malfunction

Result of Calibration ∴

(✓) Without Adjustment

() After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

$a = 5 \text{ cm}$
 $b = 5 \text{ cm}$
 $c = 5 \text{ cm}$

Dimension of the chamber

$W = 45 \text{ cm}$
 $H = 30 \text{ cm}$
 $D = 35 \text{ cm}$



Certificate No. : 23TH0521

CSR No. : A075/03704

Page. : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Water 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	44.47	44.48	44.45	44.51	44.50	0.14

3. Performance Result

The performance of the Water 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	0.24	0.25

- 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 ...



REVIEW BY	Autcharawan S.
APPROVED BY	Sarasat M.
NEXT CAL. DATE	12 / Jan / 23
	12 / Jan / 22

Certificate of Calibration

ICS-2100: Anion (ID#659)

This certificate is to verify that instrument below are calibrated

by Archemica Lab Co., Ltd.

ICS-2100 S/N: 15010977

AS-HV S/N: 5450A36659

For

ALS Laboratory Group (Thailand) Co., Ltd.



Operator Signature: _____

Date: Jan 12, 2022

(Mr.Thitipong Piromkripuk)

Applications Chemist



REVIEW BY Aulcharawan S.
APPROVED BY Sararat M.
NEXT CAL. DATE 12 Jan 24

Certificate of Calibration

ICS-2100: Anion (ID#659)

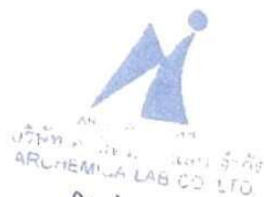
This certificate is to verify that instrument below are calibrated
by Archemica Lab Co., Ltd.

ICS-2100 S/N: 15010977

AS-HV S/N: 5450A36659

For

ALS Laboratory Group (Thailand) Co., Ltd.



Operator Signature: Nutdanai

Date: Jan 12, 2023

(Mr.Nutdanai Laekhwan)

Application Chemist



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th

E-Mail : calibrate@scg.co.th

Certificate No. T221642

Page 1 of 5

Certificate of Calibration

Equipment : Digestion Unit

Manufacturer : SCP Science

Model : DigiPRER HT

Serial No. : HTC1120480658

Customer Code : BKK_EN0366

ID No. : T2635A5

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.

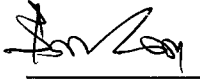
104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,

Khet Suan Luang, Bangkok 10250

Customer Location : Wet Chemistry Lab 1

Date of Receipt : 27 June 2022

Calibrated By : Sujjar Naknakred (Site Calibration Manager)

Approved By :  / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 04 JUL 2022

REVIEW BY	<u>Sinluk P.</u>
APPROVED BY	<u>Kel AL</u>
NEXT CAL. DATE	<u>30/06/23</u>

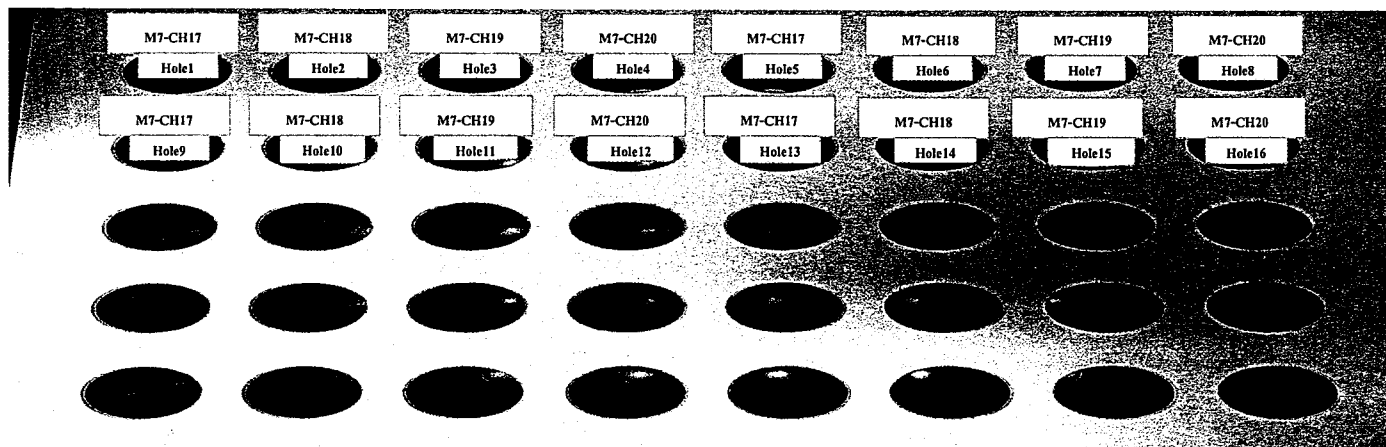
The uncertainties are for a confidence probability of approximately 95%.

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

Certificate No. T221642

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Calibration Report



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Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
°C	°C	°C	Reading	Hole1	Hole2	Hole3	Hole4	Hole5	Hole6	Hole7	Hole8
				M7-CH17	M7-CH18	M7-CH19	M7-CH20	M7-CH17	M7-CH18	M7-CH19	M7-CH20
380.0	380.0	379.4 - 380.7	Max °C	379.1	379.8	379.3	377.4	377.6	379.3	379.6	377.9
			Min °C	378.7	379.4	378.9	377.0	377.3	378.8	379.1	377.3
			Average °C	378.9	379.6	379.1	377.2	377.4	379.1	379.3	377.6
			Stability ± °C	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
°C	°C	°C	Reading	Hole9	Hole10	Hole11	Hole12	Hole13	Hole14	Hole15	Hole16
				M7-CH17	M7-CH18	M7-CH19	M7-CH20	M7-CH17	M7-CH18	M7-CH19	M7-CH20
380.0	380.0	379.4 - 380.7	Max °C	378.5	378.8	378.1	379.0	380.3	381.6	381.0	379.5
			Min °C	377.8	378.2	377.6	378.6	379.9	381.2	380.5	378.9
			Average °C	378.2	378.5	377.9	378.8	380.1	381.4	380.7	379.2
			Stability ± °C	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3

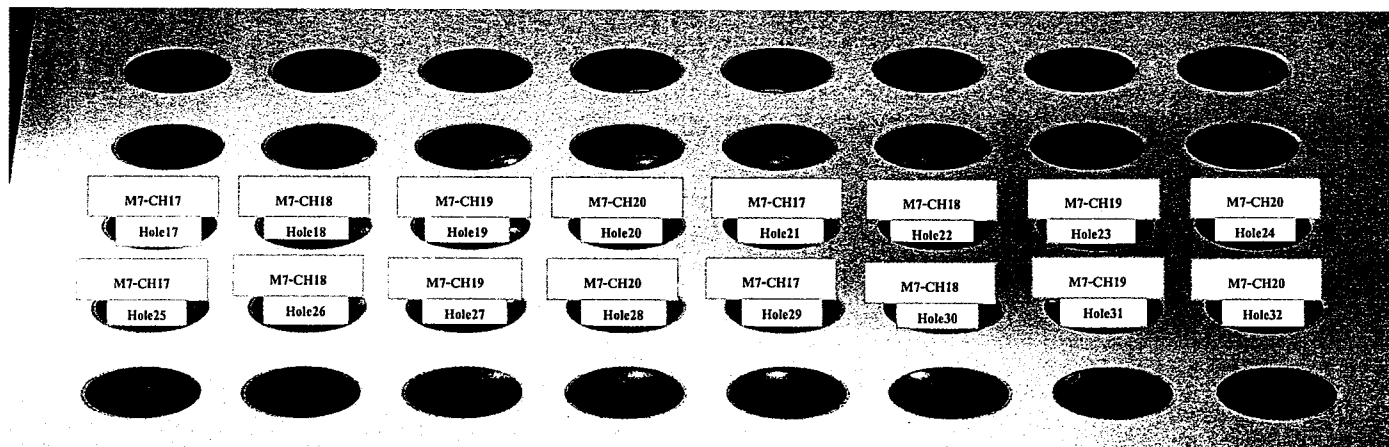
Approved By.



Certificate No. T221642

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Calibration Report



FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole17	Hole18	Hole19	Hole20	Hole21	Hole22	Hole23	Hole24
				M7-CH17	M7-CH18	M7-CH19	M7-CH20	M7-CH17	M7-CH18	M7-CH19	M7-CH20
380.0	380.0	379.4 - 380.7	Max °C	378.4	378.8	378.0	379.2	379.0	382.0	381.5	380.3
			Min °C	377.8	378.2	377.7	378.8	378.7	381.5	381.1	379.6
			Average °C	378.1	378.5	377.9	379.0	378.9	381.8	381.3	379.9
			Stability ± °C	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.4

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole25	Hole26	Hole27	Hole28	Hole29	Hole30	Hole31	Hole32
				M7-CH17	M7-CH18	M7-CH19	M7-CH20	M7-CH17	M7-CH18	M7-CH19	M7-CH20
380.0	380.0	379.4 - 380.7	Max °C	378.3	378.7	378.4	378.8	379.6	382.6	382.0	380.8
			Min °C	377.6	378.3	377.9	378.4	379.3	382.2	381.4	380.0
			Average °C	378.0	378.5	378.1	378.6	379.5	382.4	381.7	380.4
			Stability ± °C	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.4

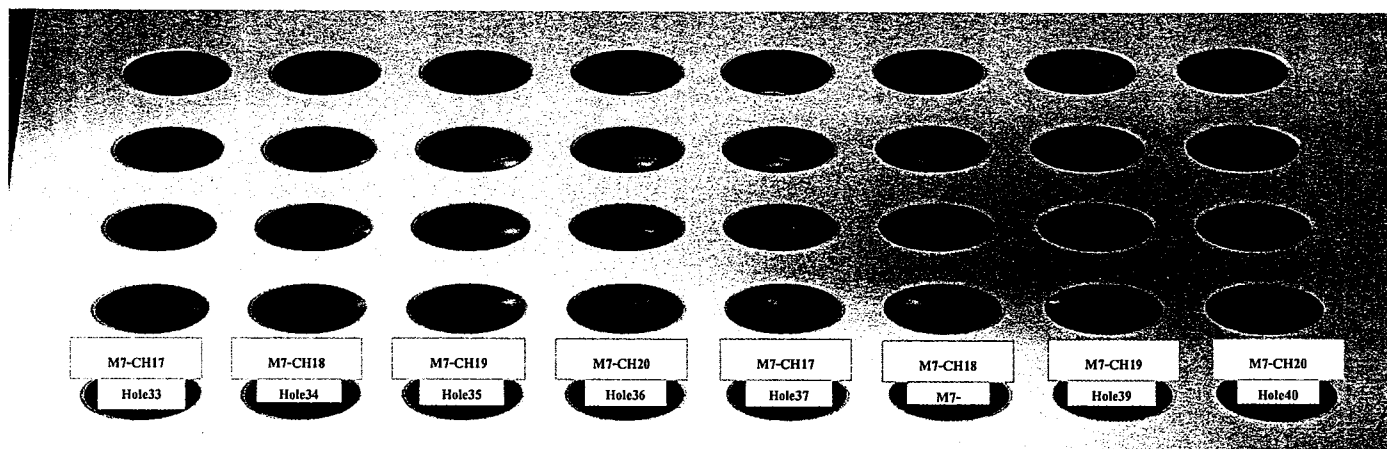
Approved By.



Certificate No. T221642

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Calibration Report



FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole33	Hole34	Hole35	Hole36	Hole37	Hole38	Hole39	Hole40
				M7-CH17	M7-CH18	M7-CH19	M7-CH20	M7-CH17	M7-CH18	M7-CH19	M7-CH20
380.0	380.0	379.4 - 380.7	Max °C	378.6	376.7	377.2	378.0	380.0	382.2	381.5	379.7
			Min °C	378.1	376.2	376.7	377.5	379.5	381.7	380.9	379.1
			Average °C	378.3	376.5	377.0	377.7	379.8	381.9	381.2	379.4
			Stability ± °C	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

 The expanded uncertainty of temperature measurement was ± 2.49 °C

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95 %.

Approved By.





Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th

E-Mail : calibrate@scg.co.th

Certificate No. T230902

Page 1 of 5

Certificate of Calibration

Equipment : Digestion Unit

Manufacturer : SCP Science

Model : DigiPRER HT

Serial No. : HTC1120480658

Customer Code : BKK_EN0366

ID No. : T2635A5

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,

Khet Suan Luang, Bangkok 10250

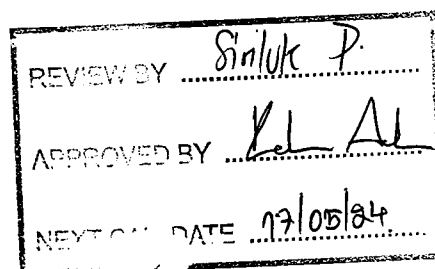
Customer Location : Wet Chemistry Lab 1

Date of Receipt : 10 May 2023

Calibrated By : Sujjar Naknakred (Site Calibration Manager)

Approved By :  / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 29 MAY 2023



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

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



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th

E-Mail : calibrate@scg.co.th

Certificate No. T230902

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Calibration Report

Equipment : Digestion Unit
Date of Calibration : 17 May 2023
Environment : Temperature : 23.9 - 26.3 °C
Line Voltage : 221.8 - 225.9 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert four standard thermocouples type S into its chamber , the other one thermocouple type T use for ambient temperature measurement . The calibration was done in according to WI-T10.

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	Type S	M20A1-(CH17-CH20)	T230547	18 April 2024
DATA LOGGER	34970A	T149	T230547	18 April 2024

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244.)

4. Condition of calibrated item : good

Equipment Description :

Time Constant 1 Hour 54 Minute At 380 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

(X) without adjustment

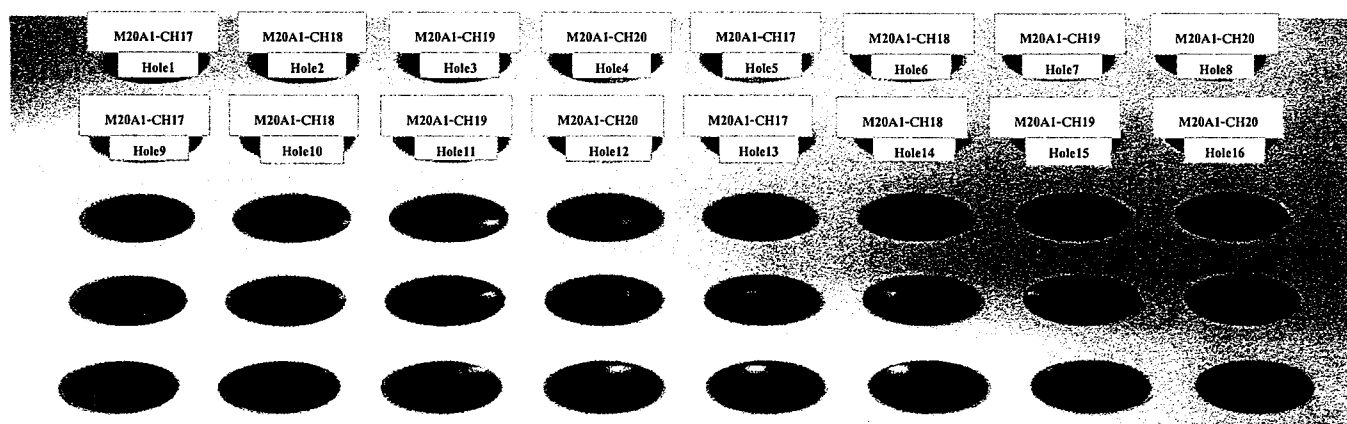
() after adjustment

Approved By. 

Certificate No. T230902

Page 3 of 5

Calibration Report



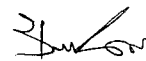
FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole1	Hole2	Hole3	Hole4	Hole5	Hole6	Hole7	Hole8
				M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20	M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20
380.0	380.0	379.4 - 380.7	Max °C	377.3	379.0	379.2	380.2	377.5	379.5	380.7	380.1
			Min °C	376.8	378.6	378.9	379.9	377.0	379.0	380.2	379.6
			Average °C	377.0	378.8	379.1	380.0	377.3	379.2	380.4	379.9
			Stability ± °C	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole9	Hole10	Hole11	Hole12	Hole13	Hole14	Hole15	Hole16
				M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20	M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20
380.0	380.0	379.4 - 380.7	Max °C	377.1	378.9	379.7	379.9	379.3	379.6	379.5	377.4
			Min °C	376.7	378.5	379.3	379.5	378.9	379.1	379.0	377.0
			Average °C	376.9	378.7	379.5	379.7	379.1	379.4	379.3	377.2
			Stability ± °C	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2

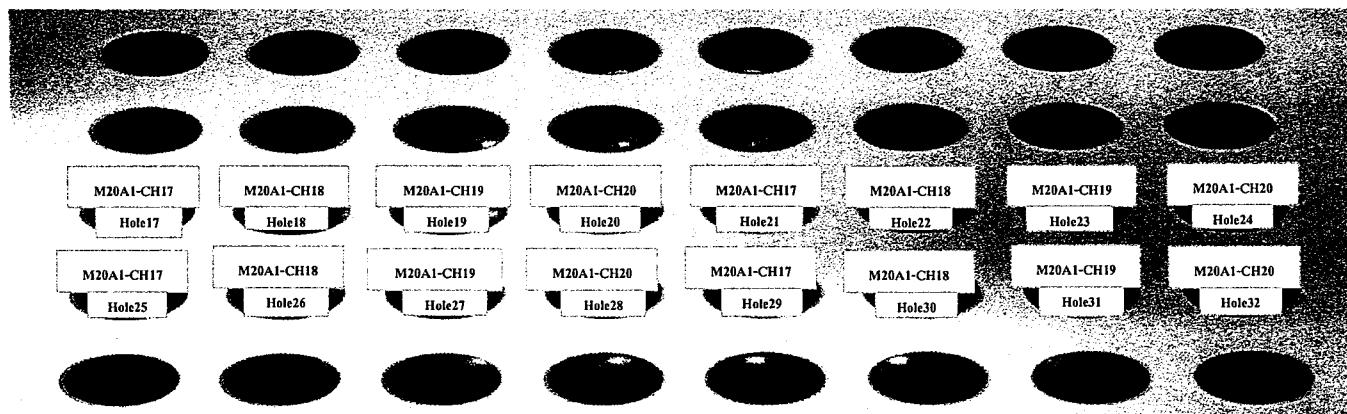
Approved By.



Certificate No. T230902

Page 4 of 5

Calibration Report



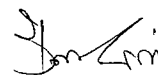
FRONT

Measurement Results

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole17	Hole18	Hole19	Hole20	Hole21	Hole22	Hole23	Hole24
				M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20	M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20
380.0	380.0	379.4 - 380.7	Max °C	378.4	380.1	380.1	380.0	379.1	379.8	379.6	377.8
			Min °C	377.8	379.6	379.7	379.3	378.6	379.2	379.2	377.3
			Average °C	378.1	379.9	379.9	379.7	378.9	379.5	379.4	377.5
			Stability ± °C	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2

Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole25	Hole26	Hole27	Hole28	Hole29	Hole30	Hole31	Hole32
				M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20	M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20
380.0	380.0	379.4 - 380.7	Max °C	377.9	379.4	380.1	380.1	379.3	379.6	378.9	377.3
			Min °C	377.4	378.9	379.7	379.7	378.8	378.9	378.4	376.7
			Average °C	377.7	379.2	379.9	379.9	379.0	379.3	378.6	377.0
			Stability ± °C	0.3	0.3	0.2	0.2	0.3	0.4	0.3	0.3

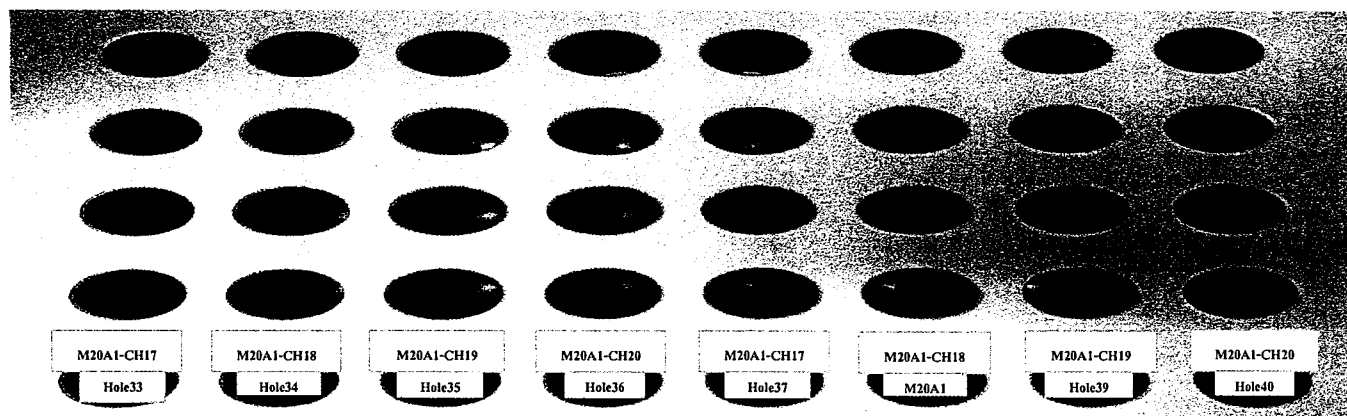
Approved By.



Certificate No. T230902

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Calibration Report



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Measurement Results

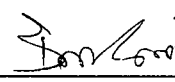
Cal. Point	Setting	Reading	STD.	Position of Standards at Block							
(°C)	(°C)	(°C)	Reading	Hole33	Hole34	Hole35	Hole36	Hole37	Hole38	Hole39	Hole40
				M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20	M20A1-CH17	M20A1-CH18	M20A1-CH19	M20A1-CH20
380.0	380.0	379.4 - 380.7	Max °C	377.7	378.0	378.3	379.0	378.2	378.5	377.3	377.4
			Min °C	377.3	377.6	377.9	378.6	377.7	378.1	376.9	377.0
			Average °C	377.5	377.8	378.1	378.8	378.0	378.3	377.1	377.2
			Stability ± °C	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

 The expanded uncertainty of temperature measurement was ± 1.85 °C

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

 The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95 %.

 Approved By. 



บริษัท ดับเบิล เอส ไดแอกโนสติกส์ จำกัด
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Maintenance Plan YEAR : 2023

เดือน	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
รอบ	PM-6M ck											

Periodical maintenance check list for Konelab

	6M	12M	Note!
1.Diluent-wash tubing change	☒	☐	
2.ISE tubing change	☒	☒	none.
3.Syringe check/change		☐	
4.Dispensing check/ change		☐	
5.Waste tubing change when necessary		☐	
6.Lamp check/change	☒	☐	
7.Mixer paddle/paddle change(not Konelab20)		☐	
8.ISE needles check/change		☐	
9.Pump tubing check/ chance	☒	☐	
10.Broken/worn out part check /change		☐	
11.Peristaltic pump check /cleaning/ lubrication	☒	☐	
12.Heating check		☐	
13.Cooling check		☐	
14.Dispenser mechanic check/adjustment	☒	☐	
15.Cuvette transfer mechanic check/adjustment	☒	☐	
16.Dispenser movement check/adjustment	☒	☐	
17.Sample/reagent register check/adjustment	☒	☐	
18.Dispensing tubing tightness check	☒	☐	
19.Photometer and optics cleaning/check/adjustment	☒	☐	
20.Workstation PC cleaning if necessary	☒	☐	
21.Mechanic cleaning/lubrication	☒	☐	
22.Instrument cleaning if necessary	☒	☐	
23.Complete analyzer testing with waterblank/QC or sample	☒	☐	
24.Test parameters/Adjustment/config. Save to USB key	☒	☐	
25.UPS Test	☒	☐	

Place: ALS Laboratory Instrument: Konelab Aquakem 250
Date/Time: 05-01-66 Serial no: 22781
Service done by: M. S. S. Install date:
Signature of customer: Date/Time: