

ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Carbon Monoxide	CO Analyzer	SGK_F50068	5-Jan-26	5-Jul-26	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	BKK_F50794	5-Jan-26	5-Jul-26	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	SGK_F50095	5-Jan-26	5-Jul-26	6
Ambient	Total Hydrocarbon	THC Analyzer	BKK_F50804	5-Jan-26	5-Jul-26	6
Ambient	Particulate Matter (PM10)	High Volume	SGK_F50121	30-May-25	30-May-26	12
Ambient	Particulate Matter (PM10)	Digital Balance	BKK_EN0403	30-May-25	30-May-26	12
Ambient	Total Suspended Particulate	High Volume	SGK_F50060	30-May-25	30-May-26	12
Ambient	Total Suspended Particulate	Digital Balance	BKK_EN0403	30-May-25	30-May-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	pH at 25 °C	pH meter	SGK_CL0030	31-Mar-26	1-Oct-27	18
Songkhla Lab	Total Alkalinity	pH meter	SGK_CL0030	31-Mar-26	1-Oct-27	18
Songkhla Lab	Oil & Grease	Electronic Top-Loading Balance	SGK_CL0045	15-Dec-25	15-Dec-26	12
Songkhla Lab	Oil & Grease	Oven	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 Dissolved Solids 180°C	Electronic Top-Loading Balance	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	Total Suspended Solids	Electronic Top-Loading Balance	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	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
Songkhla Lab	Total Kjeldahl Nitrogen	KJELDATHERM/BLOCK-DIGESTION	SGK_CL0092	18-Jan-26	18-Jan-27	12
Songkhla Lab	Residual Free Chlorine	Chlorine Meter	SGK_F50137	31-Mar-26	31-Mar-27	12
Songkhla Lab	Total Chlorine	Chlorine Meter	SGK_F50137	31-Mar-26	31-Mar-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	Staphylococcus aureus	Autoclave	SGK_ML0002	15-Dec-25	15-Jun-27	18
Songkhla Lab	Staphylococcus aureus	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Songkhla Lab	Staphylococcus aureus	pH meter	SGK_ML0045	17-Nov-25	17-Nov-26	12
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
Water Lab	Ammonium	Discrete analyzer	BKK_EN0438	3-Sep-25	3-Sep-26	12
Water Lab	Nitrate	Ion Chromatography	BKK_EN0451	3-Aug-25	31-Jul-26	12
Water Lab	Chloride	Ion Chromatography	BKK_EN0451	3-Aug-25	31-Jul-26	12
Water Lab	Pseudomonas aeruginosa	Autoclave	BKK_ML0041	4-Mar-25	4-Sep-26	18
Water Lab	Pseudomonas aeruginosa	Incubator	BKK_ML0231	21-Aug-25	21-Aug-26	12
Water Lab	Pseudomonas aeruginosa	Water Bath	BKK_ML0054	3-Dec-25	3-Dec-26	12
Water Lab	Pseudomonas aeruginosa	Hot Air Oven	BKK_ML0013	9-Oct-25	9-Apr-27	18
Water Lab	Cyanuric acid	Spectrophotometer	SGK_CL0100	12-Jan-26	12-Jan-27	12
Songkhla Lab	Clostridium perfringens	Autoclave	SGK_ML0002	15-Dec-25	15-Jun-27	18
Songkhla Lab	Clostridium perfringens	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Songkhla Lab	Clostridium perfringens	pH meter	SGK_ML0045	17-Nov-25	17-Nov-26	12
Swab Test	Legionella spp.	Incubator	BKK_ML0231	21-Aug-25	21-Aug-26	12
Swab Test	Legionella spp.	Hot Air Oven	BKK_ML0013	9-Oct-25	9-Apr-27	18
Swab Test	Legionella spp.	Autoclave	BKK_ML0044	17-Dec-24	17-Jun-26	18
Swab Test	Legionella spp.	Chamber (Cold Room)	BKK_ML0110	5-Nov-25	5-May-27	18

1

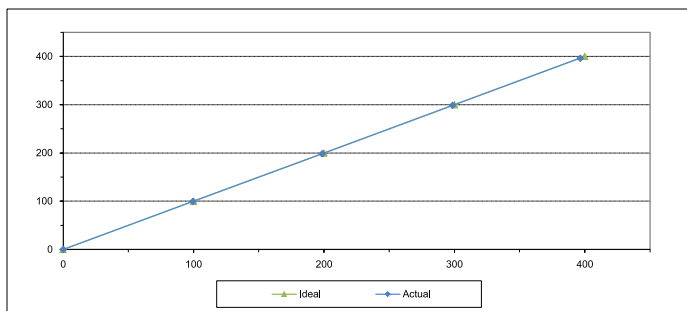
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MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jan-26	Equipment Name	CO Analyzer
Manufacturer	Teledyne API	Model	T300
Serial No.	3630	Equipment ID	SGK_FS0068
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.22	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.50	-0.50	-0.50
2	200.00	198.70	-1.30	-0.65
3	300.00	298.60	-1.40	-0.47
4	400.00	396.60	-3.40	-0.85
AVERAGE (%)				-0.47



Calibrated By

Approved By

(Mr.Jirawut Sakam)
Field Environmental Scientist (3)

(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

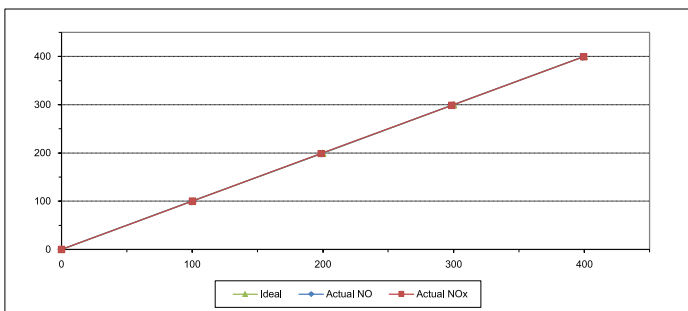
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jan-26	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	ROA0GWJC	Equipment ID	BKK_FS0794
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.30	-0.70	-0.70	100.20	0.20	0.20
2	200.00	198.60	-1.40	-0.70	198.80	-1.20	-0.60
3	300.00	298.50	-1.50	-0.50	298.70	-1.30	-0.43
4	400.00	398.70	-1.30	-0.33	399.50	-0.50	-0.13
AVERAGE (%)				-0.43			-0.17



Calibrated By

Approved By

(Mr.Jirawut Sakam)
Field Environmental Scientist (3)

(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

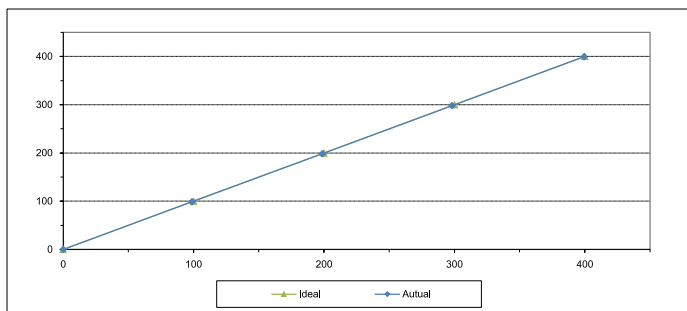
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jan-26	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	3EYT4WAA	Equipment ID	SGK_FS0095
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.90	-1.10	-1.10
2	200.00	198.70	-1.30	-0.65
3	300.00	298.20	-1.80	-0.60
4	400.00	399.40	-0.60	-0.15
AVERAGE (%)				-0.48



Calibrated By

Approved By

(Mr.Jirawut Sakam)
Field Environmental Scientist (3)

(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

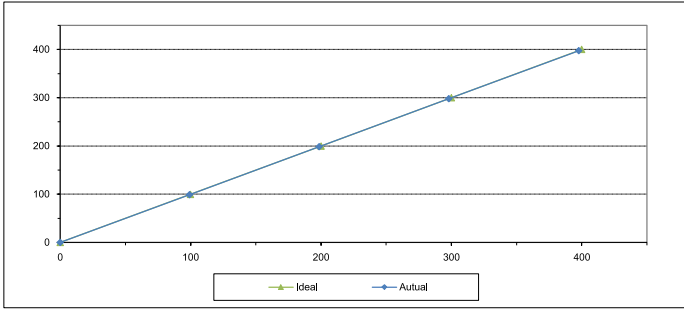
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jan-26	Equipment Name	THC Analyzer
Manufacturer	HORIBA	Model	APHA-370
Serial No.	TPXJ6KFL	Equipment ID	BKK_FS0804
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Conc. (PPM C3H8)	50.9	Cylinder No.	D612257
Cylinder Pressure (psi)	1800	Certified By	Linde
Certified Date	27-Jun-18	Expired Date	27-Jun-26

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.10	-0.90	-0.90
2	200.00	198.70	-1.30	-0.65
3	300.00	298.00	-2.00	-0.67
4	400.00	397.80	-2.20	-0.55
AVERAGE (%)				-0.53



Calibrated By

[Signature]

(Mr.Jirawut Sakarn)
Field Environmental Scientist (3)

Approved By

[Signature]

(Mr.Sarayuth Jitranont)
Assistant General Manager

ALS Laboratory Group

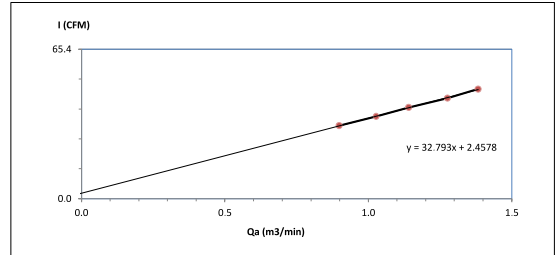
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



High Volume Air Sampler Calibration Worksheet

Project Site :	Stone Bitter Co.,Ltd.	Barometric Pressure (mm Hg) :	760.2
Calibrate Location :	ห้องตรวจวัดคุณภาพอากาศ	Temperature (°C) :	33.4
Calibrate Date :	20-Feb-26	High Volume ID :	SGK_FS0121
CalibrationSheet No.:	C-200226-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	0.898	32	Slope :	32.7927
2	2.4	1.027	36	Intercept :	2.4578
3	3.0	1.141	40	Correlation Coefficient :	0.9995
4	3.8	1.276	44		
5	4.5	1.383	48		



Calibrated by

[Signature]
(Mr.Yongsil Rangsee)
SGK Field Services Scientist (2)

Approved by

[Signature]
(Mr.Supt Salameh)
Field Services Section Head

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

SARTORIUS



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 WII 08.
Serial QM Ident. no.	C309774648 BKK_EN0403	This certificate relate and apply this equipment only.
Customer	ALS Laboratory Group (Thailand)Co., Ltd.	
Order no.	261969	
Number of pages	6	
Date of calibration	30 May 2025	

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>[Signature]</i>	<i>[Signature]</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

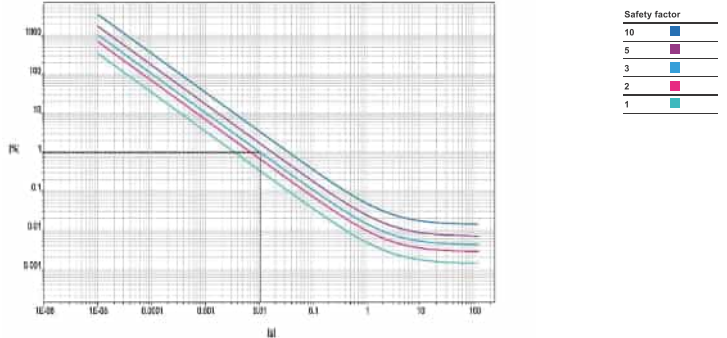
Device adjusted before measurement	Yes
Temperature deviation considered	5 K
Temperature coefficient considered	2 · 10 ⁻⁶ /K

Uncertainty of the weighing result *U*_G(*W*)*U*_G(*W*) = 0.000035 g + 1.38 · 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 ‰	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

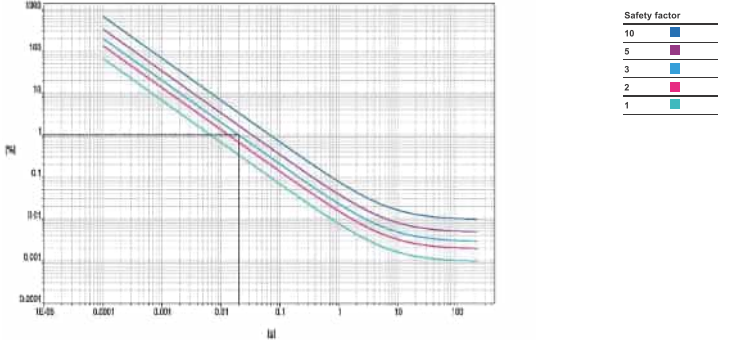
Device adjusted before measurement	Yes
Temperature deviation considered	5 K
Temperature coefficient considered	2 · 10 ⁻⁶ /K

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

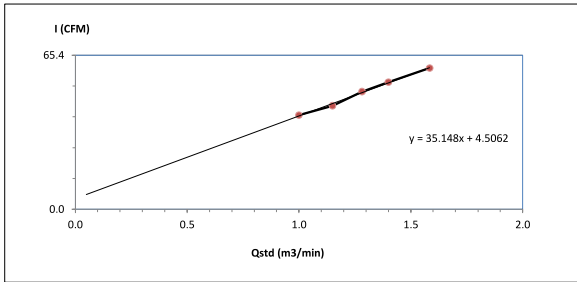
Process accuracy	1.00 ‰
Safety factor	3
Minimum sample weight	0.02019 g



High Volume Air Sampler Calibration Worksheet

Project Site :	Stone Bitter Co.,Ltd.	Barometric Pressure (mm Hg) :	760.2
Calibrate Location :	ห้องควบคุมคุณภาพอาคาร	Temperature (°C) :	33.4
Calibrate Date :	20-Feb-26	High Volume ID :	SGK_FS0060
CalibrationSheet No.:	C-200226-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	2.2	0.9995	40	Slope : 35.1481 Intercept : 4.5062 Correlation Coefficient : 0.9974
2	3.0	1.1500	44	
3	3.8	1.2815	50	
4	4.6	1.3997	54	
5	6.0	1.5840	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



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 : 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 Wichai 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 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 Saleemin

Approved by :

Wichai Rattamaylum / 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.



Certificate No. : 25TH0226

CSR No. : A101/05028

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	MY58008613	PSL-T0707-167	22-May-2025

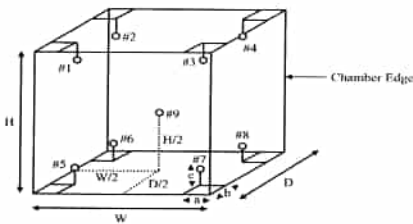
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

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 : (✓) 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 = 80.0 cm



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 ...



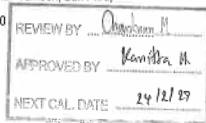
CALIBRATION CERTIFICATE

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) %



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 :
Sakorn Heemhad / Laboratory 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
Zero Oxygen Solution	HI7040L	C02374	S0032/21	12-Apr-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

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.F0.018/04/0723



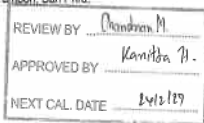
CALIBRATION CERTIFICATE

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) %



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 for 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 Salemin

Approved by :
Sakorn Heemhad / Laboratory 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
Digital Thermometer With Sensor (PRT)	1529	B4C223	QR25-2862	25-Sep-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

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.F0.018/04/0723



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 :

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

Calibrated by : Aisara Ma

Approved by :

Aisara 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 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 (mV)	pH	Correction (mV)	Uncertainty (± mV)	Coverage factor k
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 (pH)	mV	Correction (pH)	Uncertainty (± pH)	Coverage factor k
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 (pH)	mV	Correction (pH)	Uncertainty (± pH)	Coverage factor k
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 ...

SCAL-F0-018040723



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%

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



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	25WS001	2-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. Repeatability

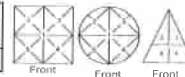
Nominal Value (g)	Standard Deviation (g)
20	0.00000
200	0.00000

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-F0-018040723

Result of Calibration : cont.

4. Departure from nominal value

Nominal Value (g)	Standard Value (g)	UUC Reading (g)	Correction (g)	Uncertainty ($\pm$ 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.F010106010023

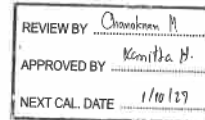
CALIBRATION CERTIFICATE

Issued Date : 3-Apr-2026

Certificate No. : 26TH1563

CSR No. : A247112304

Page. : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250Calibration 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 $\pm$ 10) °C
Relative Humidity : (50 $\pm$ 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%

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 with Sensor	DAQ970A	MY58036254	QR25-2036	1-Jul-2026

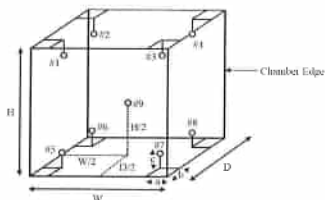
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

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

SCAL.F010106010023

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 ($\pm$ °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	0.36
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 ($\pm$ °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	0.63	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 ...

SCAL.F010106010023

CALIBRATION CERTIFICATE

Issued Date : 19-Dec-2025

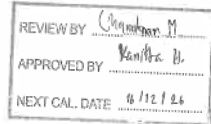
Certificate No. : 25TH5535

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) %



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 Rattanaylum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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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.FD.016/04/0173

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

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

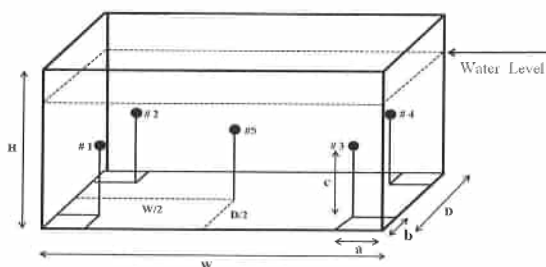
4. Condition of Item : normal condition, no indication for any damage or malfunction

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

CALIBRATION CERTIFICATE

Issued Date : 18-Dec-2025

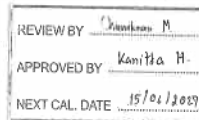
Certificate No. : 25TH5497

CSR No. : A230/11460

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kamchanawanich 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) %



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 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 with Sensor	DAQ870A	MY58036254	QR25-2036	1-Jul-2026

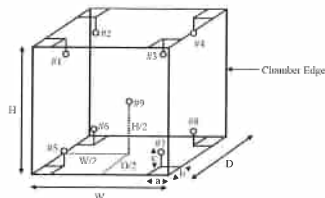
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

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-F018/W010723

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-F018/W010723

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.sca.co.th



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

SCAL-F018/W010723



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	GL240	C90432223	25SDAT005	16-Apr-2026

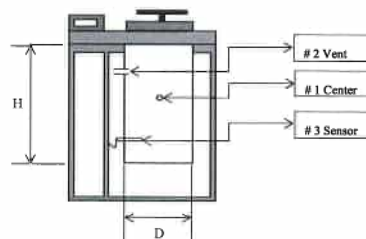
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

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-F018/W010723

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 ---

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 Saleemini

Approved by :

Innon Rattirattayum / 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	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

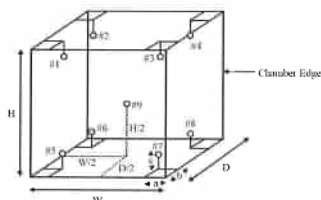
4. Condition of Item : normal condition , no indication for any damage or malfunction

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

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 ---

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, Karnchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250Calibration Place : Customer Laboratory
Instrument Name : pH meter
Manufacturer : Mettler Toledo
Model : Seven Direct SD20
Serial No. : C431515809
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



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	4.000	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.F018/010723

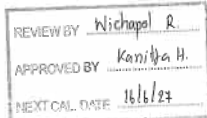
CALIBRATION CERTIFICATE

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, 90250Calibration 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 : Ibromim 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 Acquisition/Switch Unit	DAQ970A	MY58036254	QR25-2036	1-Jul-2026

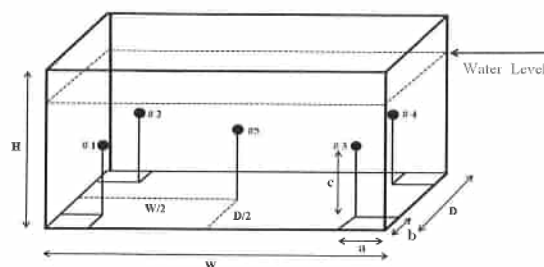
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

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.F018/010723



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 ...

SCAL.FO.01/06/0723



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 : Ibrohim Saleemin

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

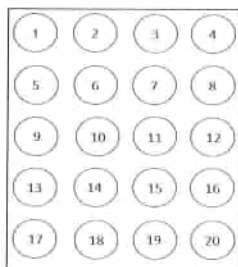
Details of Calibration**1. Reference Standard Equipment Used:**

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition Switch Unit with Sensor	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 :**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

SCAL.FO.01/06/0723



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...

SCAL.FO.01/06/0723



REVIEW BY *Chaithe R*
APPROVED BY *Manthan P*
NEXT CAL. DATE 31/03/26

Ref. Job number : #13517

Test Report

Customers	ALS Laboratory Group (Thailand) Co., Ltd.		
Equipment	Colorimeter	Manufacturer	HACH
Controller Model	☒ DR300 ☐ Pocket II	ID No.	SGK_FS0137
Controller Serial No.	230208001936	Sensor Serial No.	-
Date of test	31/03/2026	Period	1 Year
Environment temperature	25.5 °C	Humidity	61.9 %RH

Results

Instrument Checked

Item	Characteristic	Before	After	Remark
1	Visual Inspect	☒ Pass ☐ Fail	☒ Pass ☐ Fail	
2	Power Supply (4.5 - 6.0 VDC)	5.8 VDC	5.8 VDC	
3	Display Check	☒ Pass ☐ Fail	☒ Pass ☐ Fail	
4	Keyboard Check	☒ Pass ☐ Fail	☒ Pass ☐ Fail	
5	Function System Program	☒ Pass ☐ Fail	☒ Pass ☐ Fail	

Warning and Error Checked

Item	Event	Before	After
6	Error list	☒ None ☐ Appear	☒ None ☐ Appear

Check with Standard

Item	Characteristic	Before	After	Remark
7	Blank (0.0 mg/l)	0.00 mg/l	0.00 mg/l	
8	Standard Cl2 No. 1 (0.24 ± 0.09 mg/l)	0.25 mg/l	0.25 mg/l	
9	Standard Cl2 No. 2 (0.91 ± 0.1 mg/l)	0.91 mg/l	0.91 mg/l	
10	Standard Cl2 No. 3 (1.59 ± 0.14 mg/l)	1.61 mg/l	1.61 mg/l	
11	Blank (0.0 mg/l)	0.0 mg/l	0.0 mg/l	
12	Standard Cl2 No. 1 (2.3 ± 0.2 mg/l)	2.3 mg/l	2.3 mg/l	
13	Standard Cl2 No. 2 (3.9 ± 0.3 mg/l)	3.9 mg/l	3.9 mg/l	
14	Standard Cl2 No. 3 (7.1 ± 0.6 mg/l)	7.1 mg/l	7.1 mg/l	

บริษัท ฮาช (ประเทศไทย) จำกัด: อาคาร 8 ห้องเลขที่ 311 ชั้น 3 เลขที่ 735/4 ถนนศรีนครินทร์ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพฯ 10250
Tel: +66 (02) 026-3529 | Fax: +66(02) 026-3572 | Tax ID : 0105552107330 | Email: thmarketing@hach.com | www.th.hach.com



Ref. Job number : #13517

Summary of checked

- ☒ The instrument can work normally and efficiently. (เครื่องมือสามารถทำงานได้ปกติและมีประสิทธิภาพ)
☐ The instrument can work but it's requiring to maintenance. (เครื่องมือสามารถทำงานได้ปกติแต่ต้องบำรุงรักษา)
☐ The instrument could not work it's requiring to repair. (เครื่องมือไม่สามารถทำงานได้และต้องทำการซ่อมบำรุง)

Remark:

Standard Equipment Used

Equipment	Equipment I.D.
Standard Absorbance DPD-CHLORINE-LR	Lot No. A4150 Exp. date : Jun-26
Standard Absorbance DPD-CHLORINE-HR	Lot No. A4162 Exp. date : Jun-26
Digital multi meter	S/N : 86940012 Due date : 01-Sep-26
Thermo hygrometer	S/N : 41432443 Due date : 06-Nov-26

Test By :

(Mr. Puttipong Duangsawat)

Service Engineer

Approved by :

(Mr. Poolaph Kongsungsorn)

Position :

Service Manager

บริษัท ฮาช (ประเทศไทย) จำกัด: อาคาร 8 ห้องเลขที่ 311 ชั้น 3 เลขที่ 735/4 ถนนศรีนครินทร์ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพฯ 10250
Tel: +66 (02) 026-3529 | Fax: +66(02) 026-3572 | Tax ID : 0105552107330 | Email: thmarketing@hach.com | www.th.hach.com



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. : 25TH5453

CSR No. : A23011461

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kamchanawich 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) %

REVIEW BY *Nichap R*
APPROVED BY *Kamita H.*
NEXT CAL. DATE 15/6/27

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 Saleemim

Approved by :

Imron Pattanayak / 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.



Certificate No. : 25TH5453

CSR No. : A23011461

Page : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

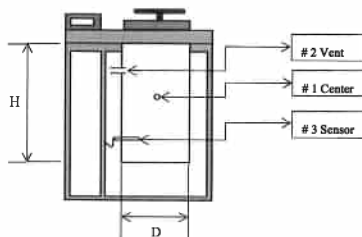
Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	GL240	CS0432223	25SDAT005	16-Apr-2026

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



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_F0101810023



บริษัท ซีจี ไซน์แอนด์สเคิล จำกัด
CG SCIENTIFIC CO., LTD.

BKK_EN0438

Report number CGS250901

Calibration Instrument Report

Instrument: Automated Discrete Analyzer
Manufacturer: AMS
Model: SmartChem 600
Serial number: 2401055

Customer: ALS Laboratory Group (Thailand) Co., Ltd.
Address: 104 Phatthanakan 40 Alley, Phatthanakan, Suan Luang, Bangkok 10250
Calibration date: 3 Sep 2025
Place: ALS Laboratory Group (Thailand) Co., Ltd.

REVIEW BY	Aranya M.
APPROVED BY	Siriluk P.
NEXT CAL. DATE	31/9/2026

Check fluid to validate the correct functioning of the instrument

INTENDED USE

Check fluid to validate the correct functioning of the instrument.

Purpose

The purpose of this document is to aim at the correct execution of the method and the installation of the Check fluid to validate the correct functioning of the instrument.

COMPOSITION

Fluidic Test CHECK-01 20 x 4.5 mL (liquid) Lot number: 45751 Expiry date: 2027-04

PROCEDURE

The reagent is ready to use. Check fluid to validate the correct functioning of the instrument following method CHECK-01 and WORKPLAN CHECK01 DILUTION.

Results For the correct operation of the machine, the expected results are as follows:

1. Evaluation of calibration Results: R²

Result	Range
1	>0.995 - 1

2. Evaluation of Samples Results:

Dilution	Replicates	Results mg/L	Range	CV% calculated	CV%
1/1	x10	0.804	0.599 - 0.810	0.17	≤ 1
1/10	x10	0.811	0.590 - 0.825	1.37	≤ 2
1/20	x10	0.643	0.535 - 0.675	3.49	≤ 5
1/50	x10	0.689	0.510 - 0.750	7.70	≤ 10
1/75	x10	0.758	0.500 - 0.895	11.11	≤ 15

Validation by (Signature)
Apirom Ekviyarakul

1194 Soi Wachirathamsothit 57, Sukhumvit 101/1 Rd, Bangchak, Phraekhanong, Bangkok, Thailand 10260

1194 ซอยวชิรธรรมสาธิต 57 ถนนสุขุมวิท 101/1 แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260



แบบฟอร์มการประเมินเครื่อง Discrete Analyzer หลังการสอบเทียบ

ชื่อเครื่อง : Discrete Analyzer

ID No. BKK_EN0438

S/N : 2401055

Parameter	Range	Test Results	Pass	Fail	Remark
Evaluation of calibration	>0.995 - 1	1.00	☒	☐	
CV% calculated Dilution 1/1	≤ 1	0.17	☒	☐	
CV% calculated Dilution 1/10	≤ 2	1.4	☒	☐	
CV% calculated Dilution 1/20	≤ 5	3.5	☒	☐	
CV% calculated Dilution 1/50	≤ 10	7.70	☒	☐	
CV% calculated Dilution 1/75	≤ 15	11.11	☒	☐	

ผู้ตรวจสอบ : Aranya M.
(Aranya Meechai)
(05/09/2025)

ผู้อนุมัติ : Siriluk P.
(Siriluk Bunnak)
(05/09/2025)

BKK_EN0451

ARCHÉMICA	
Certificate of Calibration	
Inuvion RFIC (ID#1238)	
This certificate is to verify that instruments below are calibrated by	
Archemica International Co., Ltd.	
Inuvion RFIC	S/N 250451022
AS-HV	S/N 5303A30541
For	
ALS Laboratory Group (Thailand) Co., Ltd.	
Operator Signature: (Signature)	
(Mr. Prasert Marnmard)	
Application Chemist	
Date: August 1, 2025	

Certificate No. T250353

Page 1 of 4

Certificate of Calibration

Equipment : Autoclave

Manufacturer : TOMY

Model : SX-700

Serial No. : 48134190

Customer Code : BKK_ML0041

ID No. : T7725A3

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

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,
Khet Suan Luang, Bangkok 10250

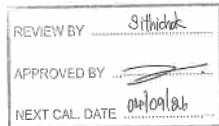
Customer Location : Washing Room

Date of Receipt : 26 February 2025

Calibrated By : Boonchai Suriyawong (Site Calibration Manager)

Approved By :  / Sujjar Naknakred (Site Calibration Manager)

Date of Issue : 10 Mar 2025



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

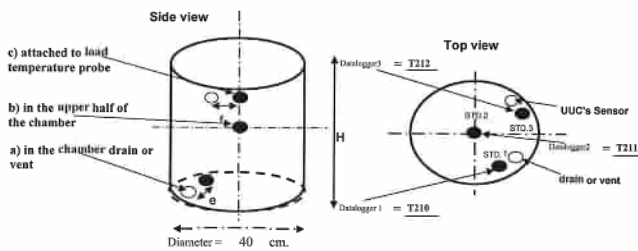
This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding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

FM-L14 118/18-08-66

Certificate No. T250353

Page 3 of 4

Calibration Report



Remark :

Size of Installed Standard sensor STD.1 : Distance the chamber drain or vent $e \leq 10$ cm.(less than or be equal to 10 cm.)

Size of Installed Standard sensor STD.2 : Geometric Center (upper half of the chamber)

Size of Installed Standard sensor STD.3 : Distance UUC's Sensor $f = 2$ cm.

Measurement Results :

Calibration Point	Average Standard Reading at each position (°C)		
	T210	T211	T212
121	121.2	121.1	121.1

Autoclave		Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (±°C)	Uncertainty (±°C)
	Min	Max				
121	-	121	121.2	0.1	0.1	0.65
						Coverage Factor k
						2.00

* The quoted uncertainty exclude "uniformity"

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 which for a t-distribution, providing a level of confidence of approximately 95 % .

End of Certificate

Approved By: 

FM-L15 118/18-08-66

Certificate No. T250353

Calibration Report

Page 2 of 4

Equipment : Autoclave
Date of Calibration : 4 March 2025
Environment : Temperature : 22.2-25.4 °C
Line Voltage : 221.1-224.7 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 3 standard temperature recorder into its chamber and test according to WI-T23 inhouse method.(based on BS 2646-1 : 2021)
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Standard No.	Certificate No.	Due Date
1. Temperature recorder	RTD	T210	T242028	11 December 2025
2. Temperature recorder	RTD	T211	T242029	11 December 2025
3. Temperature recorder	RTD	T212	T242030	11 December 2025

3. This certificate is traceable to :

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

4. Condition of calibrated item : good

Equipment Description :

Pressure Indicator 0.11-0.12 MPa At 121 °C Holding time 20 minute

5. Adjustment :

(X) without adjustment

() after adjustment

Approved By: 

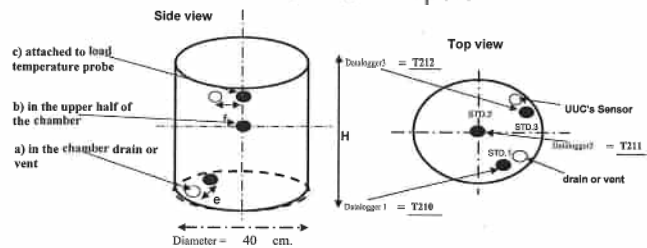
FM-L15 118/18-08-66

Certificate No. T250353

TEST REPORT (BKK_ML0041)

Page 4 of 4

Calibration Report



Remark :

Size of Installed Standard sensor STD.1 : Distance the chamber drain or vent $e \leq 10$ cm.(less than or be equal to 10 cm.)

Size of Installed Standard sensor STD.2 : Geometric Center (upper half of the chamber)

Size of Installed Standard sensor STD.3 : Distance UUC's Sensor $f = 2$ cm.

Measurement Results :

Calibration Point	Average Standard Reading at each position (°C)		
	T210	T211	T212
121	121.18	121.12	121.13

Autoclave		Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (±°C)	Uncertainty (±°C)
	Min	Max				
121	-	121	121.16	0.10	0.10	0.65
						Coverage Factor k
						2.00

* The quoted uncertainty exclude "uniformity"

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 which for a t-distribution, providing a level of confidence of approximately 95 % .

End of Certificate

Approved By: 

FM-L13 108/30-05-57



Certificate of Calibration

Cert. No.: 25TM1235
Page : 1 of 3

Equipment : Incubator
Manufacturer : Memmert
Model : IPP750eco
Serial No. : V821.0172
ID No. : BKK_ML0231

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand
Location : Incubation & Microbiological Reading

Received Order : 21 August 2025
Calibration Date : 21 August 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Khit Ruttanapachai

Approved by :
() Chakrit Waewwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 25 August 2025

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 : Incubator
Condition As-Received : Used Item
Reference : 2508-0459OC-2
Procedure Used :-

Cert. No.: 25TM1235
Page : 2 of 3

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 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	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44073381	25LM82	TPA	17 May 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 :

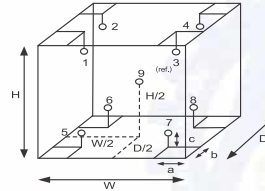
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	21	20
REL.Humid. (%)	62	65
AC Supply (Volt)	222	221



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	25-01RTD-01
2	25-01RTD-02
3	25-01RTD-03
4	25-01RTD-04
5	25-01RTD-05
6	25-01RTD-06
7	25-01RTD-07
8	25-01RTD-08
9 (ref.)	25-01RTD-09



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2508-0459OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 25TM1235
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.12	0.37	0.43	2
37.0	37.0	37.0	0.15	0.47	0.49	2
41.5	41.5	41.5	0.13	0.79	0.84	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
35.0	34.834	34.929	34.924	34.849	34.856	34.954	35.002	35.002	35.127	0.30
37.0	36.940	37.065	37.010	36.921	36.883	36.973	37.043	37.045	37.235	0.31
41.5	41.641	41.838	41.742	41.484	41.249	41.427	41.466	41.495	41.926	0.34

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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Certificate of Calibration

Cert. No.: 25TM1661
Page : 1 of 3

Equipment : Water Bath
Manufacturer : Memmert
Model : WPE 45
Serial No. : L707.0058
ID No. : BKK_ML0054

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand
Location : Presumptive Testing Lab

Received Order : 03 December 2025
Calibration Date : 03 - 04 December 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Preecha Hlahib

Approved by :
() Chakrit Waewwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 16 December 2025

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 : Water Bath
Condition As-Received : Used Item
Reference : 2512-0009OC-1
Procedure Used :-

Cert. No.: 25TM1661
Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Serial No. Cert. No. Traceable Due Date
1) Data Acquisition MY44073381 25LM82 TPA 17 May 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 :

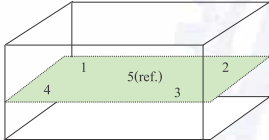
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	23	61	220
Finished of Calibration	20	64	221



Front

Position :	Ref. Std. S/N.:
1	4803988-006
2	4803988-007
3	4804539-014
4	4804539-015
5(ref.)	4804539-016



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2512-0009OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 25TM1661
Page : 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)					Uncertainty (± °C)
			1	2	3	4	5 (ref.)	
42.0	42.0	42.0	41.990	41.984	41.990	41.978	41.959	0.15
44.0	44.0	44.0	43.988	43.990	43.982	43.981	43.957	0.15
44.5	44.5	44.5	44.503	44.466	44.458	44.503	44.485	0.15
46.0	46.0	46.0	45.999	45.966	45.966	45.995	45.980	0.15

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Coverage Factor k
42.0	0.055	0.019	2
44.0	0.061	0.032	2
44.5	0.063	0.043	2
46.0	0.071	0.031	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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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.: 25TM525
Page : 1 of 3

Equipment : Hot Air Oven

Manufacturer : Binder

Model : ED 240/E2

Serial No. : 00-15533

ID No. : BKK_ML0013

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand

Location : Media Preparation Room

Received Order : 08 October 2025

Calibration Date : 09 October 2025

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Uthen Kankawi

Approved by :

() Chakrit Waewwanjua

() Suwit Imjai

(✓) Kunchit Promprat

Issue Date : 16 October 2025

REVIEW BY: Sithichok T.

APPROVED BY: [Signature]

NEXT CAL DATE: 09/04/27



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2510-0042OC-3

Cert. No.: 25TM525
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Serial No. Cert. No. Traceable Due Date
1) Data Acquisition MY59003411 24LM192 TPA 24 Dec 2025

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 :

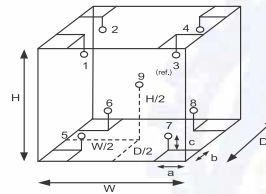
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	23	24
REL.Humid. (%)	54	56
AC Supply (Volt)	220	221



Probe Installation Details :

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

Dimension of Chamber :

D = 0.50 m
W = 0.80 m
H = 0.60 m
Capacity = 0.24 m³

Position :	Ref. Std. ID No.:
1	23-20TC-01
2	23-20TC-02
3	23-20TC-03
4	23-20TC-04
5	23-20TC-05
6	23-20TC-06
7	23-20TC-07
8	23-20TC-08
9 (ref.)	23-20TC-09

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 : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2510-0042OC-3
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 25TM525
 Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
170	170	170	0.45	1.3	2.3	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
170	169.588	170.427	168.486	168.900	169.725	169.499	168.946	169.327	169.529	1.3

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, SUANLIANG, SUANLIANG BANGKOK 10250
 TEL.0-2717-3000-29 FAX 0-2719-9484



Certificate of Calibration

Cert.No.: 26CHO12
 Page.: 1 of 3

Equipment : Spectrophotometer
 Manufacturer : Hach
 Model : DR 3900
 Serial No. : 2403637
 ID No. : SGK_CL0100
 Condition As-Received : Used Item
 Received Date : 12 January 2026
 Calibration Date : 12 January 2026
 Reference : 2601-0210OC-3
 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

Calibration Place : Chemistry Room
 Ambient Temperature : (25.2 to 24.4) °C (On-Site)
 Relative Humidity : (50.7 to 55.2) % (On-Site)
 Calibration Procedure : In - house method :
 CP-0CH4 based on ASTM E 275-08

Calibrated by : Kunchit Promprat

Approved by :

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

Issue Date :

Kunchit Promprat

Approved Signatory

21 January 2026

REVIEW BY Chanokan M.
 APPROVED BY Kanittha H.
 NEXT CAL DATE..... 12/01/27

The Uncertainties are for a confidence probability of approximately 95%

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Cert. No.: 26CHO12
 Page : 2 of 3

Condition of calibration result

1. Reference Standard Material :

Material	Serial No.	Certificate No.	Due date
1. Absorbance Standard set	44487	122584	31 May 2026
2. Wavelength Standard set	36730	118120	15 Jan 2026
3. Wavelength Standard set	36730	118121	15 Jan 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
 3. This certificate is traceable to the International System of Unit maintained through :
 - Stama Scientific Ltd.

4. Spectral BandWidth : 5 nm
 Scan Speed : - nm/min

Calibration Results : without adjustment

Wavelength Accuracy

Certified Values of Reference Material (nm)	UUC Reading (nm)	Uncertainty of Measurement (± nm)	Coverage Factor k
418.40	418	0.59	2.00
479.88	480	0.59	2.00
513.75	514	0.59	2.00
537.00	537	0.59	2.00
638.00	638	0.59	2.00
684.70	685	0.59	2.00
747.61	748	0.59	2.00
807.04	807	0.59	2.00

Calibration Results : without adjustment

Photometric Accuracy

Wavelength (nm)	Certified Values of Reference Material (Abs)	UUC Reading (Abs)	Uncertainty of Measurement (±Abs)	Coverage Factor k
420.0	Zero	0.000	0.0028	2.00
	0.5750	0.573	0.0028	2.00
	0.7156	0.714	0.0028	2.00
	1.0176	1.016	0.0028	2.00
440.0	Zero	0.000	0.0028	2.00
	0.5598	0.557	0.0028	2.00
	0.7037	0.700	0.0028	2.00
465.0	1.0013	0.997	0.0028	2.00
	Zero	0.000	0.0028	2.00
	0.5222	0.521	0.0028	2.00
546.1	0.6646	0.664	0.0028	2.00
	0.9444	0.944	0.0028	2.00
	Zero	0.000	0.0028	2.00
	0.5234	0.522	0.0028	2.00
590.0	0.7007	0.700	0.0028	2.00
	0.9992	0.999	0.0028	2.00
	Zero	0.000	0.0028	2.00
635.0	0.5573	0.554	0.0028	2.00
	0.7760	0.772	0.0028	2.00
	1.1104	1.105	0.0028	2.00
	Zero	0.000	0.0028	2.00
635.0	0.5648	0.563	0.0028	2.00
	0.7654	0.763	0.0028	2.00
	1.0961	1.094	0.0028	2.00

Remark

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer
 - 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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Certificate No. T242061

Page 1 of 3

Certificate of Calibration

Equipment : Autoclave

Manufacturer : TOMY

Model : SX 700

Serial No. : 49134129

Customer Code : BKK_ML0044

ID No. : T9753A3

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

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,

Khet Suan Luang, Bangkok 10250

Customer Location : Media Preparation Room

Date of Receipt : 4 December 2024

Calibrated By : Sujjar Naknakred (Site Calibration Manager)

Approved By : Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 19 DEC 2024

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

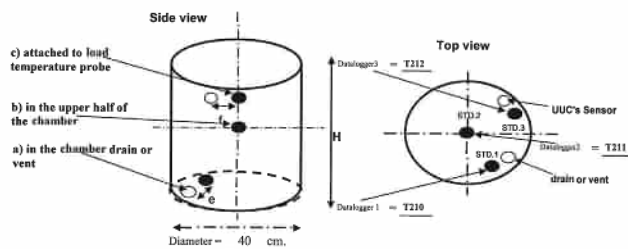
This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding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

FM-L14 11/18-08-66

Certificate No. T242061

Page 3 of 3

Calibration Report



Remark :

Size of Installed Standard sensor STD.1 : Distance the chamber drain or vent $e \leq 10$ cm.(less than or be equal to 10 cm.)

Size of Installed Standard sensor STD.2 : Geometric Center (upper half of the chamber)

Size of Installed Standard sensor STD.3 : Distance UUC's Sensor $f = 2$ cm.

Measurement Results :

Calibration Point	Average Standard Reading at each position (°C)		
	T210	T211	T212
108	108.9	108.8	108.8
115	115.9	115.8	115.8
118	118.7	118.7	118.6
121	121.7	121.7	121.6

Setting (°C)	Temperature Distribution					
	Reading (°C)		Average	Stability	Uniformity	Coverage
	Min	Max	(°C)	(±°C)	(±°C)	Factor k
108	108	108	108.8	0.10	0.10	2.00
115	115	115	115.8	0.10	0.20	2.00
118	118	118	118.7	0.10	0.10	2.00
121	121	121	121.7	0.20	0.20	2.00

* The quoted uncertainty exclude "uniformity"

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 which for a t-distribution, providing a level of confidence of approximately 95 % .

End of Certificate.

Approved By:

FM-L15 11/18-08-66

Certificate No. T242061

Calibration Report

Page 2 of 3

Equipment : Autoclave
Date of Calibration : 17 December 2024
Environment : Temperature : 23.4-24.2 °C
Line Voltage : 220.8-223.2 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 3 standard temperature recorder into its chamber and test according to WI-T23 inhouse method.(based on BS 2646-1 : 2021)
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Standard No.	Certificate No.	Due Date
1. Temperature recorder	RTD	T210	T242028	11 December 2025
2. Temperature recorder	RTD	T211	T242029	11 December 2025
3. Temperature recorder	RTD	T212	T242030	11 December 2025

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 :

Pressure Indicator	0.035 MPa	At 108 °C	Holding time 15 minute
	0.071 MPa	115 °C	Holding time 15 minute
	0.091 MPa	118 °C	Holding time 15 minute
	0.109 MPa	121 °C	Holding time 15 minute

5. Adjustment :

(X) without adjustment

() after adjustment

Approved By:

FM-L15 11/18-08-66

Certificate No. T251978

Certificate of Calibration

Page 1 of 4

Equipment : Chamber (Cooling Room)

Manufacturer : KOLDTECH

Model : KM-320

Serial No. : TBN-1012061/08

Customer Code : BKK_ML0110

ID No. : T2514A3

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

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,

Khet Suan Luang, Bangkok 10250

Customer Location : Microbiological Sample Receipt

Date of Receipt : 29 October 2025

Calibrated By : Saneek Musikawan (Site Calibration Manager)

Approved By : Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 11 NOV 2025

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation 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.

FM-TL06 R02/27-03-68

Certificate No. T251978

Calibration Report

Page 2 of 4

Equipment : Chamber (Cooling Room)
Date of Calibration : 5 November 2025
Environment : Temperature : 22.4-23.9 °C
Line Voltage : 221.4-230.2 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

- This equipment was calibrated by insert 12 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20 (based on ASTM E145-94 (Recapproved 2019) and AS2853-1986).
All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.
- Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN141-TN150	T250839	24 May 2026
TC	TYPE T	TN151-TN160	T250839	24 May 2026
DATA LOGGER	34970A	T193	T250839	24 May 2026
- This certificate is traceable to :
National Institute of Metrology (Thailand) through Metrological Center (NSC-TIS-TIS 17025 CALIBRATION 0244)
- Condition of calibrated item : good
Equipment Description :
Time Constant $\frac{1}{\text{Hour}}$ $\frac{10}{\text{Minute}}$ At $\frac{3}{\text{°C}}$
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available
- Adjustment :
(X) without adjustment () after adjustment

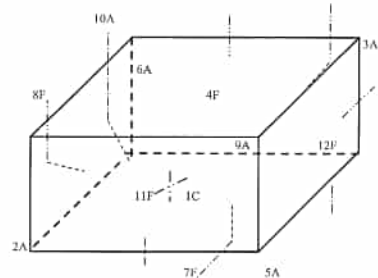
Approved By.

FM-TL07 102/27-03-68

Certificate No. T251978

Calibration Report

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C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN141	12F = TN152
2A = TN142	
3A = TN143	
4F = TN144	
5A = TN145	
6A = TN146	
7F = TN147	
8F = TN148	
9A = TN149	
10A = TN150	
11F = TN151	

Approved By.

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Calibration Report

Certificate No. T251978

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Measurement Results

Calibration Point	Average Standard Reading at each position (°C)									
	TN141	TN142	TN143	TN144	TN145	TN146	TN147	TN148	TN149	TN150
3.0	3.23	3.12	3.04	3.10	3.05	3.22	2.98	2.85	2.76	2.82
	TN151	TN152								
	2.91	2.99								

Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage Factor k
	Min	Max					
3.0	3.3	3.1	3.01	1.10	1.00	1.60	2.00

* The Annotated uncertainty exclude "uniformity"

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 which for a t-distribution, providing a level of confidence of approximately 95 %.

Approved By.

FM-TL07 102/27-03-68