

เอกสารสอบเทียบเครื่องมือตรวจวัด

Mettler-Toledo (Thailand) Ltd.
846/5 Lasalle Rd. Bangna Tai Sub-District
Bangna District, Bangkok 10260
Tel: 02-2723 0382
E-Mail: ServiceSupport@mt.com

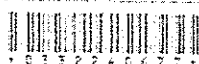


NSO-TISI-TIS 17025
CALIBRATION 0052

Accuracy Calibration Certificate

Customer

Company: WATER INDEX & CONSULTANT CO., LTD.
Address: 229/7-5 Soi Charansanitwong 95/1, Charansanitwong Rd., Bang-sor
City: Bangkok Contact: Nungnuthai Sairat
Zip / Postal: 10700
State / Province: Bangkok
Order Number:



Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument
Model: MS204TS/00 Asset Number: 300E17
Serial No.: E724267367 Terminal Model: N/A
Building: Office Terminal Serial No.: N/A
Floor: 2 Terminal Asset No.: N/A
Room: Laboratory

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20
This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.
The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.
In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 26.7 °C	End: 26.5 °C	Start: 40.3 %	End: 39.2 %

As Found Calibration Date: 23-Aug-2021 Calibrator: Kassekom Tassanachaisakul
As Left Calibration Date: N/A
Issue Date: 23-Aug-2021
Approved Signatory:

☐ Kassekom Tassanachaisakul
☐ Sant Jitnyom
☒ Surachet Sukkate

Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9999 g	N/A
2	99.9999 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A
6	99.9998 g	N/A
7	99.9998 g	N/A
8	99.9998 g	N/A
9	99.9999 g	N/A
10	99.9999 g	N/A
Standard Deviation	0.00006 g	N/A

○ As Found
◆ As Left

10 Test Points

25d

4d

3d

2d

1d

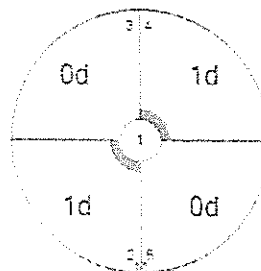
The 'd' in the graph represents the readability of the range/interval in which the test was performed.

The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	99.9999 g	N/A
2	100.0000 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A
Maximum Deviation	0.0001 g	N/A



As Found

The 'd' in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	10.0000 g	10.0000 g	0.0000 g	0.16 mg	2
7	20.0000 g	20.0000 g	0.0000 g	0.17 mg	2
8	50.0000 g	50.0001 g	0.0001 g	0.19 mg	2
9	100.0000 g	99.9999 g	-0.0001 g	0.25 mg	2
10	150.0000 g	149.9999 g	-0.0001 g	0.35 mg	2
11	200.0001 g	200.0000 g	-0.0001 g	0.39 mg	2

As Found

As Left

Error of Indication [mg]

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

Calibration Points (g)

The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-16. The value of the measurand lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.	WS44	Date of Issue	27-Aug-2020
Certificate Number	169096	Calibration Due Date	26-Feb-2022

Thermo Hygrometer

Equipment No.	IN35	Date of Issue	01-Sep-2020
Certificate Number	20H2025	Calibration Due Date	30-Aug-2021

Calibration Certificate ID
TCE21-045-062321-ACC-TH

METTLER TOLEDO Service

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.5 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.15 \text{ mg} + 0.00593 \text{ mg/g} \cdot R$	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.068%	N/A	N/A
2.2000 g	0.16 mg	0.0074%	N/A	N/A
22.0000 g	0.26 mg	0.0013%	N/A	N/A
220.0000 g	1.5 mg	0.00068%	N/A	N/A

Absolute Uncertainty [mg]

Relative Uncertainty [%]

Weighing Range [%]

Reading [g]

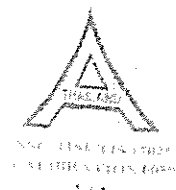
As Found

As Left



CALIBRATION LABORATORY CO., LTD.

101/101 หมู่ 10 ซอย 11 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
Tel: 02-261-1111 Fax: 02-261-1112 E-mail: info@clc.co.th Website: www.clc.co.th



CERTIFICATE OF CALIBRATION FOR

NOMENCLATURE : GRADUATED CYLINDER
MANUFACTURER : ISOLAB
MODEL / TYPE : 1000 ml
SERIAL NO. : 1538-57
CLID. NO. : 27141909
JOB CONTROL NO. : 210824078376

CUSTOMER : WATER INDEX & CONSULTANT CO., LTD.
229/7-8 SOI CHARANSANITWONG 95/1 CHARAN SANIT WONG RD.,
BANG-AOR, BANGPHUAT, BANGKOK 10700

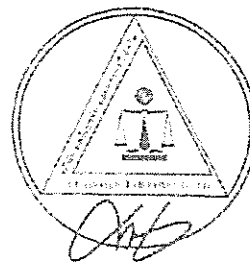
DATE OF RECEIVED : 24 August 2021

DATE OF ISSUED : 06 September 2021

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Prapaporn Khanchalee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
06 September 2021



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

Certificate No. Q21078376

F3-011-04/01-12

page 1 of 3



www.clc.co.th

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	GRADUATED CYLINDER
MANUFACTURER	:	ISOLAB
MODEL / TYPE	:	1000 ml
SERIAL NO.	:	1538-57
DATE OF CALIBRATION	:	28 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5) ^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

The instrument was calibrated under procedure No. WI-305-84 based on ASTM E542-01 as calibration guidelines. The calibration was performed by using Electronic Balance, Thermo-hygraph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Baringo S/N: 601
2. Electronic Balance, Sartorius Model CPA3202S, S/N: 23908511
3. Thermohygrograph, Isern Model: S-3126, S/N: 30760420
4. Thermometer, Brannan S/N: 3

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21027460, Due Date 24 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 13 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor, which complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (J-A-4:02 M:2013)".

Certificate No. Q21078376

FD-301-14701-12

page 2 of 3



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC). The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DLC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
200	201.26	+1.26	0.07	2.00
400	401.76	+1.76	0.09	2.00
600	602.01	+2.01	0.17	2.00
800	801.98	+1.98	0.17	2.00
1000	1001.74	+1.74	0.17	2.00

Type of glassware: ☒ to Contain ☐ to Deliver

Note: The Scope of Accredited TISI Certificate No. 19C0870655 Issue 1 Page 77 of 111

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

*** End of Certificate ***

Certificate No. Q21078376

F3-011-04701-12

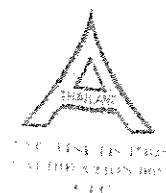
page 3 of 3





CALIBRATION LABORATORY CO., LTD.

111 หมู่ 10 ต. บางพลีใหญ่ อ. บางพลี จ. สมุทรปราการ 10520
Tel: 02-010-8222 Fax: 02-010-8223 E-mail: info@clc.co.th



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : GRADUATED CYLINDER
MANUFACTURER : ISOLAB
MODEL / TYPE : 100 ml
SERIAL NO. : 3133-56
CLID. NO. : 27141910
JOB CONTROL NO. : 210824078375

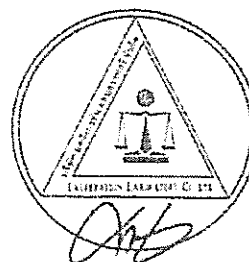
CUSTOMER : WATER INDEX & CONSULTANT CO., LTD.
229/7-8 SOI CHARANSANITWONG 95/1, CHARAN SANIT WONG RD.,
BANG-AOR, BANGPHLAT, BANGKOK 10700

DATE OF RECEIVED : 24 August 2021

DATE OF ISSUED : 31 August 2021

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Prapaporn Khanchalee
Calibration Engineer



Approved By : Mongkol Yotsoontorn
Authorized Signatory

31 August 2021

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

Certificate No. Q21078375

F3-011-04/01-12

page 1 of 3





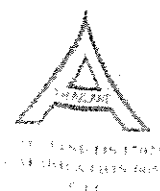
CIC
Accredited
ISO 9001:2015

CALIBRATION LABORATORY CO., LTD.

217/2, Mahatma Jyoti Bapu Marg, 2nd Floor, Plot No. 10, Sector 10, Connaught Place, New Delhi - 110028, India

TEL: +91 11 2610 1000 FAX: +91 11 2610 1001 E-MAIL: info@cll.co.in, sales@cll.co.in, www.cll.co.in

ILAC-MRA



REPORT OF CALIBRATION FOR

NOMENCLATURE : GRADUATED CYLINDER
MANUFACTURER : ISOLAB
MODEL / TYPE : 100 ml
SERIAL NO. : 3133-56
DATE OF CALIBRATION : 28 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5) ^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-84 based on ASTM E542-01 as calibration guidelines.

The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N.001.
2. Electronic Balance, AND Model GF-600 S/N.14637938.
3. Thermo-hygrograph, Isuzu Model 3-5126 S/N.30760420
4. Thermometer, Brannon S/N. 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014605, Due Date 15 February 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078375

F3-011-04/01-12

page 2 of 3

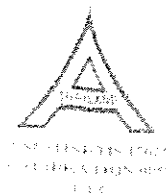


info@cll.co.in



CALIBRATION LABORATORY Co., LTD.

Calibration Laboratory Co., Ltd. is a company established in 1998, specializing in the calibration of various measuring instruments and equipment.



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC). The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
10	10.437	+0.437	0.012	2.00
50	50.355	+0.355	0.018	2.00
100	100.465	+0.465	0.035	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note: The Scope of Accredited ISI (Certificate No. 19C087/0655 Issue 1) Page 77 of 111

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

End of Certificate

Certificate No. Q21078375

F3-011-04/01-12

page 3 of 3

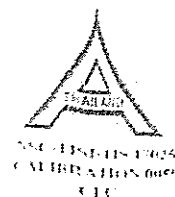


Information



CALIBRATION LABORATORY CO., LTD.

210-11, 14, 55 Soi Prasert Manulit 23 Yodh 4 Prasert Manulit Rd., Ladphrao, Bangkok 10230
Tel: 02-572-6353-4 Fax: 02-572-2672 www.calibration.co.th Email: info@calibration.co.th



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VOLUMETRIC FLASK
MANUFACTURER : WITEG
MODEL / TYPE : 50 ml
SERIAL NO. : G17217-20
CLID. NO. : 272102003
JOB CONTROL NO. : 210824078377

CUSTOMER : WATER INDEX & CONSULTANT CO., LTD.
229/7-8 SOI CHARANSANITWONG 95/1, CHARAN SANIT WONG RD.,
BANG-AOR, BANGPHLAT, BANGKOK 10700

DATE OF RECEIVED : 24 August 2021

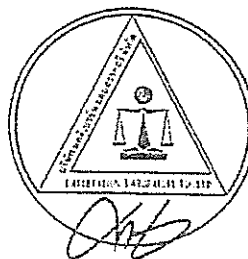
DATE OF ISSUED : 31 August 2021

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Prapaporn Khanchalee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory

31 August 2021



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

Certificate No. Q21078377

F3-011-04/01-12

page 1 of 3



CLC Calibration

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	VOLUMETRIC FLASK
MANUFACTURER	:	WITEG
MODEL / TYPE	:	50 ml
SERIAL NO.	:	G17217-20
DATE OF CALIBRATION	:	28 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5)^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \%RH$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-88 based on ASTM E542-01 as calibration guidelines. The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N 901.
2. Electronic Balance, Sartorius Model CPA224S S/N 21609487
3. Thermo hygograph, Isuzu Model 3-5126 S/N 30760420.
4. Thermometer, Brannon S/N 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor, which complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02:2013)".

Certificate No. Q21078377

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page 2 of 3

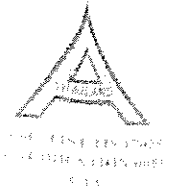




CLC
Accredited
ISO/IEC 17025

CALIBRATION LABORATORY CO., LTD.

110, 5th Floor, The Exchange Square, 100, Market Street, Singapore 050110
Tel: 65 6334 8888 Fax: 65 6334 8889 Email: info@clc.com.sg Website: www.clc.com.sg



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC). The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
50	50.0404	-0.0404	0.0120	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note: The Scope of Accredited TISI Certificate No. 19C0870655 Issue 1 Page 78 of 111

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

End of Certificate

Certificate No. Q21078377

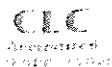
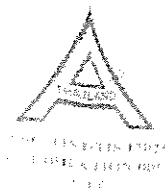
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page 3 of 3



of calibration

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

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FOR

NOMENCLATURE	:	VOLUMETRIC FLASK
MANUFACTURER	:	WTTEG
MODEL / TYPE	:	100 ml
SERIAL NO.	:	173618-4
DATE OF CALIBRATION	:	28 August 2021

ENVIRONMENT CONDITIONS :

Relative Humidity : $(50 \pm 10) \%RH$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-88 based on ASTM E542-01 as calibration guidelines. The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S.N.001.
2. Electronic Balance, Sartorius Model CPA2245 S.N.239008487
3. Thermo-hygrograph, Isuzu Model 3-3126 S.N.30760420.
4. Thermometer, Braunan S.N. 1

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022354, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor, which complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4 02 M:2013)".

Certificate No. Q21078378

page 2 of 2





CLC
Accredited
ISO/IEC 17025

CALIBRATION LABORATORY CO., LTD.

2110-11, 14, 55 Soi Prachin Manohit 29 Yaek 4, Prachin Manohit Rd. Ladprao - Bangkok 10240
Tel: 02-578-0352-4 Fax: 02-578-2672 Email: info@calibration.co Email: info@calibration.co



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC) . The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
100	100.0026	+0.0026	0.0190	2,00

Type of glassware : ☒ to Contain ☐ to Deliver

Note, The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 78 of 111

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

End of Certificate

Certificate No. Q21078378

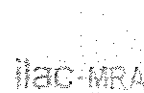
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page 3 of 3



calibration

• *Journal of Management Education*

[illegible]

NOMENCLATURE	:	VOLUMETRIC FLASK
MANUFACTURER	:	WITEG
MODEL / TYPE	:	1000 ml
SERIAL NO.	:	175618-2
DATE OF CALIBRATION	:	28 August 2021

Temperature : $(20 \pm 2.5)^\circ\text{C}$ Relative Humidity : $(50 \pm 10)\% \text{RH}$

This instrument was calibrated under procedure No. WI-305-88 based on ASTM E542-01 as calibration guidelines. The calibration was performed by using Electronic Balance, Thermohygraph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

1. Barometer, Bingsu S/N.001.
2. Electronic Balance, Sartorius Model CPA3202S S/N.21908511.
3. Thermo-hygraph, Isuzu Model 3-3126 S/N.30760420.
4. Thermometer, Brannan S/N.1

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815. Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21027440. Due Date 24 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014506. Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384. Due Date 11 March 2022.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor, which complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4-02:2010)".

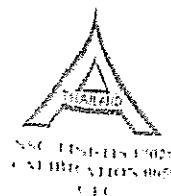
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CALIBRATION LABORATORY Co., LTD.

210-11,11,55 Soi Praset Manjid 27 Yod 3 Praset Manjid Rd., Loeprad, Bangkok, 10230
Tel 02-578-0353 4 Fax 02-578-2072 www.misoanw.com E-mail: info@calibration.co.th



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC) . The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
1000	999.80	-0.20	0.14	2,00

Type of glassware : ☒ to Contain ☐ to Deliver

Note. The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 78 of 111

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

End of Certificate

Certificate No. Q21078379

F3-011-04/01-12

page 3 of 3



Calibration

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	MEASURING PIPETTE
MANUFACTURER	:	WITEG
MODEL / TYPE	:	5 ml
SERIAL NO.	:	184G62-10
DATE OF CALIBRATION	:	26 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5)^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-89 based on ASTM E542-01 as calibration guidelines. The calibration was performed by using Electronic Balance, Thermic-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N.001.
2. Electronic Balance, Sartorius Model CPA224S S/N.23906487.
3. Thermo-hygrograph, Isuzu Model 3-3126 S/N.30760420.
4. Thermometer, Brannan S/N. 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor, which complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078380

13-011-04/01-12

page 2 of 3




$$\begin{aligned} \frac{1}{2} \left(\frac{1}{2} \right) &= \frac{1}{4} \\ \frac{1}{4} \left(\frac{1}{4} \right) &= \frac{1}{16} \\ \frac{1}{16} \left(\frac{1}{16} \right) &= \frac{1}{256} \\ \frac{1}{256} \left(\frac{1}{256} \right) &= \frac{1}{65536} \end{aligned}$$


The calibration was performed by applied volume to the Device Under Calibration (DUC). The actual volume readings from STD were reported in average of seven times measurements.

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
1.5	1.4993	-0.0007	0.0028	2,00
3.5	3.4952	-0.0048	0.0029	2,00
5	4.9875	-0.0125	0.0029	2,00

Note: The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 79 of 111

End of Certificate

page 3 of 3



1. *Chlorophyll a*



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Accredited
since 2015

CALIBRATION LABORATORY Co., LTD.

1-1-1, Higashi-Shinjyuku, Shinjyuku-ku, Tokyo 162-8501, Japan
TEL: 03-3344-1111 FAX: 03-3344-1112 E-MAIL: info@calibration.co.jp

ILAC-MRA



REPORT OF CALIBRATION

FOR

NOMENCLATURE : MEASURING PIPETTE
MANUFACTURER : WITEG
MODEL / TYPE : 10 ml
SERIAL NO. : 185G63-10
DATE OF CALIBRATION : 26 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5) ^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-89 based on ASTM E542-01 as calibration guidelines.
The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N.001.
2. Electronic Balance, Sartorius Model CPA224S S/N.23908487.
3. Thermo-hygrograph, Isuzu Model 3-3126 S/N.30760420.
4. Thermometer, Brannan S/N. 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078381

F3-011-04/01-12

page 2 of 3



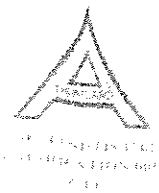
calibration



CALIBRATION LABORATORY CO., LTD.

101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

HAC-MRA



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC) . The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
3.5	3.5082	-0.0082	0.0029	2.00
5	5.0037	-0.0037	0.0029	2.00
7	7.0005	+0.0005	0.0039	2.00
10	9.9959	-0.0041	0.0039	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note: The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 79 of 111

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

End of Certificate

Certificate No. Q21078381

F3-011-04/01-12

page 3 of 3





$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}}$



FOR

NOMENCLATURE	:	MEASURING PIPETTE
MANUFACTURER	:	WITEG
MODEL / TYPE	:	25 ml
SERIAL NO.	:	186-G19-10
CLID. NO.	:	272001161
JOB CONTROL NO.	:	210824078382

CUSTOMER : WATER INDEX & CONSULTANT CO., LTD.
229/7-8 SOI CHARANSANITWONG 95/1, CHARAN SANIT WONG RD.,
BANG-AOR, BANGPHLAT, BANGKOK 10700

DATE OF RECEIVED : 24 August 2021

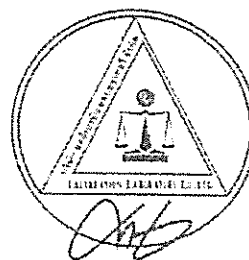
DATE OF ISSUED : 30 August 2021

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Prapaporn Khanchalee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory

30 August 2021



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

Certificate No. Q21078382

F3-011-0401-12

page 1 of 3



de la siguiente manera:



CALIBRATION LABORATORY CO., LTD.

100-1, 100-2, 100-3, 100-4, 100-5, 100-6, 100-7, 100-8, 100-9, 100-10, 100-11, 100-12, 100-13, 100-14, 100-15, 100-16, 100-17, 100-18, 100-19, 100-20, 100-21, 100-22, 100-23, 100-24, 100-25, 100-26, 100-27, 100-28, 100-29, 100-30, 100-31, 100-32, 100-33, 100-34, 100-35, 100-36, 100-37, 100-38, 100-39, 100-40, 100-41, 100-42, 100-43, 100-44, 100-45, 100-46, 100-47, 100-48, 100-49, 100-50, 100-51, 100-52, 100-53, 100-54, 100-55, 100-56, 100-57, 100-58, 100-59, 100-60, 100-61, 100-62, 100-63, 100-64, 100-65, 100-66, 100-67, 100-68, 100-69, 100-70, 100-71, 100-72, 100-73, 100-74, 100-75, 100-76, 100-77, 100-78, 100-79, 100-80, 100-81, 100-82, 100-83, 100-84, 100-85, 100-86, 100-87, 100-88, 100-89, 100-90, 100-91, 100-92, 100-93, 100-94, 100-95, 100-96, 100-97, 100-98, 100-99, 100-100



REPORT OF CALIBRATION FOR

NOMENCLATURE	:	MEASURING PIPETTE
MANUFACTURER	:	WITEG
MODEL / TYPE	:	25 ml
SERIAL NO.	:	186-G19-10
DATE OF CALIBRATION	:	26 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5) ^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-395-89 based on ASTM E542-01 as calibration guidelines. The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N.001.
2. Electronic Balance, Sartorius Model CPA224S S/N.23908487.
3. Thermo-hygrograph, Isuzu Model S-3126 S/N.30760420.
4. Thermometer, Brannon S/N. 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078382

F3-011-04/01-12

page 2 of 3





CALIBRATION LABORATORY CO., LTD.

100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

ILAC-MRA



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC) . The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
10	10.0039	+0.0039	0.0039	2.00
20	20.0058	+0.0058	0.0066	2.00
25	25.0100	+0.0100	0.0066	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note: The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 79 of 111

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

End of Certificate

Certificate No. Q21078382

F3-011-04/01-12

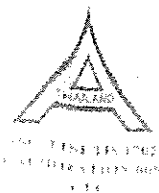
page 3 of 3



calibration



1. The first step is to identify the problem. In this case, the problem is that the company is not meeting its sales targets. The second step is to analyze the data. The third step is to develop a plan. The fourth step is to implement the plan. The fifth step is to evaluate the results.

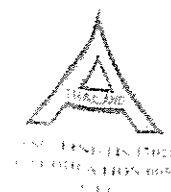


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CALIBRATION LABORATORY CO., LTD.

150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000



REPORT OF CALIBRATION FOR

NOMENCLATURE : BURETTE
MANUFACTURER : WITEG
MODEL / TYPE : 10 ml
SERIAL NO. : 287G63-1
DATE OF CALIBRATION : 26 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5) ^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-86 based on ASTM E542-01 as calibration guidelines.

The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N 001
2. Electronic Balance, Sartorius Model CPA224S S/N 23908487
3. Thermo-hygrograph, Isuzu Model 3-3126 S/N 30760420
4. Thermometer, Brannan S.N. 1

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014608, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

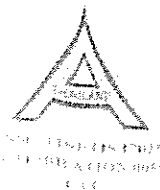
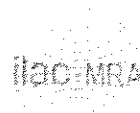
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078383

F3-011-04/01-12



[illegible]

The calibration was performed by applied volume to the Device Under Calibration (DUC) . The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
5	4.9983	-0.0017	0.0038	2.00
10	10.0019	+0.0019	0.0042	2.00

Type of glassware: ☐ to Contain ☒ to Deliver

Note: The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 77 of 111

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

End of Certificate

Certificate No. Q21078383

F3-011-04/01-12

page 3 of 3





REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	BURETTE
MANUFACTURER	:	WITEG
MODEL / TYPE	:	50 ml
SERIAL NO.	:	189G63-2
DATE OF CALIBRATION	:	26 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5)^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-86 based on ASTM E542-01 as calibration guidelines.

The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barco S/N 001.
2. Electronic Balance, Sartorius Model CPA224S S/N.23908487.
3. Thermo-hygrograph, Isuzu Model 5-3126 S/N.30760420.
4. Thermometer, Brannan S/N. 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor, which complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078384

F3-011-04/01-12

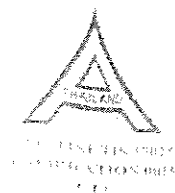
page 2 of 3





CALIBRATION LABORATORY CO., LTD.

100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC) . The actual volume readings from STD were reported in average of seven times measurements

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
20	19.9745	-0.0255	0.0066	2.00
50	49.9998	-0.0002	0.0110	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note: The Scope of Accredited ISI Certificate No. 19C087/0655 Issue 1 Page 77 of 111

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

End of Certificate

Certificate No. Q21078384

F3-011-04/01-12

page 3 of 3

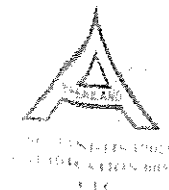


Calibration



CALIBRATION LABORATORY CO., LTD.

1130-MRA



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : GRADUATED CYLINDER
MANUFACTURER : WITEG
MODEL / TYPE : 50 ml
SERIAL NO. : 198G63
CLID. NO. : 272102005
JOB CONTROL NO. : 210824078385

CUSTOMER : WATER INDEX & CONSULTANT CO., LTD.
229/7-8 SOI CHARANSANITWONG 95/L. CHARAN SANITWONG RD.,
BANG-AOR, BANGPHLAT, BANGKOK 10700

DATE OF RECEIVED : 24 August 2021

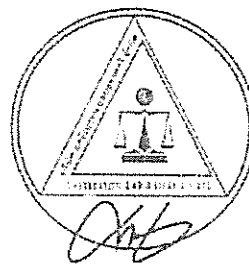
DATE OF ISSUED : 31 August 2021

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Prapaporn Khanchalee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory

31 August 2021



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

Certificate No. Q21078385

F3-011-04/01-12

page 1 of 3





CALIBRATION
LABORATORY CO., LTD.

CALIBRATION LABORATORY CO., LTD.

1-1-1, Higashi-Shinjuku, Shinjuku-Ku, Tokyo 162-8502, Japan
TEL: 03-3344-1111 FAX: 03-3344-1112

ILAC-MRA



REPORT OF CALIBRATION FOR

NOMENCLATURE : GRADUATED CYLINDER
MANUFACTURER : WITEG
MODEL / TYPE : 50 ml
SERIAL NO. : 198G63
DATE OF CALIBRATION : 28 August 2021

ENVIRONMENT CONDITIONS :

Temperature : $(20 \pm 2.5) ^\circ\text{C}$

Relative Humidity : $(50 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-84 based on ASTM E542-01 as calibration guidelines.
The calibration was performed by using Electronic Balance, Thermo-hygrograph, Barometer and Thermometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Barometer, Barigo S/N 001.
2. Electronic Balance, Sartorius Model CPA224S S/N 23905487.
3. Thermo-hygrograph, Isuzu Model S-F126 S/N 30760420
4. Thermometer, Brannan S/N 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21015815, Due Date 19 February 2022.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21024361, Due Date 16 March 2022.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21014606, Due Date 17 February 2022.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q21022384, Due Date 11 March 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2013)"

Certificate No. Q21078385

F3-011-04/01-12

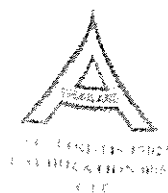
page 2 of 3





CALIBRATION LABORATORY CO., LTD.

Calibration Laboratory Co., Ltd. is a company that provides calibration services for various instruments and equipment. The company is located in the industrial area of the city and has a long history of providing high-quality calibration services.



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The calibration was performed by applied volume to the Device Under Calibration (DUC). The actual volume readings from STD were reported in average of seven times measurements.

CALIBRATION DATA

CORRECTION OF VOLUME

DUC Test point (ml)	Actual volume (ml)	Correction (ml)	Uncertainty \pm (ml)	Coverage factor k
10	9.9172	-0.0828	0.0120	2.00
30	29.9463	-0.0537	0.0180	2.00
50	49.9888	-0.0112	0.0180	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note: The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 77 of 111

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

End of Certificate

Certificate No. Q21078385

F3-011-04/01-12

page 3 of 3



Calibration



Inctech Metrological Center Co.Ltd.

39/1 Soi 82, Sukhapiban 5 Rd. O ngoen

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto. 10 lines) www.imcinstrument.com



Certificate of Calibration

Certificate No. : MT21-5731

Page : 1 of 2

Customer : Water Index & Consultant Co., Ltd.

Address : 229/8 Soi Charan Sanit Wong 95/1 Charan Sanit Wong Rd., Bang-Aor,
Bangphlat, Bangkok 10700

Description : Hot Air Oven

Manufacturer : Memmert

Model : SM400

Serial No. : B4921010

Identification No. : ID146E94

Calibration Place : Customer Laboratory

Order No. : 2589/21

Received date : Sep 28, 2021

Calibration date : Oct 14, 2021

Environment Condition :

Temperature : (25 \pm 10) °C

Humidity : (50 \pm 30) %RH

Calibration Method : Calibration were conducted using in-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on DKD-R5-7 guidelines for calibration of climatic chamber edition 07:2009.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY49020095	MT20-7636	Dec 10, 2021

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

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : Mr Jiraphan Sreebannasarn

Issue date : Nov 04, 2021

Approved by :

(Mr.Panuwat Phuklan)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd



Inctech Metrological Center Co.Ltd.
 39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
 Saimai, Bangkok 10220, Thailand
 Tel. (662) 909-8820 (Auto 10 lines) www.imcinsrument.com



Calibration (cert. # 3984.01)
 ISO/IEC 17025

Certificate No. : MT21-5731

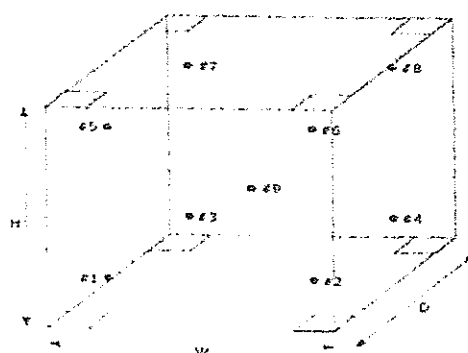
Page : 2 of 2

Function : Temperature measurement
 Calibration point : 104, 110, 120, 150, 180 °C

Result : Without adjustment
 Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
104	104.204	104.292	104.279	104.272	104.414	104.360	104.291	104.277	104.157	0.44
110	110.246	110.283	110.310	110.277	110.432	110.414	110.293	110.285	110.153	0.44
120	120.438	120.186	120.160	120.207	120.205	120.370	120.148	120.183	120.312	0.44
150	149.927	149.488	149.465	149.754	149.758	149.515	149.619	149.435	149.786	0.44
180	181.145	180.298	181.160	180.261	180.214	180.210	180.290	180.263	180.283	0.44

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
104.0	104.0	0.11	0.54	0.54
110.0	110.0	0.13	0.54	0.54
118.0	118.0	0.13	0.43	0.58
140.0	140.0	0.12	0.48	0.78
179.0	179.0	0.15	1.1	1.3



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

Front view

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time

Stability = One half of the maximum difference of measured temperatures at any one probe

-oOo-



CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammassop 31, Salathammassop Rd.,

Salathammassop, Thawewatthana, Bangkok 10170 Thailand

Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com



CERTIFICATE OF CALIBRATION

Certificate No. : 21-1003-006

Work Order No. : 21/1003

Issue Date : 30 October 2021

Customer Name : Water Index & Consultant Co., Ltd
229/7-8 Soi Charan Sanit Wong 95/1, Charan Sanit Wong Rd.,
Bang-aor, Bangphlat, Bangkok 10700

Date of Received : 14 October 2021

Date of Calibration : 14 October 2021

Instrument Details : Description : pH meter
Manufacturer : Mettler Toledo
Model : Seven Compact
Serial No. : B614308589
ID No. : N/A
Resolution : 0.01 pH
Location : Laboratory

Calibration Method : This instrument was calibrated by in-house calibration procedure no. CWI-C-02 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

Environmental Condition

Temperature : Area Monitoring between 15°C to 40°C

Humidity : Area Monitoring between 30%RH to 85%RH

Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Mr. Kritsada Kaewwangpa
Calibration Engineer

Approved by :

(Mr. Anuwat Yaklermjit)
Laboratory Manager

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Crystal Calibration Sales and Service Co., Ltd

45/48 Salathammassop 31, Salathammassop Rd., Salathammassop, Thawewatthana, Bangkok 10170

Phone : 0 2408 8474 Fax : 0 2408 8477 http://www.crystalcal.com Email : info@crystalcal.com





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Salathammassop, Thavornwathana, Bangkok 10170 Thailand

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CERTIFICATE OF CALIBRATION

Issue Date : 30 October 2021

Certificate No. : 21-1003-006

Work Order No. : 21/1003

Details of Calibration

1. Reference Standards Material

Certified Reference Material	CRM Code	Lot no.	Expire Date
1.1 Buffer Solution pH 4.00	TRM-S-2027	081020	23 August 2022
1.2 Buffer Solution pH 7.00	TRM-S-2034	020221	8 April 2022
1.3 Buffer Solution pH 10.00	TRM-S-2031	091020	23 August 2022

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

2.1 Instrument No. 2.1 traceable to : Nation Institute of Metrology (Thailand)

2.2 Instrument No. 2.2 traceable to : Nation Institute of Metrology (Thailand)

2.3 Instrument No. 2.3 traceable to : Nation Institute of Metrology (Thailand)

3. Condition of item : Used

4. Calibration location : On-site

Result of Calibration

Function : pH Measurement

Performing Three buffer standard curve using buffer nominal pH (4, 7, 10)

STD buffer solution pH @ 25°C	Average indicator reading pH	Uncertainty (\pm) pH	Coverage factor k
4.01	4.02	0.012	2.00
7.01	7.01	0.012	2.00
10.00	10.02	0.012	2.00

Description of electrode

Brand : Mettler Toledo Model : N/A Serial No. : 30014096

Type : Combination Electrode Range : 0 to 14 pH

Note : Calibrate items in good condition and this report customer request and accepted in certificate

This result of calibration was found accurate as shown on date and place of calibration only
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k=2$ providing a level of confidence of approximately 95%



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CERTIFICATE OF CALIBRATION

Issue Date : 30 October 2021

Certificate No. : 21-1003-007

Work Order No. : 21/1003

Customer Name : Water Index & Consultant Co., Ltd
229/7-8 Soi Charan Sanit Wong 95/1, Charan Sanit Wong Rd.,
Bang-aor, Bangphlat, Bangkok 10700

Date of Received : 14 October 2021

Date of Calibration : 14 October 2021

Instrument Details : Description : Digital Thermometer with sensor
Manufacturer : Mettler toledo
Model : Seven Compact
Serial No. : B614308589
ID No. : N/A
Resolution : 0.1 °C
Location : Laboratory

Calibration Method : This instrument was calibrated by comparison of indication with Standard
Thermometer into calibration bath temperature controller according to calibration
procedure no. CWI-T-09

Environmental Condition

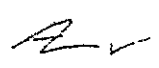
Temperature : Area Monitoring between 15°C to 40°C

Humidity : Area Monitoring between 30%RH to 85%RH

Traceability of Measurement

: This certificate of calibration documents the traceability to national standard,
which realize the unit of measurement according to the International system of
Units (SI) and The temperature scale in use at this laboratory is The International
Temperature scale of 1990.

Calibrated by : Mr. Kritsada Kaewwangpa
Calibration Engineer

Approved by : 
(Mr. Anuwat Yaktermjit)
Laboratory Manager

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Crystal Calibration Sales and Service Co., Ltd.

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CERTIFICATE OF CALIBRATION

Issue Date : 30 October 2021

Certificate No. : 21-1003-007

Work Order No. : 21/1003

Details of Calibration

1. Reference Standards Instrument

Instrument	Model	Serial No. / ID No.	Certification	Due Date
Thermometer Readout	1523	3490561	21-970-007	15-Oct-2022
Industrial Thermometer Standard (IPRT)	5627A	973798	21-970-007	15-Oct-2022

2. Certificate traceable : This certificate traceable to The International System of Unit (SI unit)

3. Condition of equipment : Used

4. Calibration site : On-Site

Result of Calibration

Calibration result : Without Adjustment

Calibration point (°C)	STD. Value (°C)	UUC Reading (°C)	Correction value (°C)	Uncertainty ± (°C)
20	19.9782	20.0	- 0.0218	0.10
25	24.9860	25.0	- 0.0140	0.10
30	29.9957	30.0	- 0.0043	0.10

Note : Calibrate items in good condition and this report customer request and accepted in certificate

Immersion Depth : 130 mm

ID No. : N/A

S/N No. : 30014096

UUC : Unit Under Calibration.

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

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2 (95% confidence)

coverage factor of approximately 95%

CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.



CERTIFICATE OF CALIBRATION

Issue Date : 30 October 2021

Certificate No. : 21-1463-018

Work Order No. : 21,1005

Customer Name : Water Index & Consultant Co., Ltd
229/7 8 Soi Charan Sanit Wong 95/1, Charan Sanit Wong Rd.,
Bang aor, Bangphlat, Bangkok 10700

Date of Received : 14 October 2021

Date of Calibration : 17 October 2021

Instrument Details	
Description	Digital Thermometer with TC type K
Manufacturer	CHY
Model	502
Serial No.	56000360
ID No.	N/A
Resolution	0.1 °C
Location	Laboratory

Calibration Method : This instrument was calibrated by comparison of indication with Standard Thermometer into calibration bath temperature controller according to calibration procedure no. CWI-T-09


Environmental Condition

Temperature : Area Monitoring between 15°C to 40°C
Humidity : Area Monitoring between 30%RH to 85%RH

Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the international system of units (SI) and the temperature scale in use at this laboratory is The International Temperature Scale of 1990

Calibrated by : Mr. Sitthisak Tonglin
Calibration Engineer

Approved by : 
(Mr. Anuvrat Yaklarmjit)
Laboratory Manager





CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammasep31, Salathammasep Rd.,

Salathammasep, Thawewatthana, Bangkok 10170 Thailand

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CERTIFICATE OF CALIBRATION

Certificate No. : 21-1003-008

Issue Date : 30 October 2021

Work Order No. : 21/1003

Details of Calibration

1. Reference Standards Instrument

Instrument	Model	Serial No. / ID No.	Certification	Due Date
Thermometer Readout	1586A	2827002	QR21-1944	7-Sep-2022
Platinum Resistance Thermometers (PRT)	5618B	967446	QR21-1944	7-Sep-2022

2. Certificate traceable : This certificate traceable to The International System of Unit (SI unit)

3. Condition of equipment : Used

4. Calibration site : On-Site

Result of Calibration

Calibration result : Without Adjustment

Sensor ID TC-K-01 Connected with channel T2

Calibration point (°C)	STD. Value (°C)	UUC Reading (°C)	Correction value (°C)	Uncertainty ± (°C)
0	0.003	0.1	- 0.097	0.60
3	3.007	3.1	- 0.093	0.60
20	20.012	20.1	- 0.088	0.60

Sensor ID TC-K-02 Connected with channel T2

Calibration point (°C)	STD. Value (°C)	UUC Reading (°C)	Correction value (°C)	Uncertainty ± (°C)
0	0.013	0.1	- 0.087	0.60
150	150.003	150.1	- 0.097	0.60

Sensor ID TC-K-01 Connected with channel T1

Calibration point (°C)	STD. Value (°C)	UUC Reading (°C)	Correction value (°C)	Uncertainty ± (°C)
0	-0.016	0.1	+ 0.116	0.60
380*	380.178	380.5	+ 0.322	0.75

Note : (*) not accreditation TISI

Calibrate items in good condition and this report customer request and accepted in certificate

Sheath Material : Stainless Steel

ID No. : N/A

S/N No. : N/A

Immersion Depth : 130 mm

Dimension of Sensor : AWG 30

Length : 2 metres (TC-K-02)

UUC : Unit Under Calibration

Dimension of Sensor : 3 mm

Length : 350mm (TC-K-01)

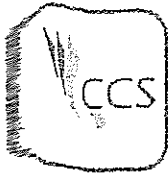
The quoted uncertainty include Inhomogeneity of thermocouple (UUC)

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

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$ in a $J = 95\%$ level of confidence of approximately 95%

-END-

Page 2 of 2



CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammassop 31, Salathammassop Rd.,

Salathammassop, Thawewatthana, Bangkok 10170 Thailand

Tel: 0-2408-8474 Fax: 0-2408-8477 Email: info@crystalcal.com www.crystalcal.com



CERTIFICATE OF CALIBRATION

Certificate No. : 21-1003-009

Issue Date : 30 October 2021

Work Order No. : 21/1003

Customer Name : Water Index & Consultant Co., Ltd.

229/7-8 Soi Charan Sanit Wong 95/1 Charan Sanit Wong Rd.,

Bang-Aor, Bangphlat, Bangkok 10700

Date of Received : 14 October 2021

Date of Calibration : 16 October 2021

Instrument Details : Description : Digital Thermo hygrometer

Manufacturer : Digicon

Model : TH-02A

Serial No. : 171880744392

ID No. : N/A

Location : Humidity and Temperature Laboratory

Calibration Method : This instrument was calibrated by comparison of indication with Standard Chilled Mirror Hygrometer and Standard Thermometer into Temperature and Humidity Chamber controller according to calibration procedure no. CWI-H-01

Environmental Condition

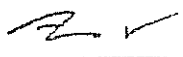
Temperature : Laboratory Control at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Humidity : Laboratory Control at $55\%\text{RH} \pm 20\%\text{RH}$

Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Miss Koollanut Mala
Calibration Engineer

Approved by : 
(Mr. Anuwat Yaklermjit)
Laboratory Manager

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CERTIFICATE OF CALIBRATION

Issue Date : 30 October 2021

Certificate No. : 21-1003-009

Work Order No. : 21/1003

Details of Calibration

1. Reference Standards Instrument

Instrument	Serial No.	ID No.	Certification	Due Date
1.1 Chilled Mirror Hygrometer	157151 / 157152	CHM-01	T11-0069-21	07 July 2022
1.2 Digital Thermometer with RTD	15000016 / RTD-11	DTM-03	21-970-005	22 October 2022

2. Certificate traceable

This certificate traceable to The International System of Unit refer to

No. 1.1 National Institute of Metrology (Thailand), NAC Calibration No. 0144

No. 1.2 Crystal Calibration Sales and Service Co., Ltd., NAC Calibration No. 0260

3. Condition of item

: Used

4. Calibration location

: Permanent

Result of Calibration

1. Temperature Measurement : Without Adjustment

Resolution of UUC : 0.1 °C

Calibration Point (°C)	Average Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
22	22.03	21.9	+ 0.13	0.30
25	25.03	24.9	+ 0.13	0.30
28	28.05	27.9	+ 0.15	0.30

2. Humidity Measurement : Without Adjustment

Resolution of UUC : 1 %RH

Calibration Point (%RH)	Calculated Standard Reading (%RH)	UUC Reading (%RH)	Correction (%RH)	Uncertainty ± (%RH)
50	50.20	52.0	- 1.80	1.2
60	60.35	62.0	- 1.65	1.4
70	70.39	71.0	- 0.61	1.8

Note : 1. Process calibration humidity measurement Reference temperature control at 25°C

2. Calculated STD humidity refer to dew-point temperature and convert to humidity by magnus's Equation

3. Calibrate items it good condition and this report customer request and accepted in certificate

21

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

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

-END-

Page 2/2



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CERTIFICATE OF CALIBRATION

Certificate No. : 21-1003-010

Work Order No. : 21/1003

Issue Date : 30 October 2021

Customer Name : Water Index & Consultant Co., Ltd.
229/7-8 Soi Charan Sanit Wong 95/1 Charan Sanit Wong Rd.,
Bang-Aor, Bangphlat, Bangkok 10700

Date of Received : 14 October 2021

Date of Calibration : 16 October 2021

Instrument Details : Description : Digital Thermo hygrometer
Manufacturer : Digicon
Model : TH-02A
Serial No. : 1718B0744383
ID No. : N/A
Location : Humidity and Temperature Laboratory

Calibration Method : This instrument was calibrated by comparison of indication with Standard Chilled Mirror Hygrometer and Standard Thermometer into Temperature and Humidity Chamber controller according to calibration procedure no. CWI-H-01

Environmental Condition

Temperature : Laboratory Control at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Humidity : Laboratory Control at $55\%\text{RH} \pm 20\%\text{RH}$

Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Miss Koollanut Mala
Calibration Engineer

Approved by :

(Mr. Anuwat Yaklermjit)

Laboratory Manager

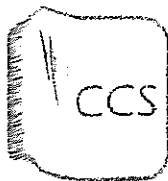
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CERTIFICATE OF CALIBRATION

Issue Date 30 October 2021

Certificate No. : 21-1003-010

Work Order No. : 21/1003

Details of Calibration

1. Reference Standards Instrument

Instrument	Serial No.	ID No.	Certification	Due Date
1.1 Chilled Mirror Hygrometer	157151 / 157152	CHM-01	114-0069-21	07 July 2022
1.2 Digital Thermometer with RTD	15000016 / RTD-11	DTM-03	21-970-005	22 October 2022

2. Certificate traceable

This certificate traceable to The International System of Unit refer to

No. 1.1 National Institute of Metrology (Thailand), NAC Calibration No. 0144

No. 1.2 Crystal Calibration Sales and Service Co., Ltd. , NAC Calibration No. 0260

3. Condition of Item

: Used

4. Calibration location

: Permanent

Result of Calibration

1. Temperature Measurement : Without Adjustment

Resolution of UUC : 0.1 °C

Calibration Point (°C)	Average Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
20	20.04	19.9	+ 0.14	0.30
25	25.06	24.8	+ 0.26	0.30
30	30.08	29.7	+ 0.38	0.30

2. Humidity Measurement : Without Adjustment

Resolution of UUC : 1 %RH

Calibration Point (%RH)	Calculated Standard Reading (%RH)	UUC Reading (%RH)	Correction (%RH)	Uncertainty ± (%RH)
40	40.27	40.0	+ 0.27	1.2
50	50.18	50.0	+ 0.18	1.2
60	60.44	60.0	+ 0.44	1.4

Note : 1. Process calibration humidity measurement Reference temperature control at 25°C

2. Calculated STD humidity refer to dew-point temperature and convert to humidity by magnus's Equation

3. Calibrate items it good condition and this report customer request and accepted in certificate

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

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

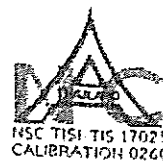


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CERTIFICATE OF CALIBRATION

Issue Date : 25 October 2021
Certificate No. : 21-1003-005
Work Order No. : 21/1003

Customer Name : Water Index & Consultant Co., Ltd.
229/7-8 Soi Charan Sanit Wong 95/1 Charan Sanit Wong Rd.,
Bang-Aor, Bangphlat, Bangkok 10700

Date of Received : 20 October 2021

Date of Calibration : 20 October 2021

Instrument Details : Description : Temperature Controlled Enclosures [Refrigerator]
Manufacturer : Accuplus
Model : i250
Serial No. : 1250402-0110-0303
ID No. : N/A
Resolution : 0.1 °C
Location : Service Room

Calibration Method : This instrument was calibrated by insert standard thermometer into the chamber according to calibration procedure no. CWI-T-10 follow up to TLAS G-20-1/02-08 (E) : Guidelines for Calibration and Checks of Temperature Controlled Enclosures.

Environmental Conditions :

Temperature : Area Monitoring between 15°C to 40°C
Humidity : Area Monitoring between 30%RH to 85%RH
Line Voltage : Area Monitoring 220 VAC \pm 10%

Traceability of Measurement :

This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Mr. Kritsada Kaewwangpa
Calibration Engineer

Approved by :
(Mr. Anuwat Yaklermjit)
Laboratory Manager

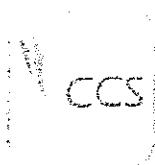
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ILAC-MRA



CERTIFICATE OF CALIBRATION

Issue Date

25 November 2021

Certificate No. : 21-1103-005

Work Order No. : 21-1103

Details of Calibration

1. Reference Standards Instrument

Instrument	Model	Serial No./Ins No.	Certificate No.	Due Date
Port A - quartz resonator	44902A	M449024826	20-1162-015	25 November 2021
Sensor type	HTD	610#101-109	20-1162-015	25 November 2021

2. Certificate traceable

: This certificate traceable to The International System of Unit refer to
Crystal Calibration Sales and Service Co., Ltd. : NAC Calibration No. 0260

3. Condition of item

: Used

4. Calibration site

: On - Site

5. Result of Calibration

: Without adjustment

6. Evaluate Condition

: Time Constant : Hour 36 Minute 41 cal. point 20 °C
Air vent : Off
Fan speed status : Fixed Fan Speed

7. Calibration note

: The results reported in this certificate refer to the condition of instrument on
the process into the steady state of chamber

8. Sensors Installation Diagram

: When : Sensor installation location in Chamber @ Working Space
A : Distance between sensor and wall of chamber is 10 cm

9. Dimensions of chamber

: W = 0.5 m : D = 0.5 m : H = 0.9 m

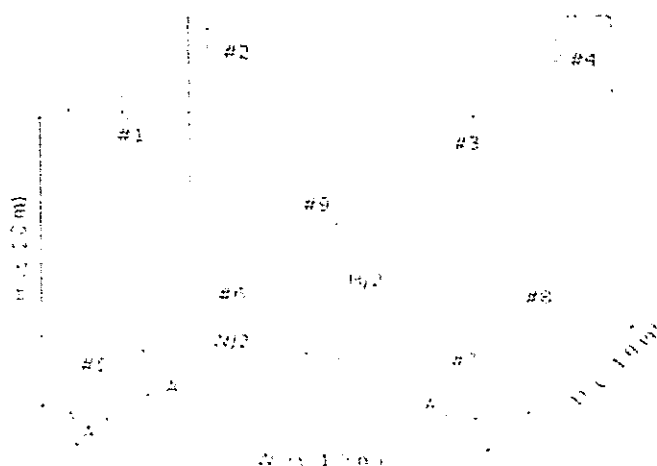


Diagram of Chamber

1315.



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CERTIFICATE OF CALIBRATION

Certificate No. : 21-1003-004

Issue Date : 25 October 2021

Work Order No. : 21/1003

Customer Name : Water Index & Consultant Co., Ltd.

229/7-8 Soi Charan Sanit Wong 95/1 Charan Sanit Wong Rd.,

Bang-Aor, Bangphlat, Bangkok 10700

Date of Received : 20 October 2021

Date of Calibration : 20 October 2021

Instrument Details : Description : Temperature Controlled Enclosures [Refrigerator]

Manufacturer : S-Cool

Model : SSM163T

Serial No. : 144201410

ID No. : N/A

Resolution : 0.1 °C

Location : Service Room

Calibration Method : This instrument was calibrated by insert standard thermometer into the chamber according to calibration procedure no. CWI-T-10 follow up to TLAS G-20-1/02-08 (E) : Guidelines for Calibration and Checks of Temperature Controlled Enclosures.

Environmental Conditions :

Temperature : Area Monitoring between 15°C to 40°C

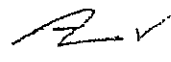
Humidity : Area Monitoring between 30%RH to 85%RH

Line Voltage : Area Monitoring 220 VAC \pm 10%

Traceability of Measurement :

This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Mr. Kritsada Kaewwangpa
Calibration Engineer

Approved by : 
(Mr. Anuwat Yaklermjit)
Laboratory Manager

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E-mail: info@crystalcal.com.tw Website: www.crystalcal.com.tw

ILAC-MRA



CERTIFICATE OF CALIBRATION

Issue Date

15 November 2021

Certificate No. : 21-1093-004

Work Order No. : 21-1093

Details of Calibration

1. Reference Standards Instrument

Instrument	Model	Serial No./Ins No.	Certificate No.	Due Date
Data Acquisition Unit	249724	MA49024526	20-1162-015	25 November 2021
Sensor type	RTD	RTD#201-209	20-1162-015	25 November 2021

2. Certificate traceable

: This certificate traceable to The International System of Unit refer to
Crystal Calibration Sales and Service Co., Ltd., NAC Calibration No. 0260

3. Condition of item

: Used

4. Calibration site

: On - Site

5. Result of Calibration

: Without adjustment

6. Evaluate Condition

: Time Constant : Hour 30 Minute At cal. point 4 °C
Air vent : On
Fan speed status : Fixed Fan Speed

7. Calibration note

: The results reported in this certificate refer to the condition of instrument on
the process into the steady state of chamber

8. Sensors Installation Diagram

: When : Sensor installation location in Chamber @ Working Space
A - Distance between sensor and wall of chamber is 10 cm

9. Dimensions of chamber

: W = 1.2 m , D = 0.4 m , H = 1.2 m

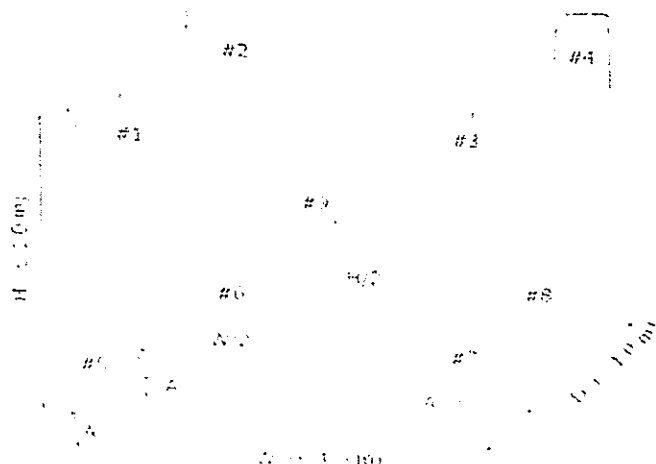


Diagram of Chamber

ACV



CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

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Salathammassop, Thawewattana, Bangkok 10170 Thailand

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CERTIFICATE OF CALIBRATION

Issue Date : 25 October 2021

Certificate No. : 21-1003-004

Work Order No. : 21/1003

Result of Temperature Distribution and Performance Check

Table1 : Reporting of Temperature Distribution

Calibration point (°C)	Average Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
3.0	3.92	3.87	4.10	3.66	4.26	4.18	2.97	2.90	2.81	0.41

Table 2 : Reporting of Performance check

Indicator Set Point (°C)	Indicator Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
	MAX	MIN	Average			
3.0	3.0	3.0	3.0	0.04	1.51	1.53

Note

Calibrate items in good condition and this report customer request and accepted in certificate

The reference sensor is preferably located at the geometric center of chamber

The measured temperature data readout by software "Benchlink Datalogger 3"

The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.

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 time

Indicating Temperature - the average reading of indicating device that forms the integral part of the enclosure.

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

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

CALIBRATION REPORT



Cert. Number
BIC-T-23-64

Page 1 of 3 pages

Issued By: B.T. METROLOGY CO., LTD.

Date of Issue: 30 October 2021

B.T. METROLOGY CO., LTD.
17/160 Soi Phraechon (KAPPA Village)
Pongsonghong, Luksit, Bangkok 10210

Approved Signatory

P. Prasittamate

Customer: Water Index & Consultant Co., Ltd.

Address: 224/7-8 Soi Charan Sanit Wong 98 J. Charan Sanit Wong Rd., Bang-sor, Bangphlat, Bangkok 10700

Date of Received: 14 October 2021

Instrument	Description	Cal. Ref. Temp.
1	10	10
10	Number	10
10	Manufacturer	10
10	Model Number	10
10	Serial Number	10

Calibration Procedure: The instrument was calibrated by comparing the temperature obtained from the reference standards at calibration point.

Measurement Method: The thermocouple shall be placed with in the chamber in accordance with the appendix A. The temperature change of the thermocouples could be found in the appendix A.

Cal. Inform.: The instrument is calibrated by the following method.

Location of Calibration: The instrument is calibrated by the following method.

Environmental Conditions:

Temperature is 22 ± 0.5 °C

Relative Humidity is 60 ± 10 % RH

Comments:

The temperature scale in use is the International Temperature Scale of 1990 (ITS-90).

The Uncertainty of the measurement is included uncertainty Multiplied by a coverage factor k=2.

The confidence level of confidence is approximately 95%.

All Tests pass standard tolerance.

Traceability Information:

Reference Standards Description	Serial Number	Certificate Number	Cal. Date	Due Date
10 STD Thermometer with Probe (PT)	10300802704 (6)	PSI-T-430-63	10 April 2020	10 April 2021

Equipment Description	Serial Number	Certificate Number	Cal. Date	Due Date
10 Standard Water Bridge Test (10)	10300802704 (6)	BIC-T-001-64	10 April 2021	10 April 2022
10	10	10	10	10

This report was prepared by the instrument manufacturer through the reference standard laboratory of the B.T. Metrology Co., Ltd. The used to perform this calibration is the reference standard laboratory of Metrology (Thailand), NMI through Reference Standard Laboratory of National Institute of Standards and Technology (NIST) Industrial Metrology and Testing Service Centre (Labware) was NIST Standard Reference Material (SRM) 10300802704 (6).

Calibrated By:

CMC (Bentley Songprach)

Date of Calibration: 14 October 2021

CALIBRATION REPORT

Issued by B.I. METROLOGY CO. LTD.

Date of Issue 23 October 2021

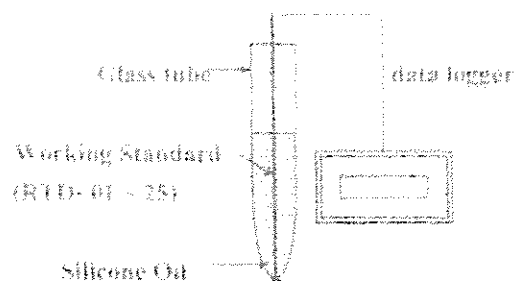
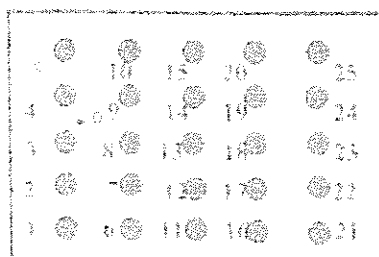
Cert. Number
BIC-T-23164

Page 2 of 2 pages

Appendix A.

Hot plate hole

Top view



Calibrated By:

Mr. Basim Singh

Mr. Basim Singh (095)

Date of Calibration : 14 October 2021

CALIBRATION REPORT

Issued By B.E. METROLOGY CONSULTING

Date of Issue: 13 October 2021

Cert. Number
BIC-1-23/64

Page 3 of 3 pages

Point No. Program	Max (°C)	Min (°C)	Mid-Range (°C)	Difference (°C)	Uncertainty of measurement (+°C)
1	10	10	47.60	0.00	
2	14.7	14.7	49.76	0.16	
3	19	19	52.00	0.10	
4	24.3	24.3	54.75	0.10	
5	29	29	57.16	0.10	
6	34.1	34	59.75	0.20	
7	39.4	39.4	62.70	0.20	
8	44.4	44.4	64.70	0.20	
9	49.1	49	66.45	0.20	
10	54.1	54.1	68.45	0.10	
11	59.1	59	70.15	0.10	
12	64.1	64	72.45	0.10	
13	69.2	69	74.45	0.10	
14	74	74	76.11	0.20	0.70
15	79.1	79.1	78.11	0.10	
16	84.1	84.1	80.11	0.10	
17	89.1	89.1	82.10	0.20	
18	94	94	84.1	0.20	
19	99	99	86.00	0.10	
20	104	104	88.00	0.20	
21	109	109	90.00	0.10	
22	114	114	92.00	0.10	
23	119	119	94.00	0.10	
24	124	124	96.00	0.10	
25	129	129	98.00	0.10	
26	134	134	100.00	0.10	
The plate					
bolt					

Calibrated By

13 October 2021

13 October 2021

Date of Calibration: 14 October 2021

CALIBRATION REPORT

Fixed By: R. T. METROLOGY LTD.
 Date of Issue: 23 October 2021

Cert. Number
 BIC-T-23-64
 Page 4 of 3 pages

Set		Average Measured Temperature °C	Measured Temperature		Measured Variation		
Setting (°C)	Reading (°C)		Max (°C)	Min (°C)	Stability (°C)	Uniformity (°C)	Overall (°C)
150.0	150.1-150.0	149.7	150.6	149.0	0.3	1.4	1.6

Note: Reference standards are not present in this subzone or at 740 value record after temperature stability is achieved or after the end of exposure to the plate at 1.4

end of certificate.

Calibrated By:

Mr. R. T. METROLOGY LTD.

Date of Calibration: 14 October 2021

ภาคผนวก

มาตรฐานควบคุมการระบายน้ำทิ้งจาก
อาคารบางประเภทและบางขนาด

รายงานผลการปฏิบัติตามเงื่อนไขของการมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม

มาตรฐานควบคุมการระบายน้ำทิ้งจากอาคาร
ค่ามาตรฐานควบคุมการระบายน้ำทิ้งจากอาคารบางประเภทและบางขนาด

พารามิเตอร์	หน่วย	เกณฑ์กำหนดสูงสุดตามประเภทมาตรฐานควบคุมการระบายน้ำทิ้ง					หมายเหตุ
		ก	ข	ค	ง	จ	
1. ค่าความเป็นกรดและด่าง (pH)		5-9	5-9	5-9	5-9	5-9	เป็นค่าที่เพิ่มจากปริมาณสารละลายในน้ำใช้ตามปกติ
2. บีโอดี (BOD)	มก./ล.(mg/l)	20	30	40	50	200	
3. ปริมาณของแข็ง (Solids)							
3.1 ค่าสารแขวนลอย	มก./ล.(mg/l)	30	40	50	50	60	
3.2 ค่าตะกอนหนัก (Settleable Solids)	มล./ล.(mg/l)	0.5	0.5	0.5	0.5	-	
3.3 ค่าสารที่ละลายได้ทั้งหมด (Total Dissolved Solids)	มก./ล.(mg/l)	500	500	500	500	-	
4. ค่าซัลไฟด์ (Sulfide)	มก./ล.(mg/l)	1.0	1.0	3.0	4.0	-	
5. ไนโตรเจน (Nitrogen)	มก./ล.(mg/l)	35	35	40	40	-	
6. น้ำมัน และ ไขมัน (Fat Oil and Grease)	มก./ล.(mg/l)	20	20	20	20	100	

แหล่งที่มาของข้อมูล : ประกาศกระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากอาคารบางประเภทและบางขนาด ลงวันที่ 7 พฤศจิกายน 2548 ประกาศในราชกิจจานุเบกษา เล่มที่ 122 ตอนที่ 125 ลงวันที่ 29 ธันวาคม 2548

ประเภทของอาคารเป็นแหล่งกำเนิดมลพิษที่จะต้องถูกควบคุมการปล่อยน้ำเสียลงสู่แหล่งน้ำสาธารณะ
หรือ ออกสู่สิ่งแวดล้อม

ประเภทอาคาร	ขนาดของอาคารที่กำหนดมาตรฐานการระบายน้ำทิ้ง				
	ก	ข	ค	ง	จ
1. อาคารชุดตามกฎหมายว่าด้วยอาคารชุด	≥ 500 ห้องนอน	100/> 500 ห้องนอน	≠ 100 ห้องนอน	-	-
2. โรงแรมตามกฎหมายว่าด้วยโรงแรม	≥ 200 ห้องนอน	60/> 200 ห้องนอน	> 60 ห้อง	-	-
3. หอพักตามกฎหมายว่าด้วยหอพัก	-	/≥250 ห้อง	50/>250ห้อง	10/> 50 ห้องนอน	-
4. สถานบริการอาบอบนวด	-	/> 5,000 ตร.ม.	1,000->5,000 ตร.ม.	-	-
5. สถานพยาบาล	≥ 30เตียง	10/>30 เตียง	-	-	-
6. อาคารโรงเรียนราษฎร์ หรือ สถาบันอุดมศึกษา	≥ 25,000ตร.ม.	5,000-> 25,000 ตร.ม.	-	-	-
7. อาคารที่ทำการ	≥55,000 ตร.ม.	10,000->55,000ตร.ม.	5,000->10,000ตร.ม.	-	-
8. ศูนย์การค้า ห้างสรรพสินค้า	≥25,000 ตร.ม.	5,000->25,000 ตร.ม.	-	-	-
9. ตลาด	≥ 2,500ตร.ม.	1,500->2,500 ตร.ม.	1,000->1,500ตร.ม.	500->1,000 ตร.ม.	-
10. ภัตตาคารและร้านค้า	≥ 2,500ตร.ม.	500-> 2,500ตร.ม.	250->50 ตร.ม.	100->250ตร.ม.	≥ 100 ตร.ม.