

## เอกสารแนบ 6

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์



# CALIBRATION LABORATORY CO., LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com Email: sale@cal-laboratory.com



NSC-TIS-TIS 17025  
CALIBRATION 0659  
CLC  
Accredited  
ISO/IEC 17025

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : BURETTE  
MANUFACTURER : ISO LAB  
MODEL / TYPE : 25 ml  
SERIAL NO. : N/AIEM-MBR10002/17  
DATE OF CALIBRATION : 27 April 2023

#### 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 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty 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:2022)"

Certificate No. Q23044052

F3-011-04/01-12



# CALIBRATION LABORATORY CO., LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
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NSC-TIS-TIS 17025  
CALIBRATION 0659  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : BURETTE  
MANUFACTURER : ISO LAB  
MODEL / TYPE : 25 ml  
SERIAL NO. : N/AIEM-MBR10002/17  
CLID. NO. : 272201671  
JOB CONTROL NO. : 230425044052

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
6735-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 25 April 2023 DATE OF ISSUED : 02 May 2023

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

Calibrated By :

Sukgascm Sechanart  
Calibration Engineer

Approved By :

Mongkol Yotsomphon  
Authorized Signatory  
02 May 2023

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. Q23044052

F3-011-04/01-12





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**CALIBRATION LABORATORY Co., LTD.**  
NSC-TISI-TIS 17025  
CALIBRATION 0059  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : CYLINDER  
MANUFACTURER : FAVORIT  
MODEL / TYPE : 50 ml  
SERIAL NO. : N/A [EM-VPP02501/21]  
CLID. NO. : 272300782  
JOB CONTROL NO. : 230328034770

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 04 April 2023

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

Calibrated By :

Sukgasem Sechanart  
Calibration Engineer

Approved By :

Authorized Signatory

04 April 2023

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. Q23034770

F3-011-04/01-12

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**CALIBRATION LABORATORY Co., LTD.**  
NSC-TISI-TIS 17025  
CALIBRATION 0059  
CLC

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
5	5.0003	+0.0003	0.0038	2.00
15	15.0044	+0.0044	0.0066	2.00
25	25.0092	+0.0092	0.0068	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 94 of 138

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

### End of Certificate ###

Certificate No. Q23044052

F3-011-04/01-12

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**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 <i>k</i>
50	50.1999	+0.1999	0.0180	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 94 of 138

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

### End of Certificate ###

Certificate No. Q23034770

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**REPORT OF CALIBRATION  
FOR**

**NOMENCLATURE** : CYLINDER  
**MANUFACTURER** : FAVORIT  
**MODEL / TYPE** : 50 ml  
**SERIAL NO.** : N/A [EM-VPP02501/21]  
**DATE OF CALIBRATION** : 31 March 2023

**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 according to ASTM E542-01:2021 as calibration guidelines.

The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

**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:2022)"

Certificate No. Q23034770

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## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : CYLINDER  
MANUFACTURER : BOROSIL  
MODEL / TYPE : 500 ml  
SERIAL NO. : 0334-58  
DATE OF CALIBRATION : 31 March 2023

#### 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. W1-305-84 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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 Secura6102-1s S/N.0042104938.
3. Thermo-hygrometer, Izuu 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22121337, Due Date 01 December 2023.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### 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:2022)"

Certificate No. Q23034769

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## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : CYLINDER  
MANUFACTURER : BOROSIL  
MODEL / TYPE : 500 ml  
SERIAL NO. : 0334-58  
CLID. NO. : 272201292  
JOB CONTROL NO. : 230328034769

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHIEKASEM 7/1 RD., WATTAPRA,  
BANGKOKKAYI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 04 April 2023

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

Calibrated By : Sukgasem Sechanart  
Calibration Engineer



Approved By : Mongkol Yotsoontorn  
Authorized Signatory  
04 April 2023



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. Q23034769

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NSC-TISI-TIS 17025  
CALIBRATION 0059  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : MEASURING PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 1 ml  
SERIAL NO. : N/A|EM-MER01001/19|  
CLID. NO. : 272201297  
JOB CONTROL NO. : 230328034780

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023 DATE OF ISSUED : 03 April 2023

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

Calibrated By : Sukgaseem Ssehanart  
Calibration Engineer



Approved By :

Authorized Signatory  
03 April 2023

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. Q23034780  
F3-011-04/01-12

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NSC-TISI-TIS 17025  
CALIBRATION 0059  
CLC

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 $k$
500	498.75	-1.25	0.10	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note: The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 94 of 138

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

### End of Certificate ###

Certificate No. Q23034769  
F3-011-04/01-12

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@clccalibration

## 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 $k$
*0.1	0.1015	+0.0015	0.0024	2.00
*0.5	0.5012	+0.0012	0.0025	2.00
1	1.0003	+0.0003	0.0025	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. \* means Calibrations marked " Not TISI Accredited " in this Certificate have been included for completeness.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 96 of 138

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

### End of Certificate ###

Certificate No. Q23034780

F3-011-04/01-12

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@clcalibration

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : MEASURING PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 1 ml  
SERIAL NO. : N/A|EM-MER01001/19|  
DATE OF CALIBRATION : 29 March 2023

#### 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. W1-305-89 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, Isuzu Model 3-3126 S/N.30760420.
4. Thermometer, Braun S/N. 1.

#### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor which 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:2022)"

Certificate No. Q23034780

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NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : MEASURING PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 5 ml  
SERIAL NO. : N/A|EM-MER01001/18|  
DATE OF CALIBRATION : 29 March 2023

#### 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 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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 SN.23908487.
3. Thermo-hygrometer, Isuzu Model 3-3126 SN.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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### 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:2022)"

Certificate No. Q23034779

F3-011-04/01-12

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NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : MEASURING PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 5 ml  
SERIAL NO. : N/A|EM-MER01001/18|  
CLID. NO. : 272201296  
JOB CONTROL NO. : 230328034779

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PIETKASEM 7/1 RD., WATTAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 03 April 2023

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

Calibrated By :

Sukgaseem Sechanart

Calibration Engineer

Approved By :

Authorized Signatory

03 April 2023

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. Q23034779

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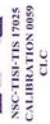
@calibration





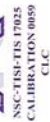
CALIBRATION LABORATORY CO., LTD.

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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : MEASURING PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 10 ml  
SERIAL NO. : N/A[EM-MER01001/17]  
CLID. NO. : 272000237  
JOB CONTROL NO. : 230328034778

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTIAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023 DATE OF ISSUED : 03 April 2023

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

Calibrated By :

Sukgasm Sechanart

Calibration Engineer

Approved By :

Authorized Signatory

03 April 2023

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. Q23034778

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@clccalibration

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
*0.5	0.5034	+0.0034	0.0025	2.00
2.5	2.4871	-0.0129	0.0029	2.00
5	4.9818	-0.0182	0.0029	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. \* means Calibrations marked " Not TISI Accredited " in this Certificate have been included for completeness.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 96 of 138

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

### End of Certificate ###

Certificate No. Q23034779

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@clccalibration

## 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 <i>k</i>
1	1.0058	+0.0058	0.0025	2.00
5	4.9937	-0.0063	0.0029	2.00
10	9.9802	-0.0198	0.0039	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 96 of 138

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

### End of Certificate ###

Certificate No. Q23034778

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## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : MEASURING PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 10 ml  
SERIAL NO. : N/AIEM-MER01001/17  
DATE OF CALIBRATION : 29 March 2023

#### 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. W1-305-S9 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, Isetzu Model 3-3126 S/N.30760420.
4. Thermometer, Braunian S/N. 1.

#### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty 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:2022)"

Certificate No. Q23034778

F3-011-04/01-12

page 2 of 3



@clccalibration



## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC FLASK  
MANUFACTURER : SCI  
MODEL / TYPE : 100 ml  
SERIAL NO. : N/AJEM-VPP02501/17  
DATE OF CALIBRATION : 03 April 2023

#### 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-305-88 according to ASTM E542-01:2021 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### 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:2022)"

Certificate No. Q23034773

F3-011-04/01-12

page 2 of 3



getcalibration

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC FLASK  
MANUFACTURER : SCI  
MODEL / TYPE : 100 ml  
SERIAL NO. : N/AJEM-VPP02501/17  
CLID. NO. : 272101212  
JOB CONTROL NO. : 230328034773

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

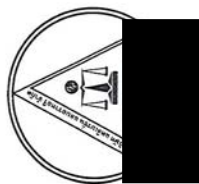
DATE OF ISSUED : 05 April 2023

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

Calibrated By :

Sukgasem Sechanart

Calibration Engineer



Approved By :

Authorized Signatory

05 April 2023

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. Q23034773

F3-011-04/01-12

page 1 of 3



getcalibration





CALIBRATION LABORATORY CO., LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC FLASK  
MANUFACTURER : BOROSIL  
MODEL / TYPE : 500 ml  
SERIAL NO. : N/AJEM-VPP02501/18  
CLID. NO. : 272201295  
JOB CONTROL NO. : 230328034772

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 06 April 2023

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

Calibrated By :

Sukgasem Sechanart

Calibration Engineer

Approved By :

Authorized Signatory

06 April 2023

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. Q23034772

F3-011-04/01-12

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@ctcalibration



CALIBRATION LABORATORY CO., LTD.

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NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

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	99.9589	-0.0411	0.0190	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 95 of 138

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

### End of Certificate ###

Certificate No. Q23034773

F3-011-04/01-12

page 3 of 3



@ctcalibration

## 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 $k$
500	500.04	+0.04	0.09	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-1-B0092 Issue 01 Page 95 of 138

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

### End of Certificate ###

Certificate No. Q23034772

F3-011-04/01-12

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@cccalibration

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC FLASK  
MANUFACTURER : BOROSIL  
MODEL / TYPE : 500 ml  
SERIAL NO. : N/AIEM-VP02501/18  
DATE OF CALIBRATION : 03 April 2023

#### 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-305-88 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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 Secura6102-1s S/N.0042104938.
3. Thermo-hygrometer, Iisuzu 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22121337, Due Date 01 December 2023.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty 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:2022)"

Certificate No. Q23034772

F3-011-04/01-12

page 2 of 3



@cccalibration





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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



ISO/IEC 17025



NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC FLASK  
MANUFACTURER : BOROSIL  
MODEL / TYPE : 1000 ml  
SERIAL NO. : N/A [EM-VPP02501/20]  
DATE OF CALIBRATION : 03 April 2023

#### 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-305-88 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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 Secura6102-1s S/N.0042104938.
3. Thermo-hygrometer, 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22121337, Due Date 01 December 2023.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### 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:2022)"

Certificate No. Q23034771

F3-011-04/01-12

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ISO/IEC 17025

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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC FLASK  
MANUFACTURER : BOROSIL  
MODEL / TYPE : 1000 ml  
SERIAL NO. : N/A [EM-VPP02501/20]  
CLID. NO. : 272300783  
JOB CONTROL NO. : 230328034771

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 06 April 2023

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

Calibrated By :

Sukgasem Sechanart

Calibration Engineer



Approved By :

Authorized Signatory

06 April 2023

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. Q23034771

F3-011-04/01-12

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@clcalibration





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Accredited  
ISO/IEC 17025

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 10 ml  
SERIAL NO. : N/A|EM-Mbro1001/17|  
CLID. NO. : 272101209  
JOB CONTROL NO. : 230328034776

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PIETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 03 April 2023

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

Calibrated By :

Sukgascm Sechanart  
Calibration Engineer



Approved By :

Authorized Signatory

03 April 2023

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. Q23034776

F3-011-04/01-12

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CLC  
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ISO/IEC 17025

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	1000.05	+0.05	0.14	2.00

Type of glassware : ☒ to Contain ☐ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 95 of 138

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

### End of Certificate ###

Certificate No. Q23034771

F3-011-04/01-12

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@cccalibration

## 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 <i>k</i>
10	9.9970	-0.0030	0.0043	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 96 of 138

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

### End of Certificate ###

Certificate No. Q23034776

F3-011-04/01-12

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@clcalibration

## REPORT OF CALIBRATION FOR

NOMENCLATURE : VOLUMETRIC PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 10 ml  
SERIAL NO. : N/A|EM-Mbro1001/171  
DATE OF CALIBRATION : 29 March 2023

#### ENVIRONMENT CONDITIONS :

Temperature :  $(20 \pm 2.5)$  °C Relative Humidity :  $(50 \pm 10)$  % RH

#### PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-89 according to ASTM E542-01:2021 as calibration guidelines.  
The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty 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:2022)"

Certificate No. Q23034776

F3-011-04/01-12

page 2 of 3



@clcalibration





CALIBRATION LABORATORY CO., LTD.

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NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## REPORT OF CALIBRATION FOR

NOMENCLATURE : VOLUMETRIC PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 20 ml  
SERIAL NO. : N/A|EM-VPP20201/17|  
DATE OF CALIBRATION : 29 March 2023

### 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 according to ASTM E542-01:2021 as calibration guidelines.

The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, Izuu 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. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

### 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:2022)"

Certificate No. Q23034775

F3-011-04/01-12

page 2 of 3



@clcalibration



CALIBRATION LABORATORY CO., LTD.

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NSC-TIS-TIS 17025  
CALIBRATION 0059  
CLC

## CERTIFICATE OF CALIBRATION FOR

NOMENCLATURE : VOLUMETRIC PIPETTE  
MANUFACTURER : GLASSCO  
MODEL / TYPE : 20 ml  
SERIAL NO. : N/A|EM-VPP20201/17|  
CLID. NO. : 272101208  
JOB CONTROL NO. : 230328034775

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTIAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 03 April 2023

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

Calibrated By :

Sulgasem Seehanart  
Calibration Engineer



Approved By :

Authorized Signatory  
03 April 2023



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. Q23034775

F3-011-04/01-12

page 1 of 3



@clcalibration





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NSC-TISI-TIS 17025  
CALIBRATION 0859  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VOLUMETRIC PIPETTE  
MANUFACTURER : HBG  
MODEL / TYPE : 25 ml  
SERIAL NO. : N/AIEM-VPP02501/17  
CLID. NO. : 272000238  
JOB CONTROL NO. : 230328034774

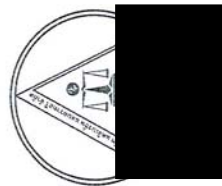
CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 28 March 2023

DATE OF ISSUED : 03 April 2023

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

Calibrated By : Sukgasm Sechanart  
Calibration Engineer



Approved By :

Authorized Signatory  
03 April 2023

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. Q23034774  
F3-011-04/01-12

page 1 of 3



@clccalibration



# CALIBRATION LABORATORY CO., LTD.

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NSC-TISI-TIS 17025  
CALIBRATION 0859  
CLC

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	20.0020	+0.0020	0.0072	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 96 of 138

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

### End of Certificate ###

Certificate No. Q23034775  
F3-011-04/01-12

page 3 of 3



@clccalibration



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 <i>k</i>
25	24.9589	-0.0411	0.0076	2.00

Type of glassware : ☐ to Contain ☒ to Deliver

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 96 of 138

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

### End of Certificate ###

Certificate No. Q23034774  
F3-011-04/01-12

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@clcalibration



REPORT OF CALIBRATION  
FOR

NOMENCLATURE : VOLUMETRIC PIPETTE  
MANUFACTURER : HBG  
MODEL / TYPE : 25 ml  
SERIAL NO. : N/A[EM-VPP02501/17]  
DATE OF CALIBRATION : 29 March 2023

ENVIRONMENT CONDITIONS :

Temperature :  $(20 \pm 2.5)$  °C

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

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-89 according to ASTM E542-01:2021 as calibration guidelines.

The calibration was performed by using Electronic Balance, Thermo-hygrometer, 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-hygrometer, Isuzu Model 3-3126 S/N.30760420.
4. Thermometer, Brauman S/N. 1.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23006081, Due Date 19 January 2024.
2. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23019117, Due Date 22 February 2024.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130804, Due Date 04 January 2024.
4. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23010604, Due Date 02 February 2024.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty 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:2022)"

Certificate No. Q23034774  
F3-011-04/01-12

page 2 of 3



@clcalibration





# CALIBRATION LABORATORY CO., LTD.

210-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com Email: sale@cal-laboratory.com



CLC  
Accredited  
ISO/IEC 17025

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : DO METER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5421/Hi76483  
SERIAL NO. : 04240005101/KC1A11T8H  
DATE OF CALIBRATION : 26 April 2023

#### ENVIRONMENT CONDITIONS :

Temperature :  $(25 \pm 2.5) ^\circ\text{C}$  Relative Humidity :  $(50 \pm 15) \% \text{RH}$

#### PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPCH-06. The calibration was performed by direct measurement with Certified Reference Material (CRM).

#### REFERENCE STANDARD USED :

Dissolved Oxygen, Sigma-Aldrich Product ID QC3077-500ML.

#### TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Merck Co., Ltd.  
Lot LRAD0713.01, Due Date September 2023.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2.00$  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:2022)"

Certificate No. Q23044469

F3-011-04/01-12

page 2 of 3



@ck-calibration



# CALIBRATION LABORATORY CO., LTD.

210-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com Email: sale@cal-laboratory.com



CLC  
Accredited  
ISO/IEC 17025

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : DO METER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5421/Hi76483  
SERIAL NO. : 04240005101/KC1A11T8H  
CLID. NO. : 272101220  
JOB CONTROL NO. : 230425044469

#### CUSTOMER :

OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 25 April 2023

DATE OF ISSUED : 28 April 2023

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

#### Calibrated By :

Sukgasem Sechanart

Calibration Engineer

#### Approved By :

Authorized Signatory

28 April 2023

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. Q23044469

F3-011-04/01-12

page 1 of 3



@ck-calibration



**CALIBRATION LABORATORY Co., LTD.**  
2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com Email: sale@cal-laboratory.com



## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : pH METER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5521/HI1131  
SERIAL NO. : 04160019101/061334CN  
CLID. NO. : 272101219  
JOB CONTROL NO. : 230425044468

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/I RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 25 April 2023 DATE OF ISSUED : 28 April 2023

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

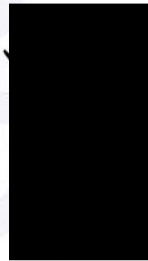
Calibrated By :

Sukgasem Sechanart  
Calibration Engineer



Approved By :

Authorized Signatory  
28 April 2023



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. Q23044468  
F3-011-04/01-12

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@clcalibration



**CALIBRATION LABORATORY Co., LTD.**  
2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com Email: sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : GOOD  
MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment

The table in the following gives the calibration results and associated measurement uncertainties of Do Meter.

### CALIBRATION DATA

Nominal Value (mg/L)	DUC Reading (mg/L)	Correction (mg/L)	Uncertainty (mg/L)
5.91	5.92	-0.01	± 0.22

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 4 of 54

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

### End of Certificate ###

Certificate No. Q23044469  
F3-011-04/01-12

page 3 of 3



@clcalibration



**CONDITION OF CALIBRATION ITEM : GOOD**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

The table in the following gives the calibration results and associated measurement uncertainties of pH meter.

**CALIBRATION DATA**

**pH METER RESULT @ 25 °C**

Standard pH Buffer Solution (pH)	pH Meter Reading (pH)	pH Meter Reading (mV)	Correction (pH)	Uncertainty of pH Measurement ( $\pm$ pH)	k Factor
4.000	3.98	132.0	+0.020	0.014	2.20
6.996	7.00	-41.1	-0.004	0.015	2.06
10.007	10.01	192.5	-0.003	0.100	2.05

Technical Note. Setting function CAL 3 point ( 4,7,10 ).

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 91 of 138

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

Certificate No. Q23044468  
F3-011-04/01-12

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@cclcalibration

**REPORT OF CALIBRATION**

**FOR**

NOMENCLATURE : pH METER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5521/HI1131  
SERIAL NO. : 04160019101/061334CN  
DATE OF CALIBRATION : 26 April 2023.

**ENVIRONMENT CONDITIONS :**

Temperature :  $(25 \pm 2.5) ^\circ\text{C}$  Relative Humidity :  $(50 \pm 15) \% \text{ RH}$

**PROCEDURE USED :**

This instrument was calibrated under procedure No. WI-305-128. The calibration was performed by direct measurement with Certified Reference Material (CRM).

**REFERENCE STANDARD USED :**

1. pH Standard Solution, NIMT TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
2. pH Standard Solution, Control Company Catalog Number 06-664-260, 11754256, Lot Number CC728484.

**TRACEABILITY :**

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Lot Number. 160221, 180121. Due Date 05 May 2023.
2. The measurements are traceable to International System of Units (SI), through Control Company. Certificate No. 4281-12405788, Due Date 30 June 2023.

**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:2022)"

Certificate No. Q23044468  
F3-011-04/01-12

page 2 of 3



@cclcalibration



## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : DIGITAL THERMOMETER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5521/Hi7662-W  
SERIAL NO. : 04160019101/0615024N  
DATE OF CALIBRATION : 27 April 2023

#### ENVIRONMENT CONDITIONS :

Temperature :  $(23 \pm 2) ^\circ\text{C}$  Relative Humidity :  $(55 \pm 10) \% \text{ RH}$

#### PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-187 based on ASTM E 644-11-2019 as calibration guidelines.

The calibration was performed by using Calibration Bath, Precision Thermometer and IPRT

which maintained by the Calibration Laboratory Co., Ltd.

#### REFERENCE STANDARD USED :

1. Calibration Bath, Kambic Model OB-22/2 ULT S/N. 17115653.
2. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
3. IPRT, ASL Model T100-250-1D S/N. L0193A-1-1.

#### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130792, Due Date 05 January 2024.
2. The measurements are traceable to International System of Units (SI), through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0010/66, Due Date 06 November 2023.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. TT-0166-22, Due Date 01 December 2023.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , 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:2022)"

Certificate No. Q23044467

F3-011-04/01-12



## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : DIGITAL THERMOMETER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5521/Hi7662-W  
SERIAL NO. : 04160019101/0615024N  
CLID. NO. : 232202088  
JOB CONTROL NO. : 230425044467

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.

67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTHAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 25 April 2023

DATE OF ISSUED : 02 May 2023

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

Calibrated By :

Monthira Treechum

Calibration Engineer

Approved By :

Authorized Signatory

02 May 2023

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. Q23044467

F3-011-04/01-12







# CALIBRATION LABORATORY CO., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd, Ladphrao, Bangkok 10230  
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com Email: sale@cal-laboratory.com



MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD  
214 Bangwaek Rd. Bangnai Bangkok 10160  
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th



## CALIBRATION CERTIFICATE

Certificate No. : SS2206-022-0001  
Date Issued : 10-Jun-22

**Customer** : OKLA TESTING & CONSULTING SERVICE CO.,LTD  
63/13 Soi Petchkasem 7, Petchkasem Rd., Thapra, Bangkok Yai, Bangkok 10600

**Equipment** : Electronic Balance

**Manufacturer** : Sartorius  
**Model** : BSA224S-CW  
**Serial No.** : 35790699  
**ID No./Tag No.** : -  
**Date Received** : 03-Jun-22  
**Date Calibrated** : 03-Jun-22

**Calibrated by** : Mr. Nirot Parnkamnoed

Calibration Method or Calibration Procedure Used

In-house method : CP-06 base on UKAS LAB 14 Edition 6 October 2019.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

### Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by  
( Mr. Nathapong Krudaum )



Page 1 of 2

CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment

The DUC Reading were recorded and the means value were reported of five times measurement in the table below.

### CALIBRATION DATA

#### CORRECTION OF TEMPERATURE [ THERMISTOR ]

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
105	24.00	24.1	-0.10	0.07
	25.01	25.1	-0.09	
	27.00	27.1	-0.10	

Note: Probe  $\varnothing$  3.5 mm

Materials : Metal Sheath.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 35 of 138

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

### End of Certificate ###

Certificate No. Q23044467  
F3-011-04/01-12

page 3 of 3





## CALIBRATION CERTIFICATE

Certificate No. : SS2206-022-0006  
 Date Issued : 10-Jun-22

**Customer** : OKLA TESTING & CONSULTING SERVICE CO.,LTD  
 63/13 Soi.Petchkasem 7, Petchkasem Rd., Thapra, Bangkok Yai,  
 Bangkok 10600

**Equipment** : Freezer  
**Manufacturer** : S-Cool  
**Model** : SM61M 9.5 Q  
**Serial No.** : OKLA-LAB-011/190118  
**ID No./Tag No.** : -  
**Date Received** : 03-Jun-22  
**Date Calibrated** : 03-Jun-22  
**Calibrated by** : Mr. Nirot Parnkamnoed

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

### Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.



Approved by: [Signature]  
 (Signature)

Certificate No. : SS2206-022-0001

**Environment** : Ambient Temperature : Start record 25.5 °C , Stop record 25.6 °C  
 Relative Humidity : Start record 54.5 %RH , Stop record 54.6 %RH  
 Atmospheric Pressure : Start record 1001.2 mbar , Stop record 1001.3 mbar

**Max. Capacity** : 220 g Resolution : 0.0001 g

**Departure from nominal value**

Nominal Value	Correction Value (g)	Before Adjusted	After Adjusted	Uncertainty
(g)				± (g)
0 *	0.0000	-	-	0.000082
20	- 0.0001	-	-	0.00025
40	- 0.0001	-	-	0.00026
60	- 0.0001	-	-	0.00028
80	- 0.0002	-	-	0.00028
100	- 0.0001	-	-	0.00028
120	- 0.0002	-	-	0.00046
140	- 0.0002	-	-	0.00046
160	- 0.0002	-	-	0.00046
180	- 0.0003	-	-	0.00046
220	- 0.0002	-	-	0.00059

Marked \* are not included in the NSC-ONSC accreditation schedule for our laboratory.

### Repeatability of reading

Load (g)

: 220

### Off-centre loading

Load (g) : 100

Standard deviation (g)

: 0.00000

Position A (g) : 100.0000

Maximum difference (g)

: 0.0000

Position B (g) : 100.0000

between successive reading

: 100.0000

Position C (g) : 100.0000

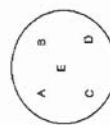
Position D (g) : 100.0000

Position E (g) : 100.0000

Maximum (g) : 0.0000

difference

Front View



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

**Measurement Standards Used & Traceability :**

The International System of Units (SI) through

SPC Certificate No. C02220774 for Weight Set E2 600g Serial No. MIT-STD-280, Due 08-Apr-23

End of Certificate





## CALIBRATION CERTIFICATE

Certificate No. : SS2206-022-0004  
 Date Issued : 10-Jun-22

**Customer** : OKLA TESTING & CONSULTING SERVICE CO.,LTD  
 63/13 Soi.Petchkasem 7, Petchkasem Rd., Thapra, Bangkok Yai,  
 Bangkok 10600

**Equipment** : Hot Air Oven

**Manufacturer** : KWF

**Model** : SOV70B

**Serial No.** : KWF2021021902

**ID No./Tag No.** : -

**Date Received** : 03-Jun-22

**Date Calibrated** : 03-Jun-22

**Calibrated by** : Mr. Nirot Parnkamnoed

**Calibration Method or Calibration Procedure Used**

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

### Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by

Page 1 of 2



Certificate No. : SS2206-022-0006

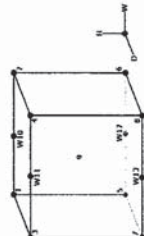
Environment : Ambient Temperature : Start record 25.5 °C, Stop record 25.6 °C

Relative Humidity : Start record 54.6 %RH, Stop record 54.7 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability <sup>1</sup> (°C)	Measured Uniformity <sup>2</sup> (°C)	Overall Variation <sup>3</sup> (°C)
2	2.0	2.2	0.12	1.38	2.37
4	4.0	4.0	0.14	0.90	1.82
6	6.0	6.0	0.05	1.08	1.74

Without adjustment

Calibration Temperature (°C)	Standard Reading (°C), Probe No. 9 is Reference Probe									Uncertainty <sup>4</sup> ±°C
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	
2	2.58	0.88	2.44	1.14	1.67	1.61	2.19	1.20	1.70	0.38
	No. W10 No. W11 No. W12 No. W13									
	2.31	0.39	1.88	0.85						
4	4.36	2.72	4.19	2.98	3.42	3.29	3.94	2.97	3.50	0.31
	No. W10 No. W11 No. W12 No. W13									
	4.06	4.26	3.60	2.68						
6	6.11	4.69	6.08	4.91	5.23	5.07	5.78	4.88	5.24	0.30
	No. W10 No. W11 No. W12 No. W13									
	5.79	6.28	5.46	4.62						



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

### Measurement Standards Used & Traceability :

The International System of Units (SI) through  
 MIT Certificate No. AD2202-080-0001 for Digital Thermometer with Probe (Agilent) Module 1 (245) Serial No. US37005130, Due 04-Aug-22

- Notes :
1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
  2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
  3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
  4. The uncertainty of measurement is included temperature stability.
  5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate



## CALIBRATION CERTIFICATE

Certificate No.: SS2206-022-0008  
Date Issued: 10-Jun-22

**Customer**  
: OKLA TESTING & CONSULTING SERVICE CO.,LTD  
63/13 Soi.Petchkasem 7, Petchkasem Rd., Thapra, Bangkok Yai,  
Bangkok 10600

**Equipment**  
: Incubator

**Manufacturer**  
: S-Cool

**Model**  
: SM 61 M

**Serial No.**  
: 18021147

**ID No./Tag No.**  
: -

**Date Received**  
: 03-Jun-22

**Date Calibrated**  
: 03-Jun-22

**Calibrated by**  
: Mr. Nirot Parnkamnoed

**Calibration Method or Calibration Procedure Used**

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

### Result of Calibration

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

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Approved

Page 1 of 2



(Signature)

Certificate No.: SS2206-022-0004  
**Environment:**  
Ambient Temperature: Start record 25.5 °C, Stop record 25.7 °C  
Relative Humidity: Start record 54.6 %RH, Stop record 54.7 %RH

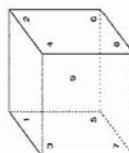
Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability <sup>1</sup> (°C)	Measured Uniformity <sup>2</sup> (°C)	Overall Variation <sup>3</sup> (°C)
104	104.0	104.0	0.21	0.62	0.82
140	140.0	140.0	0.23	0.82	0.94
160	160.0	160.0	0.21	1.39	1.68
180	180.0	180.0	0.34	1.30	1.81

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty <sup>4</sup> ±°C
104	104.56	104.42	104.30	104.43	104.54	104.68	104.34	104.68	104.81	0.95
140	140.25	140.43	140.58	140.51	140.55	140.65	140.32	140.68	140.04	1.0
160	160.16	160.62	160.39	160.55	159.32	160.51	159.73	160.44	159.45	1.1
180	180.50	180.66	180.50	180.45	179.48	180.40	179.69	180.13	179.59	1.1

Note: Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received: Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

### Measurement Standards Used & Traceability:

The International System of Units (SI) through

MIT Certificate No. AD2202-084-0002 for Data Acquisition Module 2 TC type T Serial No. US37003770, Due 08-Aug-22

Notes: 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.

3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.

4. The uncertainty of measurement is included temperature stability.

5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

Page 2 of 2





## CALIBRATION CERTIFICATE

Certificate No. : SS2206-022-0007  
 Date Issued : 10-Jun-22

**Customer** : OKLA TESTING & CONSULTING SERVICE CO.,LTD  
 63/13 Soi.Petchkasem 7, Petchkasem Rd., Thapra, Bangkok Yai,  
 Bangkok 10600

**Equipment** : Water Bath

**Manufacturer** : Labtech  
**Model** : LWB-222A

**Serial No.** : BCCLJ23001C

**ID No./Tag No.** : -

**Date Received** : 03-Jun-22

**Date Calibrated** : 03-Jun-22

**Calibrated by** : Mr. Nirot Parnkamnoed

Calibration Method or Calibration Procedure Used

In-house method : CP-14 base on ASTM E 715-80 (Reapproved 2011).

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

### Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by



Certificate No. : SS2206-022-0008

**Environment :** Ambient Temperature : Start record 25.5 °C, Stop record 25.6 °C  
 Relative Humidity : Start record 54.5 %RH, Stop record 54.6 %RH

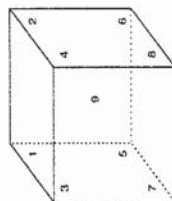
Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability <sup>1</sup> (°C)	Measured Uniformity <sup>2</sup> (°C)	Overall Variation <sup>3</sup> (°C)
20	20.0	20.0	0.08	0.76	1.11

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	STD Uncertainty <sup>4</sup> (°C)
20	19.47	19.38	19.65	19.80	19.39	20.25	19.26	19.95	20.00	0.25

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

**Measurement Standards Used & Traceability :**

The International System of Units (SI) through

MIT Certificate No. AD2111-076-0001 for Digital Thermometer with Probe (Agilent) Module 1 (08) NTC & Pt1000 Serial No. MY44000197, Due 05-Jun-22

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.

3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.

4. The uncertainty of measurement is included temperature stability.

5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

Certificate No. : SS2206-022-0007

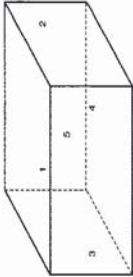
Environment : Ambient Temperature : Start record 25.4 °C, Stop record 25.5 °C  
Relative Humidity : Start record 54.5 %RH, Stop record 54.5 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability <sup>1</sup> (°C)	Measured Uniformity <sup>2</sup> (°C)	Overall Variation <sup>3</sup> (°C)
60	60	60	0.24	1.02	1.03

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	Uncertainty <sup>4</sup> ±°C
60	61.20	61.18	61.11	61.20	61.59	0.40

Note : Probe No. 5 is Reference Probe



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2111-076-0001 for Digital Thermometer with Probe (Agilent) Module 1 (08) NTC & Pt1000  
Serial No. MY44000197, Due 05-Jun-22

- Notes :
- 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
  - 2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
  - 3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
  - 4. The uncertainty of measurement is included temperature stability.

End of Certificate