เอกสารแนบ 6

เอกสารสอบเทียบเครื่องมือ
ที่ใช้ในการวิเคราะห์

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

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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	BALANCE
MANUFACTURER	:	METTLER TOLEDO
MODEL / TYPE	:	MS204TS/00
SERIAL NO.	:	B935191252[LA-002]
CLID. NO.	:	362200356
JOB CONTROL NO.	:	230321031262

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 10 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 : [redacted]

Approved By : [redacted]

Authorized Signatory

10 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. Q23031262

F3-011-04/01-12

1.6/1
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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**BALANCE**
MANUFACTURER	:	**METTLER TOLEDO**
MODEL / TYPE	:	**MS204TS/00**
SERIAL NO.	:	**B935191252[LA-002]**
LOCATION SITE	:	**LABORATORY - BALANCE ROOM**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 23 °C to 24 °C **Relative Humidity : 49 % to 50 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPMB-01** based on **EURAMET/cg-18/Version 4.0 (11/2015).**

The calibration was performed by Comparison with Weight Set which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Weight Set, Mettler Toledo Class E2 S/N. 158850.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MM-0120-21, Due Date 17 December 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)"

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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

CALIBRATION DATA

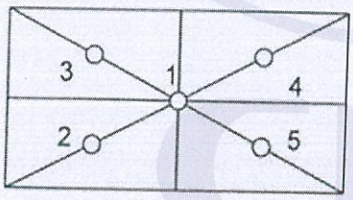
1. Error of indications

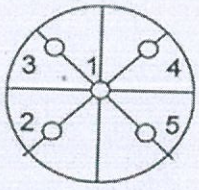
Nominal Test Value (g)	Conventional mass (g)	Display Value (g)	Error of Balance (g)	Uncertainty ± (mg)	Coverage factor *k*
Unload	0.0000	0.0000	0.0000	0.03	2,28
0.1000	0.1000	0.1000	0.0000	0.06	2,00
0.5000	0.5000	0.5000	0.0000	0.07	2,00
1.0000	1.0000	1.0000	0.0000	0.07	2,00
2.0000	2.0000	2.0000	0.0000	0.07	2,00
5.0000	5.0000	5.0000	0.0000	0.07	2,00
10.0000	10.0000	10.0000	0.0000	0.07	2,00

2. Repeatability of indications

Nominal Test Value (g)	Standard Deviation of Reading (g)
200.0000	0.00004

3. Effect of eccentric application of a load on the indication

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Nominal Test Value (g)	Display Value (g)					Maximum Difference of Center Value (g)
	Position 1	Position 2	Position 3	Position 4	Position 5	
100.0000	100.0000	100.0001	100.0000	100.0000	100.0000	0.0001

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 41 of 54

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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	WATER BATH
MANUFACTURER	:	MEMMERT
MODEL / TYPE	:	WNB14
SERIAL NO.	:	L418.0758[LA-004]
CLID. NO.	:	332100157
JOB CONTROL NO.	:	230321031268

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory

08 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. Q23031268

1.674

CALIBRATION LABORATORY CO., LTD.
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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**WATER BATH**
MANUFACTURER	:	**MEMMERT**
MODEL / TYPE	:	**WNB14**
SERIAL NO.	:	**L418.0758[LA-004]**
LOCATION SITE	:	**LABORATORY-HOT ZONE**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C **Relative Humidity : 48% to 51%**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-135** based on **ASTM E 715-80:2016** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q23022733, Due Date 01 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)"

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 the measuring water bath.

CALIBRATION DATA

1. WATER BATH PERFORMANCE

Test Point (°C)	DUC Reading (°C)	Uniformity (°C)	Stability (°C)
95.0	95.0	0.33	0.16

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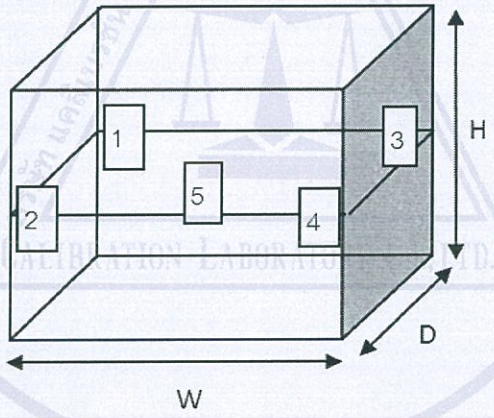
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

Test Point (°C)	DUC Reading (°C)	STD Reading (°C)					Uncertainty ±(°C)
		Probe No. 1	Probe No. 2	Probe No. 3	Probe No. 4	Probe No. 5	
95.0	95.0	96.43	96.14	96.24	96.21	96.33	0.44

Technical Note : W = 35 cm, D = 29 cm, H = 14 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 128 of 138



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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	WATER BATH
MANUFACTURER	:	M-LAB
MODEL / TYPE	:	WBN 15
SERIAL NO.	:	0335[LA-007]
CLID. NO.	:	332300657
JOB CONTROL NO.	:	230321031269

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : Wenick Inchaisri
Calibration Engineer

[redacted]

Approved By :

[redacted]

Authorized Signatory
08 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. Q23031269

1,678

CALIBRATION LABORATORY CO., LTD.
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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**WATER BATH**
MANUFACTURER	:	**M-LAB**
MODEL / TYPE	:	**WBN 15**
SERIAL NO.	:	**0335[LA-007]**
LOCATION SITE	:	**LABORATORY-HOT ZONE**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C **Relative Humidity : 48% to 51%**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-135** based on **ASTM E 715-80:2016** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q23022733, Due Date 01 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)"

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 the measuring water bath.

CALIBRATION DATA

1. WATER BATH PERFORMANCE

Test Point (°C)	DUC Reading (°C)	Uniformity (°C)	Stability (°C)
85.0	85.0	0.35	0.18

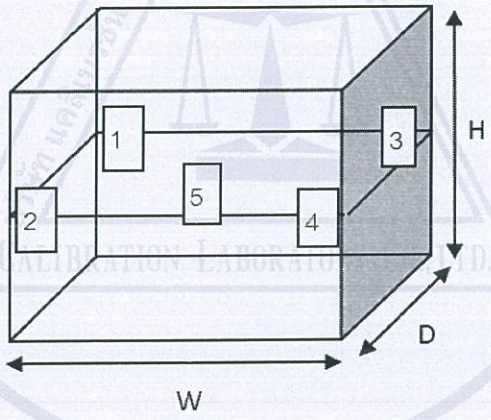
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

Test Point (°C)	DUC Reading (°C)	STD Reading (°C)					Uncertainty ±(°C)
		Probe No. 1	Probe No. 2	Probe No. 3	Probe No. 4	Probe No. 5	
85.0	85.0	84.69	84.88	84.68	84.81	84.75	0.48

Technical Note : W = 35 cm, D = 30 cm, H = 15 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 128 of 138



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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	DIGITAL THERMOHYGRO METER
MANUFACTURER	:	DIGICON
MODEL / TYPE	:	TH-02A
SERIAL NO.	:	1919E0284980[DTH-02]
CLID. NO.	:	232100201
JOB CONTROL NO.	:	230309026566

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 09 March 2023 DATE OF ISSUED : 13 March 2023

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

Calibrated By : [redacted]

Approved By : [redacted]

Authorized Signatory

13 March 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. Q23026566

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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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**DIGITAL THERMOHYGRO METER**
MANUFACTURER	:	**DIGICON**
MODEL / TYPE	:	**TH-02A**
SERIAL NO.	:	**1919E0284980[DTH-02]**
DATE OF CALIBRATION	:	**11 March 2023**

ENVIRONMENT CONDITIONS :

Temperature : (23 ± 2) °C **Relative Humidity :** (55 ± 10) %RH

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-74**. The calibration was performed by using Chilled Mirror Hygrometer and Temperature & Humidity Chamber which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 36151.

Temperature & Humidity Chamber, PGC Model 9141-5114 S/N.0802282.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation.

Certificate No. 21028, Due Date 09 December 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)"

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 the measuring digital thermohygro meter.

CALIBRATION DATA

1. CORRECTION OF TEMPERATURE

Test point (°C)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ±(°C)
20.0	20.00	19.6	+0.40	0.40
25.0	25.01	24.6	+0.41	
30.0	29.98	29.6	+0.38	

2. CORRECTION OF HUMIDITY

STD Temperature (°C)	STD Reading (%RH)	DUC Reading (%RH)	Correction (%RH)	Uncertainty ± (%RH)
25	40.0	35	+5.0	1.3
25	60.0	54	+6.0	1.5

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 48 of 138

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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	DIGITAL THERMOHYGRO METER
MANUFACTURER	:	DIGICON
MODEL / TYPE	:	TH-02A
SERIAL NO.	:	1919E0284991[DTH-01]
CLID. NO.	:	232100200
JOB CONTROL NO.	:	230309026565

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 09 March 2023 DATE OF ISSUED : 13 March 2023

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

Calibrated By : [redacted]

Approved By : [redacted]

Authorized Signatory

13 March 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. Q23026565

1/6/15
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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**DIGITAL THERMOHYGRO METER**
MANUFACTURER	:	**DIGICON**
MODEL / TYPE	:	**TH-02A**
SERIAL NO.	:	**1919E0284991[DTH-01]**
DATE OF CALIBRATION	:	**11 March 2023**

ENVIRONMENT CONDITIONS :

Temperature : (23 ± 2) °C **Relative Humidity :** (55 ± 10) %RH

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-74**. The calibration was performed by using Chilled Mirror Hygrometer and Temperature & Humidity Chamber which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 36151.

Temperature & Humidity Chamber, PGC Model 9141-5114 S/N.0802282.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation.

Certificate No. 21028, Due Date 09 December 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)"

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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 the measuring digital thermohygro meter.

CALIBRATION DATA

1. CORRECTION OF TEMPERATURE

Test point (°C)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ±(°C)
20.0	20.00	19.6	+0.40	0.40
25.0	25.01	24.5	+0.51	
30.0	29.98	29.5	+0.48	

2. CORRECTION OF HUMIDITY

STD Temperature (°C)	STD Reading (%RH)	DUC Reading (%RH)	Correction (%RH)	Uncertainty ± (%RH)
25	40.0	34	+6.0	1.3
25	60.0	52	+8.0	1.5

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 48 of 138

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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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ISO/IEC 17025

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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	REFRIGERATOR
MANUFACTURER	:	S-COOL
MODEL / TYPE	:	SS-HA-112 V2
SERIAL NO.	:	22111408[LA-0014]
CLID. NO.	:	332300655
JOB CONTROL NO.	:	230321031266

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory
08 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. Q23031266

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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**REFRIGERATOR**
MANUFACTURER	:	**S-COOL**
MODEL / TYPE	:	**SS-HA-112 V2**
SERIAL NO.	:	**22111408[LA-0014]**
LOCATION SITE	:	**LABORATORY**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C **Relative Humidity : 48% to 51 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-165** according to **TLAS G-20-1/02-08** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 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)"

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 the measuring refrigerator.

CALIBRATION DATA

1. REFRIGERATOR PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting (°C)	Indicating (°C)	(°C)	(°C)	Variation (°C)
4.0	4.0	1.56	2.70	5.65

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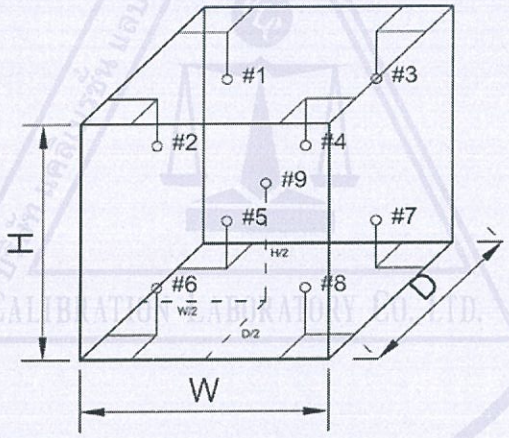
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty ±(°C)	Coverage factor *k*
Setting (° C)	Indicating (° C)	1	2	3	4	5	6	7	8	9		
4.0	4.0	7.98	8.13	7.53	7.39	7.46	7.66	7.01	7.05	7.63	3.17	2,00

Technical Note : W = 100 cm, D = 40 cm, H = 123 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 129 of 138



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

End of Certificate

12/6/21
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	REFRIGERATOR
MANUFACTURER	:	S-COOL
MODEL / TYPE	:	SS-HA-112
SERIAL NO.	:	21091450[LA-0013]
CLID. NO.	:	332300656
JOB CONTROL NO.	:	230321031267

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory

08 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. Q23031267

CALIBRATION LABORATORY CO.,LTD.

CALIBRATION LABORATORY CO., LTD.
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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**REFRIGERATOR**
MANUFACTURER	:	**S-COOL**
MODEL / TYPE	:	**SS-HA-112**
SERIAL NO.	:	**21091450[LA-0013]**
LOCATION SITE	:	**1st FLOOR**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 30 °C to 31 °C **Relative Humidity : 50% to 53 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-165** according to **TLAS G-20-1/02-08** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 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)"

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 the measuring refrigerator.

CALIBRATION DATA

1. REFRIGERATOR PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting (°C)	Indicating (°C)	(°C)	(°C)	Variation (°C)
4.0	4.0	1.31	3.16	6.65

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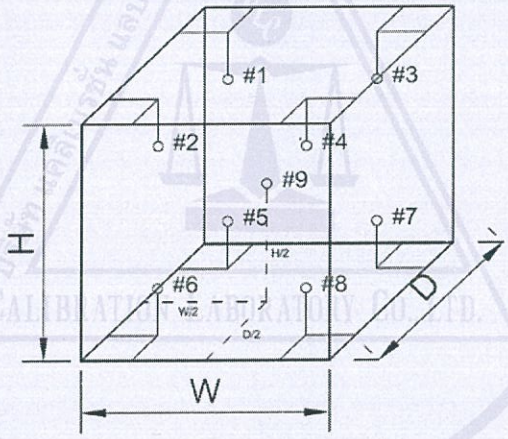
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty ±(°C)	Coverage factor *k*
Setting (° C)	Indicating (° C)	1	2	3	4	5	6	7	8	9		
4.0	4.0	8.60	8.55	7.86	8.07	9.05	9.01	8.96	8.65	8.75	3.69	2,00

Technical Note : W = 100 cm, D = 40 cm, H = 123 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 129 of 138



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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	REFRIGERATOR
MANUFACTURER	:	MEDICOOL
MODEL / TYPE	:	BB-117
SERIAL NO.	:	BB117-190725001[LA-003]
CLID. NO.	:	332100156
JOB CONTROL NO.	:	230321031265

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory
08 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. Q23031265

1/6/26
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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**REFRIGERATOR**
MANUFACTURER	:	**MEDICOOL**
MODEL / TYPE	:	**BB-117**
SERIAL NO.	:	**BB117-190725001[LA-003]**
LOCATION SITE	:	**LABORATORY**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C **Relative Humidity : 48% to 51 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-165** according to **TLAS G-20-1/02-08** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 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)"

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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 the measuring refrigerator.

CALIBRATION DATA

1. REFRIGERATOR PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting (°C)	Indicating (°C)	(°C)	(°C)	Variation (°C)
4.0	4.0	0.67	0.91	2.28

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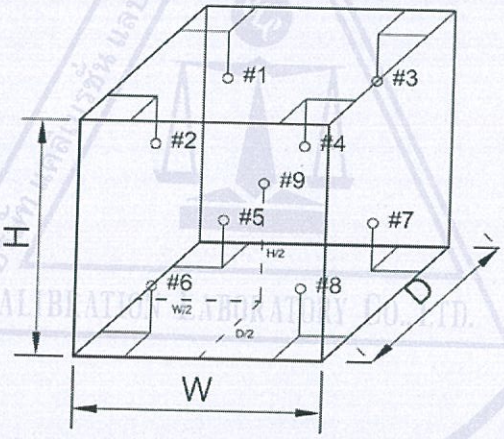
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty ±(°C)	Coverage factor *k*
Setting (° C)	Indicating (° C)	1	2	3	4	5	6	7	8	9		
4.0	4.0	3.37	3.91	3.35	3.51	3.51	3.26	3.17	3.19	3.32	1.14	2,00

Technical Note : W = 50 cm, D = 50 cm, H = 120 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 129 of 138



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

End of Certificate

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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	INCUBATOR
MANUFACTURER	:	ACCUPLUS
MODEL / TYPE	:	SMART i250
SERIAL NO.	:	2059-0718-0010[LA-002]
CLID. NO.	:	332100155
JOB CONTROL NO.	:	230321031264

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory
08 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. Q23031264

CALIBRATION LABORATORY CO., LTD.
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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**INCUBATOR**
MANUFACTURER	:	**ACCUPLUS**
MODEL / TYPE	:	**SMART i250**
SERIAL NO.	:	**2059-0718-0010[LA-002]**
LOCATION SITE	:	**LABORATORY**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C **Relative Humidity : 48% to 51 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-165** according to **TLAS G-20-1/02-08** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 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)"

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 the measuring incubator.

CALIBRATION DATA

1. INCUBATOR PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting (°C)	Indicating (°C)	(°C)	(°C)	Variation (°C)
20.0	20.0	0.47	0.53	1.18

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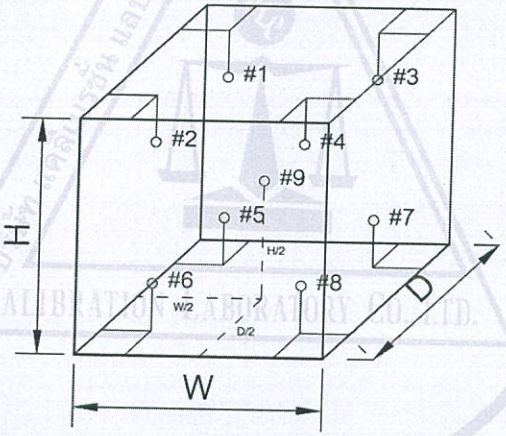
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty ±(°C)	Coverage factor *k*
Setting (° C)	Indicating (° C)	1	2	3	4	5	6	7	8	9		
20.0	20.0	20.53	20.62	20.75	20.52	20.54	20.60	20.52	20.42	20.45	0.75	2,00

Technical Note : W = 50 cm, D = 48 cm, H = 110 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 129 of 138



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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CALIBRATION AND DIMENSIONAL MEASUREMENT
ACDM-2814

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	HOT AIR OVEN
MANUFACTURER	:	MEMMERT
MODEL / TYPE	:	UF110
SERIAL NO.	:	B422.0026[LA-0012]
CLID. NO.	:	332202464
JOB CONTROL NO.	:	230321031263

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory
08 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. Q23031263

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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**HOT AIR OVEN**
MANUFACTURER	:	**MEMMERT**
MODEL / TYPE	:	**UF110**
SERIAL NO.	:	**B422.0026[LA-0012]**
LOCATION SITE	:	**LABORATORY-HOT ZONE**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C **Relative Humidity : 48% to 51 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPTH-07** based on **TLAS G-20** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 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)"

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 the measuring hot air oven.

CALIBRATION DATA

1. HOT AIR OVEN PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting (°C)	Indicating (°C)	(°C)	(°C)	Variation (°C)
104.0	104.0	0.80	0.41	2.05
180.0	180.0	1.67	0.20	3.29

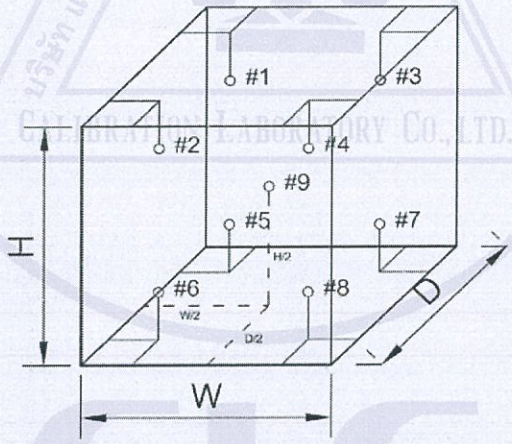
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty ±(°C)	Coverage factor *k*
Setting (°C)	Indicating (°C)	1	2	3	4	5	6	7	8	9		
104.0	104.0	103.22	103.79	103.49	103.60	103.76	103.70	103.32	104.54	103.90	0.65	2,00
180.0	180.0	178.23	179.61	178.93	179.18	179.39	179.37	178.51	181.15	179.79	0.61	2,00

Technical Note : W = 56 cm, D = 40 cm, H = 48 cm.

The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 48 of 54



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

End of Certificate

CALIBRATION LABORATORY CO., LTD.
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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	BALANCE
MANUFACTURER	:	SHIMADZU
MODEL / TYPE	:	AP225WD
SERIAL NO.	:	D316300692[LA-001]
CLID. NO.	:	362100172
JOB CONTROL NO.	:	230321031261

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023 DATE OF ISSUED : 08 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 : [redacted]

Approved By : [redacted]

Authorized Signatory

08 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. Q23031261

F3-011-04/01-12

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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	**BALANCE**
MANUFACTURER	:	**SHIMADZU**
MODEL / TYPE	:	**AP225WD**
SERIAL NO.	:	**D316300692[LA-001]**
LOCATION SITE	:	**LABORATORY - BALANCE ROOM**
DATE OF CALIBRATION	:	**04 April 2023**

ENVIRONMENT CONDITIONS :

Temperature : 23 °C to 24 °C **Relative Humidity : 49 % to 50 %**

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-46** according to **EURAMET cg-18 Version 4.0 (11/2015).**

The calibration was performed by Comparison with Weight Set which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Weight Set, Mettler Toledo Class E2 S/N. 158850.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MM-0120-21, Due Date 17 December 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)"

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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CLC Accredited ISO/IEC 17025

NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

CALIBRATION DATA

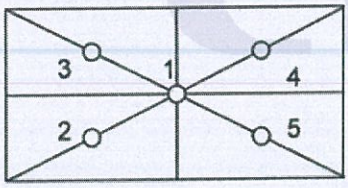
1. Error of indications

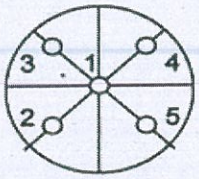
Nominal Test Value (g)	Conventional mass (g)	Display Value (g)	Error of Balance (g)	Uncertainty ± (mg)	Coverage factor *k*
Unload	0.0000	0.0000	0.0000	0.06	2,00
5.0000	5.0000	5.0000	0.0000	0.11	2,00
10.0000	10.0000	10.0000	0.0000	0.11	2,00
20.0000	20.0000	20.0000	0.0000	0.12	2,00
40.0000	40.0000	40.0000	0.0000	0.14	2,00
60.0000	60.0000	60.0000	0.0000	0.15	2,00
80.0000	80.0000	80.0000	0.0000	0.19	2,00
100.0000	100.0000	100.0000	0.0000	0.17	2,00
120.0000	120.0000	120.0000	0.0000	0.22	2,00
140.0000	140.0000	140.0000	0.0000	0.24	2,00
160.0000	159.9999	160.0000	+0.0001	0.26	2,00
180.0000	180.0000	180.0000	0.0000	0.30	2,00
200.0000	199.9997	199.9997	0.0000	0.26	2,00

2. Repeatability of indications

Nominal Test Value (g)	Standard Deviation of Reading (g)
200.0000	0.00005

3. Effect of eccentric application of a load on the indication

☐ 

☑ 

Nominal Test Value (g)	Display Value (g)					Maximum Difference of Center Value (g)
	Position 1	Position 2	Position 3	Position 4	Position 5	
100.0000	100.0000	100.0000	99.9999	100.0000	100.0001	0.0001

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 116 of 138

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

End of Certificate