



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0006
 Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
 122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Thermometer ctandard

Manufacturer : -

Model : -

Serial No. : 19009

ID No./Tag No. : -

Date Received : 31-Oct-22

Date Calibrated : 31-Oct-22

Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-136 by comparing against Standard Thermometer.

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. : S2022100447-0006
Environment : Ambient Temperature : Start record 26.8 °C, Stop record 26.9 °C
 Relative Humidity : Start record 53.1 %RH, Stop record 53.4 %RH
Description of UUC : Range 0-250 °C
 Scale Division 0.05 °C
 Resolution 0.01 °C
 UUC Reference scale 0 °C
 Measured Reference temperature 0.005 °C
 Type Total Immersion

STD	Unit Under Calibration	UUC Error	Measurement
Reading (°C)	Reading (°C)	(°C)	Uncertainty (±°C)
0.004	0.00	-0.004	0.28
50.001	50.00	-0.001	0.30
99.992	100.00	0.008	0.30

STD = Standard

UUC = Unit Under Calibration

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. AD2206-242-0001 for Digital Thermometer with PRT Serial No. A87128, Due 08-Feb-23

End of Certificate

Page 2 of 2



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0011
 Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
 122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Furnace

Manufacturer : CARBOLITE

Model : CWE 12/5

Serial No. : 296/521

ID No./Tag No. : -

Date Received : 31-Oct-22

Date Calibrated : 31-Oct-22

Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-61 by comparison against Standard Thermometer.

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. : S2022100447-0011

Environment : Ambient Temperature : Start record 26.9 °C, Stop record 26.7 °C
 Relative Humidity : Start record 53.3 %RH, Stop record 53.1 %RH

UUC	UUC Display	UUC Display	STD Reading	STD Reading	Uncertainty
Setting (°C)	Maximum (°C)	Minimum (°C)	Before Adjusted (°C)	After Adjusted (°C)	(± °C)
550	550	550	549.2	550.5	3.4

STD = Standard

UUC = Unit Under Calibration

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. L202209095-007 for Thermocouple Sensor (Type N) Serial No. 44703001/02-63, Due 01-Oct-23

MIT Certificate No. AD2204-089-0001 for Multifunction Calibrator (TRX-II) Serial No. 0468, Due 22-Apr-23

End of Certificate

Page 2 of 2



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



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0012
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Moisture analyzer

Manufacturer : Sartorius
Model : MA35
Serial No. : SWB26303311
ID No./Tag No. : -
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22
Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-06 base on UKAS LAB 14 Edition 5 July 2015.

In-house method : CP-69 In-situ technique by comparing against Standard Thermometer.

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 3

Certificate No. : S2022100447-0012
Environment : Ambient Temperature : Start record 25.9 °C , Stop record 25.6 °C
Relative Humidity : Start record 53.5 %RH , Stop record 53.4 %RH
Atmospheric Pressure : Start record 1008.4 mbar , Stop record 1008.5 mbar

Max. Capacity : 35 g **Resolution :** 0.001 g

Departure from nominal value

Nominal Value (g)	Before Adjusted Correction (g)	After Adjusted Correction (g)	Uncertainty ± g
0.0 *	0.000	-	0.00082
3.5	0.000	-	0.00087
7.0	0.000	-	0.00083
10.5	0.000	-	0.00085
14.0	0.000	-	0.00084
17.5	0.000	-	0.00085
21.0	0.000	-	0.00084
24.5	0.000	-	0.00085
28.0	0.000	-	0.00087
31.5	0.000	-	0.00085
35.0	0.000	-	0.00086

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

Repeatability of reading

Load (g) : 35
Standard deviation (g) : 0.0000
Maximum difference (g) : 0.000
between successive reading

Off-centre loading

Load (g) : 15
Position A (g) : 15.000
Position B (g) : 15.000
Position C (g) : 15.000
Position D (g) : 15.000
Position E (g) : 15.000
Maximum difference (g) : 0.000
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

Calibratech Certificate No. 65-210275-1 for Weight Standard 6 kg (F1) Serial No. MIT-STD-20, Due 23-Jun-23

Page 2 of 3

METTLER TOLEDO

Certificate No. : S2022100447-0012

Temperature *

Setting (°C)	Display Reading (°C)	Before Adjusted STD Reading (°C)	After Adjusted STD Reading (°C)	Error (°C)	Uncertainty (± °C)
75	75	75.3	-	-0.3	0.50
105	105	105.5	-	-0.5	0.50

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. AD2203-426-0001 for Sound Level Meter (Temperature Measurement Function) Serial No. Q671506, Due 31-Mar-23

End of Certificate

Page 3 of 3

Certificate Number CCP-2424-22

Calibration Certificate Seven2Go™ Polarographic DO S4

Customer

Company Integrated Research Center Co., Ltd.
Address 122, Moo 2, Tha Tum, Si Maha Phot
PRACHINBURI 25140
Customer ID number 301604799
Service Assignment 0332587026

Instrument

Type Seven2Go™ Polarographic DO S4 **Instrument Serial Number** C136509714
Internal Identification IRC-TE22001 **Firmware version** 1.00

Technical specifications

Measuring Range 0.00 ... 99.9 mg/L (ppm)	0.0 ... 600 %
Resolution 0.01 mg/L	0.1 %
Limit of Error ± 0.2 mg/L in range 0 ... 15 ± 10 % in range 15 ... 60	± 10 %
Temperature range ATC 0 ... 60 °C	Pressure range 500 ... 1100 mbar
Resolution 0.1 °C	Resolution 1 mbar
Limit of Error ± 0.2 °C	Limit of Error ± 2 %

Procedure Statement

METTLER TOLEDO Seven2Go Service Manual Section B (Doc. No. 30232219) will be used as referring documentation to adjust and certify the instrument indicated in the "Type" and "Serial number" section. The measurement results of this certification were obtained at ambient conditions.

Certificate Number CCP-2424-22

Certification Tools

Certified digital voltmeter	Manufacturer Keysight Technologie	Serial number MY60036967
	Type 34401A	Certificate number E1U220883
		Date of Certification 05-Mar-22
DO Calibration Kit	Manufacturer METTLER-TOLEDO	Serial number G049
	Type 51302345	Certificate number 62617
		Date of Certification 15-Feb-22
DO resistors	Designation	Nominal value
	DO 10 MQ	10.000 MQ
Temperature resistors	DO 1 MQ	1.000 MQ
	DO 1 MQ	1.000 MQ
Temperature resistors	Designation	Nominal value
	NTC 22 kΩ, 0 °C	66.180 kΩ
Barometric pressure meter	NTC 22 kΩ, 25 °C	22.000 kΩ
	NTC 22 kΩ, 50 °C	8.446 kΩ
Barometric pressure meter (Testo 511)	Manufacturer Testo Industrial Services GmbH	Serial number 39114205/612
	Type 0560 0511	Certificate number 22P222
		Date of Certification 26-Jan-22

Certificate Number CCP-2424-22

Certification Measurements

DO signal input	Designation	Theoretical current	Measured value	Max. Tolerance	Passed / Failed
	Empty	<60 mV	<61.5 mV	10 mV	Passed
	10 MQ	-66.049 nA	-65.870 nA	0.5 %	Passed
	1 MQ	-662.032 nA	-661.800 nA	0.5 %	Passed
Temperature sensor input	Designation	Nominal value	Measured value	Max. Tolerance	Passed / Failed
	NTC 22 kΩ, 0 °C	0.0 °C	0.0 °C	0.2 °C	Passed
	NTC 22 kΩ, 25 °C	25.0 °C	25.0 °C	0.2 °C	Passed
	NTC 22 kΩ, 50 °C	50.0 °C	50.0 °C	0.2 °C	Passed
Barometric pressure input	Designation	Measured value	Measured value	Max. Tolerance	Passed / Failed
	Ambient pressure	1006.9 mbar	1006 mbar	2 %	Passed

Summary of Certification

Certification of instrument

Passed

The instrument referred to in this certificate has fulfilled the criteria of the certification. This is indicated by the notation Passed in the column above.

Remarks

Certification of the instrument was performed by

Name Khomsan Prataung Function Service Engineer
Company Mettler-Toledo (Thailand) Ltd.

Date 29-Oct-2022

Signature

Mettler-Toledo (Thailand) Limited

METTLER TOLEDO

Performance Test

Attachment to Certificate No. CCE-2424-22

DO Sensor
Type: Inlab 605-ISM S/N: 1471235

Measurement

Test	Measurement Probe	
	Before Adjustment	After Adjustment
Air	115.3%	100.0%
Pressure	1006 mbar	1006 mbar
Temperature	28.1	29.0

Remarks:

Place: Laboratory Calibration Date: 29-Oct-2022
Service Specialist: Khomsan Prataung Signature:



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



CALIBRATION CERTIFICATE

Certificate No. : S2022110134-0001
Date Issued : 18-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Block Digestion Unit

Manufacturer : Gerhardt
Model : KT 20S
Serial No. : 5720190108
ID No./Tag No. : -
Date Received : 17-Nov-22
Date Calibrated : 17-Nov-22
Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-49 base on TLAS G-20 by comparing against Standard Thermometer.

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. Sarayuth Tochua)



Page 1 of 2

Certificate No. : S2022110134-0001

Environment : Ambient Temperature : Start record 26.5 °C, Stop record 26.4 °C
Relative Humidity : Start record 53.4 %RH, Stop record 53.6 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
380	380	380	0.33	1.53	1.79

Calibration Temperature (°C)	Standard Reading (°C), Probe No. 8 is Reference Probe					Uncertainty ⁴ (±°C)
380	No. 1	No. 2	No. 3	No. 4	No. 5	1.5
	379.74	380.96	379.62	379.85	380.41	
	No. 6	No. 7	No. 8	No. 9	No. 10	
	380.47	380.49	379.82	380.22	380.32	
	No. 11	No. 12	No. 13	No. 14	No. 15	
	379.63	380.86	379.52	379.74	380.30	
	No. 16	No. 17	No. 18	No. 19	No. 20	
	380.36	380.38	379.71	380.12	380.22	

Without adjustment

No. 1	No. 6	No. 11	No. 16
No. 2	No. 7	No. 12	No. 17
No. 3	No. 8	No. 13	No. 18
No. 4	No. 9	No. 14	No. 19
No. 5	No. 10	No. 15	No. 20

Top view position

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. L202208263-002 for Digital Thermometer with Probe (Agilent) Module 2 (172) Type K Serial No. US37011204, Due 11-Mar-23

- 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

Page 2 of 2



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



CALIBRATION CERTIFICATE

Certificate No. : L202211020-004
Date Issued : 08-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Digital Thermo - Hygrometer

Manufacturer : Thermopro
Model : TP55
Serial No. : -
ID No./Tag No. : WL-2022/02
Date Received : 02-Nov-22
Date Calibrated : 04-Nov-22

Calibrated by : Mr. Apiwat Peanrungrot

Calibration Method or Calibration Procedure Used

In-house method : CP-19 by comparing against Standard Digital Humidity / Temperature Meter

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. : L202211020-004

Environment : Ambient Temperature : (25 ± 2) °C
Relative Humidity : (50 ± 15)%RH

Function : Temperature Measurement Humidity Control : (50 ± 15) %RH

STD Reading (°C)	UUC Reading (°C)	UUC Error (°C)	Measurement Uncertainty (±°C)
19.99	20.5	0.51	0.35
24.99	25.3	0.31	0.35

Function : Humidity Measurement Temperature Control : (25 ± 5)°C

STD Reading (%RH)	UUC Reading (%RH)	UUC Error (%RH)	Measurement Uncertainty (±%RH)
29.99	31	1.01	2.5
49.99	51	1.01	2.5
69.98	69	-0.98	2.5

STD = Standard

UUC = Unit Under Calibration

Description of UUC : Range (-50) to 70 °C Internal Sensor / 10 to 99 %RH
Resolution 0.1 °C / 1 %RH

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. AD2111-077-0001 for Digital Thermometer with Probe (Fluke) Serial No. 5856603, Due 11-Nov-22

MIT Certificate No. AD2205-305-0001 for Humidity/Temperature Transmitter Serial No. C4240013, Due 04-Jun-23

End of Certificate

Page 2 of 2



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



CALIBRATION CERTIFICATE

Certificate No. : L202211020-003
Date Issued : 08-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Digital Thermo - Hygrometer

Manufacturer : Thermopro
Model : TP55
Serial No. : -
ID No./Tag No. : WL-2022/01
Date Received : 02-Nov-22
Date Calibrated : 04-Nov-22

Calibrated by : Mr. Apiwat Peanrungrot

Calibration Method or Calibration Procedure Used

In-house method : CP-19 by comparing against Standard Digital Humidity / Temperature Meter

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. : L202211020-003

Environment : Ambient Temperature : (25 ± 2) °C

Relative Humidity : (50 ± 15)%RH

Function : Temperature Measurement		Humidity Control : (50 ± 15) %RH	
STD	UUC Reading	UUC Error	Measurement
Reading (°C)	(°C)	(°C)	Uncertainty (±°C)
19.99	20.3	0.31	0.35
24.99	25.2	0.21	0.35

Function : Humidity Measurement		Temperature Control : (25 ± 5)°C	
STD	UUC Reading	UUC Error	Measurement
Reading (%RH)	(%RH)	(%RH)	Uncertainty (±%RH)
29.99	32	2.01	2.5
49.99	52	2.01	2.5
69.98	72	2.02	2.5

STD = Standard

UUC = Unit Under Calibration

Description of UUC :	Range	(-50) to 70 °C Internal Sensor /	10 to 99 %RH
	Resolution	0.1 °C /	1 %RH

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. AD2111-077-0001 for Digital Thermometer with Probe (Fluke) Serial No. 5856603, Due 11-Nov-22

MIT Certificate No. AD2205-305-0001 for Humidity/Temperature Transmitter Serial No. C4240013, Due 04-Jun-23

บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริง
คอนซัลแตนท์ จำกัด

รายการใบรับรองสอบเทียบ/ทวนสอบ เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์ สำหรับวิเคราะห์คุณภาพน้ำทิ้ง

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
เครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์									
1	Digestor Unit	Total Kjeldahl Nitrogen (TKN)	FOSS TECATOR	2520auto / 91794469	National Food Institute, Ministry of Industry, Thailand	2202361-001-01	4 Apr 22	3 Apr 23	-
2	Distillation Unit (Kjeldahl Method)	Total Kjeldahl Nitrogen (TKN) Ammonia	FOSS TECATOR	KT200 / 91790524	FOSS South East Asia	5874	30 Nov 21	29 Nov 22	-
3	Incubator	Fecal Coliform Bacteria Total Coliform Bacteria	Memmert	IPP 260 / V616.0066	Technology Promotion Association (Thailand-Japan)	20TM2140	4 Nov 21	3 Nov 22	-
4	Incubator		Memmert	IPP 260 / V615.0187	Technology Promotion Association (Thailand-Japan)	22TM563	7 Apr 22	6 Apr 23	-
5	Water Bath		Memmert	WNE 14 / L416.0606	Technology Promotion Association (Thailand-Japan)	22TM333	17 Feb 22	16 Feb 23	-
6	Water Bath		Memmert	WNE 14 / L414.1407	Technology Promotion Association (Thailand-Japan)	22TM565	7 Apr 22	6 Apr 23	-
7	Analytical Balance		Mettler-Toledo	MS603S / B0070110311	Mettler-Toledo (Thailand) Ltd.	TH2058-096-040722-ACC-TH	7 Apr 22	6 Apr 23	-
8	Auto Clave		ALP	CL-40L / 802664	Technology Promotion Association (Thailand-Japan)	22TM89	17 Feb 22	16 Feb 23	-

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

Verification Certificate

Certificate No.: 2202361-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
 Bangchack, Prakhonong, Bangkok 10260

Page 1 of 4

Equipment: HEATING BLOCK DIGESTION

Manufacturer: FOSS

Model: 2520

Serial No.: 91794469

ID No.: UAE.WAS.011/2560

Order No.: 2202361

Operation No.: 2202361-001

Date of Receipt: 4 April 2022

Date of Calibration: 4-6 April 2022

Calibrated by Mr.Nuttapol Niyomchat
Specialist

Approved by (Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 11 April 2022

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

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

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2202361-001-01
Equipment: HEATING BLOCK DIGESTION
 Model: 2520 Serial No.: 91794469
 Resolution: 1 °C ID No.: UAE.WAS.011/2560
 Manufacturer: FOSS

Date of Calibration: 4-6 April 2022

Page 2 of 4

Location: Laboratory Room, NATIONAL FOOD INSTITUTE
Environment Condition: Ambient Temperature (25 ± 3) °C
 Relative Humidity (55 ± 15) %
 Line Voltage (220 ± 10) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert standard thermocouples type R into its heating block digestion and compared to temperature obtained from reference standards thermometer at calibrated point.
 - The temperature scale used was based on ITS - 90 .
 - All data show below were final values and the initial data may be obtained upon request.
- Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
Digital Thermometer with Thermocouple	34970A/34901A	MY44045576/MY41194453	TC21/0041	24-Apr-2022	N.M. Technical Center Laboratory
	Type R	TC#101-103 / CH#101-103			

- This certificate is traceable to international system of units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC* Description

Time of Record - Hour 30 Minute At 380 °C

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2202361-001-01
Equipment: HEATING BLOCK DIGESTION
 Model: 2520 Serial No.: 91794469
 Resolution: 1 °C ID No.: UAE.WAS.011/2560
 Manufacturer: FOSS

Date of Calibration: 4-6 April 2022

Page 3 of 4

Calibration point: 380 °C

Calibration result:

Reporting of Temperature

Block No.	UUC* Setting (°C)	UUC* Reading (°C)	Stability (±°C)	Standard Thermometer (°C)	Uncertainty (±°C)
1	380	380	0.13	376.48	1.5
2	380	380	0.12	376.58	1.5
3	380	380	0.12	376.51	1.5
4	380	380	0.14	376.70	1.6
5	380	380	0.18	376.81	1.6
6	380	380	0.12	377.23	1.6
7	380	380	0.12	377.37	1.5
8	380	380	0.13	376.68	1.5
9	380	380	0.14	376.72	1.5
10	380	380	0.18	378.97	1.6
11	380	380	0.25	378.79	1.6
12	380	380	0.11	377.14	1.6
13	380	380	0.19	379.65	1.6
14	380	380	0.16	379.61	1.6
15	380	380	0.16	378.66	1.6
16	380	380	0.15	379.18	1.6
17	380	380	0.23	377.39	1.6
18	380	380	0.11	377.71	1.6
19	380	380	0.22	376.64	1.6
20	380	380	0.16	376.56	1.6

Note:

- UUC* = Unit Under Calibration
- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.
- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2202361-001-01
Equipment: HEATING BLOCK DIGESTION
 Model: 2520 Serial No.: 91794469
 Resolution: 1 °C ID No.: UAE.WAS.011/2560
 Manufacturer: FOSS

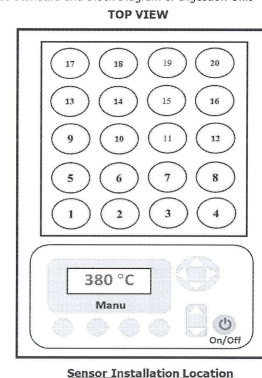
Date of Calibration: 4-6 April 2022

Page 4 of 4

Calibration point: 380 °C

Calibration result: Continued

Figure 1. Location of Reference Standard and Block Diagram of Digestion Unit



Sensor Installation Location

Note:

- UUC* = Unit Under Calibration
- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.
- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

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

----- End -----

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Date: 30/11/21
 Customer: UAE
 Instrument: KT 200

Hours
 Start 8.00
 Finish 9.00

FOSS South East Asia
 3388 Sirinrat Building, 25th - 26th Floor, Unit No. 3388/90,
 Rama IV Road, Klongton, Klongtoey, Bangkok, Thailand 10110

Report No: 5874

Address: 91 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110

Serial: 91790529

Labour
 9.00
 10.00

Travel From Customer
 10.00
 15.00

Job Type					
Application	Special	Standard			
Normal	Courtesy Visit	Installation	Training		
Distributor	PMA Onboarding	Quote	In House		
Internal	Warranty	Repair	PM		
Digital Service	Sales Support	Remote	Other		

PO/Quote Number: if applicable

PMA Type: FOSS Customer Pro Contract No. if applicable

Details of Work / Test	Condition / Status
- Check Instrument	OK
- Check PM kit for KT 200	Pass
- Check Safety Valve	Pass
- Check Rubber Grommet	Pass
- Check Seal	Pass
- Check Heating element	Pass
- Check New panel PCB	Pass
- Check Safety door pass complete	Pass
- Clean & Lubricant	Pass
- Check Leaked	Pass
- Check Valve Alkali set 30ml for 20ml	Pass

Instrument Ready for Use: OK Not OK (if not OK - Continue)

Part No.	Batch	Description	Qty
10009965	11235-983	Foss PM kit KT 200	1
15750029	29.08.21	Safety Valve	1
15990026	09.11.20	Rubber Grommet for Heating	2
1000512	02.08.21	Heating Element	1
1000512	16.11.20	Seal	1
10009973	14.08.20	KT 200 new panel PCB	1
10009973	22.04.21	Safety door complete	1

I confirm this report is accurate and complete

Signed FOSS: [Signature] Signed Customer: [Signature]

Name: [Name] Name: [Name]

Would you be willing to participate in a brief survey in order to tell us how we performed? Email: [Email]

Customer: UAE

Instrument	Kjeltec™ 2100 = Kjeltec 200	
Recommended PM interval (whichever occurs first between interval and no. of samples analysed)	12 months	No. of samples analysed (if applicable):
Preventive maintenance kit (P/N)	10009965	C/N 91790529

Introduction

A maintenance protocol provides systematic and functional means of maintaining a specific instrument type. The recommended PM interval depends on the operational conditions and is based on our extensive experience and knowledge of manufacturing and maintaining analytical instruments.

Apart from sample throughput, the environmental conditions also need to be considered. A demanding environment, such as high ambient temperature, humidity, dirtiness etc can measurably shorten component lifetime and also the maintenance and component replacement intervals.

NOTE!

The content of this protocol is subject to change over time. In order to safeguard that you obtain the correct parts, please make sure to indicate serial no and date of installation when contacting your FOSS representative.

Dedicated Analytical Solutions

FOSS Analytical A/S
 69 Slangerupgade
 DK-3400 Hillerød
 Denmark

Tel +45 7010 3370
 Fax +45 7010 3371
 E-mail support@foss.dk
 Web www.foss.dk

FOSS Analytical AB
 Box 70
 SE-263 21 Höganäs
 Sweden

Tel +46 42 361500
 Fax +46 42 340349
 E-mail support@foss.dk
 Web www.foss.dk

Customer Support, 1001 4572 / Rev. 3

(12)

เอกสารไม่ควบคุม

เอกสารไม่ควบคุม

Maintenance Procedure

Exchange of Parts and Cleaning

Step	Action	Part	P/N	OK
1	Replace	Adapter for dig. tube 250 ml	1000 0056	<input type="checkbox"/>
2	Replace	Non return valve	1000 3538	<input type="checkbox"/>
3	Replace valves in alkali pump	Valve kit reagent/water pump	1575 0093	<input type="checkbox"/>
4	Replace steam tubing	Silicone tubing 8/12 mm	1582 0006	<input type="checkbox"/>
5	Replace alkali tubing	Tubing reinforced for alkali	1582 0011	<input type="checkbox"/>
6	Replace water tubing	Tubing PVC 8/11 mm	1582 0004	<input type="checkbox"/>
7	Cleaning	Steam generator		<input type="checkbox"/>
8	Cleaning	Splash head		<input type="checkbox"/>

Check and Adjustments

Step	Action	Module	Measured	Limits	OK
1	Check alkali volume, 10 ml/stroke	Alkali pump	98	At 50 ml -0/+3 ml	<input checked="" type="checkbox"/>
2	Check distillation volume		120ml	100 - 150 ml/4 min	<input checked="" type="checkbox"/>
3	Check front panel switches				<input checked="" type="checkbox"/>
4	Check cables and electrical connections				<input checked="" type="checkbox"/>
5	Check level pins in steam generator				<input checked="" type="checkbox"/>
6	Check safety door switch				<input checked="" type="checkbox"/>



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



Cert. No.: 21TM1874
 Page.: 1 of 3

Certificate of Calibration

Equipment : Incubator

Manufacturer : Memmert

Model : IPP 260

Serial No. : V616.0066

ID No. : UAE.MIC.032/2559

Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Soi Udomsuk 41, Sukhumvit Road,
 Bangkok, Phrakhanong,
 Bangkok 10260

Location : Microbiology Laboratory (302)

Received Order : 28 October 2021
 Calibration Date : 28 - 29 October 2021
 Ambient Temperature : (26 ± 10) °C
 Relative Humidity : (50 ± 30) %

Calibrated by : Kunchit Promprat

Approved by : [Signature]
 Approved Signatory

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

Issue Date : 4 November 2021

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
 Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

เอกสารไม่ควบคุม



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2110-0698OC-1

Cert. No.: 21TM1874
Page.: 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44067817	21LM10	20 Jul 2022

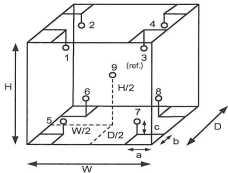
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available



Probe Installation Details :

Dimension of Chamber :

a = 5.0 cm	D = 0.50 m
b = 5.0 cm	W = 0.64 m
c = 5.0 cm	H = 0.80 m
	Capacity = 0.26 m ³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	22	22
REL.Humid. (%)	59	60
AC Supply (Volt)	226	226

Position :	Ref. Std. ID No.:
1	15RTD2/11
2	15RTD2/12
3	15RTD2/13
4	15RTD2/14
5	15RTD2/15
6	15RTD2/20
7	15RTD2/17
8	15RTD2/18
9 (ref.)	15RTD2/19

Malee

เอกสารไม่ควบคุม



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2110-0698OC-1

Cert. No.: 21TM1874
Page.: 3 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
25.0	25.0	24.5	0.053	0.25	0.42	0.30	2
35.0	35.0	35.0	0.029	0.43	0.75	0.30	2

Calibration Point (°C)	Measured Temperature (°C)							
	Position							
	1	2	3	4	5	6	7	8
25.0	25.007	24.986	24.943	24.894	24.653	24.806	24.672	24.694
35.0	35.340	35.384	35.336	35.307	34.680	35.120	34.813	34.996

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

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

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

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

UUC* : Unit Under Calibration

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

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

-000-

Malee

เอกสารไม่ควบคุม



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



Cert. No.: 22TM563
Page.: 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : IPP 260
Serial No. : V615.0187
ID No. : UAE.MIC.003/2559
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 7 April 2022
Calibration Date : 7 April 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Prawat Sodavitchit
Approved by : Malee
() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai

Issue Date : 18 April 2022

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

A 0040248



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2204-0016OC-1

Cert. No.: 22TM563
Page.: 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44067817	21LM10	20 Jul 2022

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

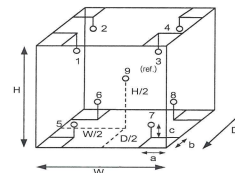
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	26
REL.Humid. (%)	60	62
AC Supply (Volt)	220	220



Probe Installation Details :

Dimension of Chamber :

a = 5.0 cm	D = 0.50 m
b = 5.0 cm	W = 0.64 m
c = 5.0 cm	H = 0.80 m
	Capacity = 0.26 m ³

Position :	Ref. Std. ID No.:
1	15RTD2/11
2	15RTD2/12
3	15RTD2/13
4	15RTD2/14
5	15RTD2/15
6	15RTD2/16
7	15RTD2/17
8	15RTD2/18
9 (ref.)	15RTD2/19

Malee

เอกสารไม่ควบคุม

a 1104310