

Validation Calibration Report

Customer Name: PINTHONG GROUP MANAGEMENT AND
CONSULTANTS CO.,LTD. CO.,LTD.

Department: LAB Analytical

Present By: Meshcotech Co., Ltd.

Instrument System ID: GC 1

Instrument List in System

Name and Model	Serial Number	Manufacturer
Clarus 580	580S17020103	Perkin Elmer
TotalChrom	Version. 6.3.2.0646	Perkin Elmer

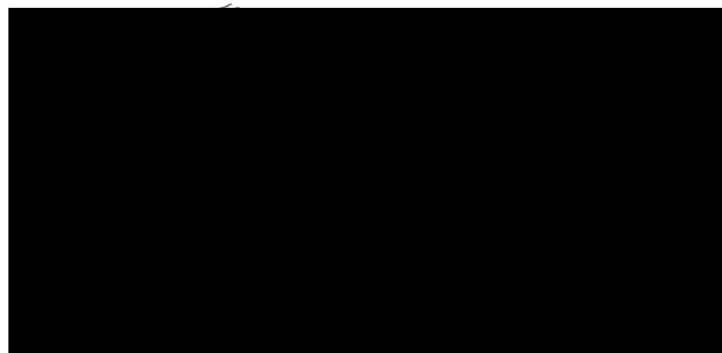
This report confirms that the above instrument has been calibrated.

The actual measurement results are stated on the inside of Validation Calibration
Report.

Qualifier's signature / Date

Acceptor's signature / Date

Performance Qualification Report



Carrier Gas Flow Rate Accuracy Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** Qualifier: **Mescotech Co., Ltd.**
 Department: **LAB Analytical** Procedure: **VKIT.GC.FLOW**
 Manufacturer: **PERKIN ELMER** Model: **Clarus 580**
 Serial No: **580S17020103** Detector Type: **FID**
 Standard Batch: **N/A** Traceable To: **3186-GFM**
 Expiry Date: **March 31,2023** System ID **GC 1**

The result reference to raw data on page: 1

Setpoint Flow Rate ml/min.	Observed Flow Rate ml/min.	Deviation ml/min. % Error
1.00	1.03	3.00
2.00	2.03	1.50
3.00	3.11	3.67
4.00	4.11	2.75
5.00	5.13	2.60

Acceptance criteria
of absolute deviation
Evaluate Result

≤ 5%.

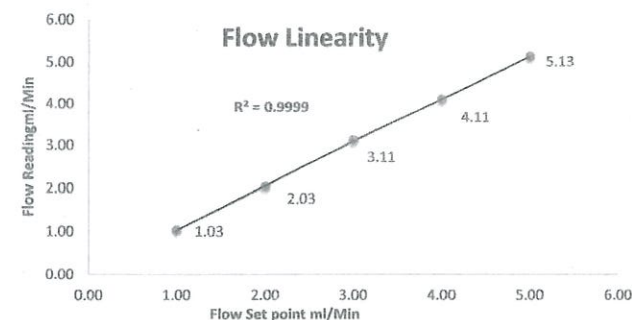
PASS

Carrier Gas Flow Rate Linearity Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** Qualifier: **Mescotech Co., Ltd.**
 Department: **LAB Analytical** Procedure: **VKIT.GC.FLOW**
 Manufacturer: **PERKIN ELMER** Model: **Clarus 580**
 Serial No: **580S17020103** Detector Type: **FID**
 Standard Batch: **N/A** Traceable To: **3186-GFM**
 Expiry Date: **March 31,2023** System ID: **GC 1**

The result reference to raw data on page: 1

Flow Rate Setpoint (ml/min)	Flow Rate (ml/min) Reading
1.00	1.03
2.00	2.03
3.00	3.11
4.00	4.11
5.00	5.13
R-Square	0.9999



Acceptance criteria of $R^2 > 0.9990$

Evaluate Result

PASS

GC Column OvenTemperature Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**
 Department: **LAB Analytical**
 Manufacturer: **PERKIN ELMER**
 Serial No: **580S17020103**
 Standard Batch: **N/A**
 Expiry Date: **March 31,2023**

Qualifier: **Mescotech Co., Ltd.**
 Procedure: **VKIT.GC.TEMPACC**
 Model: **Clarus 580**
 Detector Type: **FID**
 Traceable To: **1513-DTM**
 System ID: **GC 1**

The result reference to raw data on page: 2

Setpoint Temperature (°C)	Collected 1 Temperature (°C)	Collected 2 Temperature (°C)	Collected 3 Temperature (°C)	Collected 4 Temperature (°C)	Collected 5 Temperature (°C)	Average Temperature (°C)	Deviation of Accuracy Absolute/°C. (Set Temp-Average Temp)
50.0	50.2	50.2	50.2	50.3	50.2	50.2	0.22
100.0	100.4	100.4	100.4	100.3	100.4	100.4	0.38
150.0	150.6	150.6	150.7	150.6	150.5	150.6	0.60
200.0	199.5	199.6	199.5	199.5	199.5	199.5	0.48
250.0	250.6	250.4	250.3	250.5	250.5	250.5	0.46

Acceptance criteria $\leq 1^{\circ}\text{C}$.
 of absolute deviation Accuracy

Evaluate Result **PASS**

GC Column OvenTemperature Stability Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**
 Department: **LAB Analytical**
 Manufacturer: **PERKIN ELMER**
 Serial No: **580S17020103**
 Standard Batch: **N/A**
 Expiry Date: **March 31,2023**

Qualifier: **Mescotech Co., Ltd.**
 Procedure: **VKIT.GC.TEMPSTEB**
 Model: **Clarus 580**
 Detector Type: **FID**
 Traceable To: **2706-DTM**
 System ID: **GC 1**

The result reference to raw data on page: 3

Setpoint Temperature (°C)	Collected Point1 Temperature (°C)	Collected Point2 Temperature (°C)	Collected Point3 Temperature (°C)	Collected Point4 Temperature (°C)	Collected Point5 Temperature (°C)	Average Temperature (°C)	STDEV Temperature (°C)
100.0	100.4	100.4	100.4	100.3	100.4	100.38	0.04

Acceptance criteria $\leq 0.5^{\circ}\text{C}$.
 of absolute deviation Stability

Evaluate Result **PASS**

GC Injections Carry Over Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**
 Department: **LAB Analytical**
 Manufacturer: **PERKIN ELMER**
 Serial No: **580S17020103**
 Standard Batch: **177-FID**
 Expiry Date: **March 31,2023**

Qualifier: **Mescotech Co., Ltd.**
 Procedure: **VKIT.GC.LINPRC**
 Model: **Clarus 580**
 Detector Type: **FID**
 Traceable To: **177-FID**
 System ID: **GC 1**

The result reference to raw data on page: 6-8

Injections	Peak Retention Time	Area
Carry Over Blank1	-	0.000
Standard 0.08% Tetradecane	0.659	1293719.17
Carry Over Blank2	-	0.000
%Carry Over		0.000

Acception criteria of %Carry Over $\leq 0.01\%$

Evaluate Result **PASS**

GC Injections Area Precision Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**
 Department: **LAB Analytical**
 Manufacturer: **PERKIN ELMER**
 Serial No: **580S17020103**
 Standard Batch: **177-FID**
 Expiry Date: **March 31,2023**

Qualifier: **Mescotech Co., Ltd.**
 Procedure: **VKIT.GC.LINPRC**
 Model: **Clarus 580**
 Detector Type: **FID**
 Traceable To: **177-FID**
 System ID: **GC 1**

The result reference to raw data on page: 9-14

Number of Injections	Retention Time	Area Peak Number 2
Precision 1 0.08% Tetradecane	0.660	1295673.29
Precision 2 0.08% Tetradecane	0.660	1305770.17
Precision 3 0.08% Tetradecane	0.660	1308936.14
Precision 4 0.08% Tetradecane	0.660	1298993.84
Precision 5 0.08% Tetradecane	0.660	1294187.56
Precision 6 0.08% Tetradecane	0.659	1306199.98
Average 0.08% Tetradecane		1301626.83
STDEV		6151.86
%RSD		0.47

Acception criteria of Precision $\leq 1\%$
 (%RSD)
 Evaluate Result **PASS**



VCR-9

GC Injections Retention Precision Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**
Department: **LAB Analytical**
Manufacturer: **PERKIN ELMER**
Serial No: **580S17020103**
Standard Batch: **177-FID**
Expiry Date: **March 31,2023**

Qualifier: **Mescotech Co., Ltd.**
Procedure: **VKIT.GC.LINPRC**
Model: **Clarus 580**
Detector Type: **FID**
Traceable To: **177-FID**
System ID: **GC 1**

The result reference to raw data on page: 9-14

Number of Injections	Peak Retention time Peak Number 2
Precision 1 0.08% Tetradecane	0.660
Precision 2 0.08% Tetradecane	0.660
Precision 3 0.08% Tetradecane	0.660
Precision 4 0.08% Tetradecane	0.660
Precision 5 0.08% Tetradecane	0.660
Precision 6 0.08% Tetradecane	0.659
Average	0.660
STDEV	0.000
%RSD	0.06

Acceptance criteria of Peak Retention (%RSD) $\leq 0.5\%$

Evaluate Result **PASS**



VCR-10

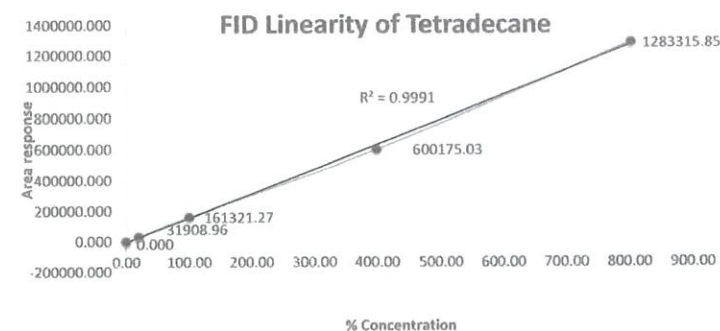
FID Linearity Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**
Department: **LAB Analytical**
Manufacturer: **PERKIN ELMER**
Serial No: **580S17020103**
Standard Batch: **177-FID**
Expiry Date: **March 31,2023**

Qualifier: **Mescotech Co., Ltd.**
Procedure: **VKIT.GC.LINPRC**
Model: **Clarus 580**
Detector Type: **FID**
Traceable To: **177-FID**
System ID: **GC 1**

The result reference to raw data on page: 15-19

Injection	Tetradecane concentration (µg/ml)	Area
Linearity 1 0.000% Tetradecane	0.00	0.000
Linearity 2 0.002% Tetradecane	20.00	31908.96
Linearity 3 0.010% Tetradecane	100.20	161321.27
Linearity 4 0.040% Tetradecane	398.60	600175.03
Linearity 5 0.080% Tetradecane	802.30	1283315.85
R-Square		0.9991



Acceptance criteria of Linearity (R^2) > 0.9990

Evaluate Result **PASS**



VCR-11

Data System Linearity of Detection Check

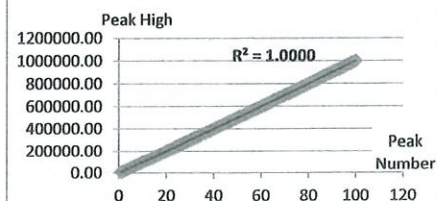
Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**Department: **LAB Analytical**Manufacturer: **PERKIN ELMER**SoftWare Version: **6.3.2.0646**Standard Batch: **N/A**Expiry Date: **March 31,2023**Qualifier: **Mescotech Co., Ltd.**Procedure: **Validator Method**Model: **TotalChrom**Traceable To: **Validator™**System ID: **GC 1**

The result reference to raw data on page: 20-22

Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)
1	10002.00	26	260002.43	51	509996.49	76	759996.98
2	20003.00	27	270002.06	52	519993.03	77	769993.79
3	30004.00	28	281599.30	53	529994.64	78	780631.83
4	40004.00	29	290001.64	54	539997.42	79	789994.06
5	50004.53	30	300003.60	55	549996.61	80	799996.06
6	60006.00	31	310002.06	56	559996.06	81	809994.61
7	70005.00	32	320005.98	57	569994.06	82	819996.97
8	80003.00	33	330004.52	58	579991.43	83	829996.57
9	90004.06	34	340005.72	59	589993.16	84	839996.61
10	100006.38	35	350005.35	60	599994.14	85	849995.05
11	110004.48	36	360003.49	61	609991.62	86	859996.12
12	120004.00	37	370003.06	62	619995.56	87	869995.92
13	130005.06	38	380005.12	63	629990.37	88	879994.61
14	140006.36	39	390002.44	64	639993.06	89	889995.06
15	150004.44	40	400000.84	65	649994.62	90	899994.59
16	160005.06	41	410003.61	66	659993.58	91	909996.23
17	170004.67	42	420001.49	67	669990.49	92	919995.29
18	180004.49	43	429999.68	68	679996.01	93	929995.41
19	190006.49	44	440000.06	69	689994.78	94	939994.44
20	200005.14	45	449998.44	70	699993.99	95	949993.25
21	210002.03	46	459996.88	71	709992.6	96	959996.12
22	220004.44	47	469999.06	72	719992.75	97	969992.63
23	230003.37	48	479996.98	73	729996.12	98	979995.09
24	240003.12	49	489994.06	74	739995.6	99	989993.96
25	250002.84	50	499996.99	75	749995.66	100	999993.66

R-Square

1.0000



Linearity Correlation Calculated

Acceptance criteria of R² ≥ 0.9960

Evaluate Result

PASS

VCR-12

Data System Precision of Detection Check

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.**Department: **LAB Analytical**Manufacturer: **PERKIN ELMER**SoftWare Version: **6.3.2.0646**Standard Batch: **N/A**Expiry Date: **March 31,2023**Qualifier: **Mescotech Co., Ltd.**Procedure: **Validator Method**Model: **TotalChrom**Traceable To: **Validator™**Traceable To: **Validator™**System ID: **GC 1**

The result reference to raw data on page: 20-34

Collected 3 Peak Data 4-1		Collected 3 Peak Data 4-2		Collected 3 Peak Data 4-3		Collected 3 Peak Data 4-4		Collected 3 Peak Data 4-5	
Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)	Peak Number#	Peak High (uVolt)
1	10002.000	1	10002.120	1	10003.000	1	10001.000	1	10005.560
50	499996.990	50	499986.060	50	499995.890	50	499996.120	50	499974.610
100	999993.660	100	999979.490	100	999996.270	100	999996.540	100	999952.560

%RSD at peak Number 1 = 0.02

%RSD at peak Number 50 = 0.00

%RSD at peak Number 100 = 0.00

Acceptance criteria %RSD ≤ 0.5

of Precision deviation

Evaluate Result

PASS



Data System Number of Detection Check

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** Qualifier: **Mescotech Co., Ltd.**
Department: **LAB Analytical** Procedure: **Validator Method**
Manufacturer: **PERKIN ELMER** Model: **TotalChrom**
SoftWare Version: **6.3.2.0646** Traceable To: **Validator™**
Standard Batch: **N/A** Traceable To: **Validator™**
Expiry Date: **March 31,2023** System ID: **GC 1**

The result reference to raw data on page: 35-36

Peak Count#	Peak count Detected
Peak Detected Specify	
≥ 32 Peak Number	43 Peak Number
Acception criteria of absolute deviation	≥ 32 Peak
Evaluate Result	PASS



Data System Square Peak High Check

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** Qualifier: **Mescotech Co., Ltd.**
Department: **LAB Analytical** Procedure: **Validator Method**
Manufacturer: **PERKIN ELMER** Model: **TotalChrom**
SoftWare Version: **6.3.2.0646** Traceable To: **Validator™**
Standard Batch: **N/A** Traceable To: **Validator™**
Expiry Date: **March 31,2023** System ID: **GC 1**

The result reference to raw data on page: 37

Peak Number#	Peak high /1000	%deviation	Evaluate Result
Peak Detection Specify	Collected (millivolt)		
1 500 millivolt	499.992	0.00	PASS
2 1000 millivolt	999.999	0.00	PASS
Acception criteria of % deviation		≤1%	
Evaluate Result			PASS

Data System Retention Time Reproduced Check

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** Qualifier: **Mescotech Co., Ltd.**
 Department: **LAB Analytical** Procedure: **Validator Method**
 Manufacturer: **PERKIN ELMER** Model: **TotalChrom**
 SoftWare Version: **6.3.2.0646** Traceable To: **Validator TM**
 Standard Batch: **N/A** System ID: **GC 1**
 Expiry Date: **March 31,2023**

The result reference to raw data on page: 38

Peak Number#	Retention Time Apex	Previous peak-Curent peak Absolute time /min.	Evaluate Result
1	0.476	N/A	
2	1.897	1.421	PASS
3	3.318	1.421	PASS
4	4.738	1.420	PASS
5	6.159	1.421	PASS
6	7.580	1.421	PASS
		Acception criteria of absolute deviation	1.41-1.43 Minute
		Evaluate Result	PASS

Raw Data
Atthachment

Carrier Gas Flow Rate Accuracy Raw data Record

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Department: LAB Analytical
 Instrument Model: Clarus 580 GC Serial Number: 580S17020103

Validated	
Flow rate ml/min	Collected
1.00	1.03
2.00	2.03
3.00	3.11
4.00	4.11
5.00	5.13

Calibrated	
Flow rate ml/min	Collected
1.00	1.03
2.00	2.03
3.00	3.11
4.00	4.11
5.00	5.13

Column Oven Temperature Raw data Reading

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Department: LAB Analytical
 Instrument Model: Clarus 580 GC Serial Number: 580S17020103

Validated					
Temperature °C	Temp at 50 °C	Temp at 100 °C	Temp at 150 °C	Temp at 200 °C	Temp at 250 °C
Reading 1	50.2	100.4	150.6	199.5	250.6
Reading 2	50.2	100.4	150.6	199.6	250.4
Reading 3	50.2	100.4	150.7	199.5	250.3
Reading 4	50.3	100.3	150.6	199.5	250.5
Reading 5	50.2	100.4	150.5	199.5	250.5

Calibrated					
Temperature °C	Temp at 50 °C	Temp at 100 °C	Temp at 150 °C	Temp at 200 °C	Temp at 250 °C
Reading 1	50.2	100.4	150.6	199.5	250.6
Reading 2	50.2	100.4	150.6	199.6	250.4
Reading 3	50.2	100.4	150.7	199.5	250.3
Reading 4	50.3	100.3	150.6	199.5	250.5
Reading 5	50.2	100.4	150.5	199.5	250.5

Column Oven Temperature Stability Raw data Reading

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD
Instrument Model: Clarus 580 GC

Department: LAB Analytical
Serial Number: 580S17020103

Validated

Temperature °C Position #	Temp stability at 100 °C
Position 1	100.4
Position 2	100.4
Position 3	100.4
Position 4	100.3
Position 5	100.4

Validated

Temperature °C Position #	Temp stability at 100 °C
Position 1	100.4
Position 2	100.4
Position 3	100.4
Position 4	100.3
Position 5	100.4

Injector port Temperature Raw data Reading

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD Department: LAB Analytical
Instrument Model: Clarus 580 GC Serial Number: 580S17020103

Validated

Temperature °C	Injector Temp 150 °C	Injector Temp 200 °C	Injector Temp 250 °C
Temperature Collectec	147.4	196.2	246.6

Calibrated

Temperature °C	Injector Temp 150 °C	Injector Temp 200 °C	Injector Temp 250 °C
Temperature Collectec	147.4	196.2	246.6



GC Injector Temperature Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,L** Qualifier: **Mescotech Co., Ltd.**
Department: **LAB Analytical** Procedure: **VKIT.GC.TEMPACC**
Manufacturer: **PERKIN ELMER** Model: **Clarus 580**
Serial No: **580S17020103** Detector Type: **FID**
Standard Batch: **N/A** Traceable To: **2706-DTM**
Expiry Date: **March 31,2023** System ID: **GC 1**

The result reference to raw data on page: 4

Setpoint Temperature (°C)	Collected Temperature (°C)	Deviation of Accuracy Absolute/°C. (Set Temp-Average Temp)
150.0	147.4	2.6
200.0	196.2	3.8
250.0	246.6	3.4

Acception criteria $\leq 10^{\circ}\text{C}$.
of absolute deviation Accuracy
Evaluate Result **PASS**



GC Base Detector Temperature Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTI** Qualifier: **Mescotech Co., Ltd.**
Department: **LAB Analytical** Procedure: **VKIT.GC.TEMPACC**
Manufacturer: **PERKIN ELMER** Model: **Clarus 580**
Serial No: **580S17020103** Detector Type: **FID**
Standard Batch: **N/A** Traceable To: **2706-DTM**
Expiry Date: **March 31,2023** System ID: **GC 1**

The result reference to raw data on page: 5

Setpoint Temperature (°C)	Collected Temperature (°C)	Deviation of Accuracy Absolute/°C. (Set Temp-Average Temp)
250.0	246.2	3.80
300.0	296.4	3.60

Acception criteria $\leq 10^{\circ}\text{C}$.
of absolute deviation Accuracy

Evaluate Result **PASS**

Base Detector Temperature Raw data Reading

Page 1 of 1

Customer Name: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,L** Department: LAB Analytical
 Instrument Model: **Clarus 580 GC** Serial Number: **580S17020103**

Validated

Temperature °C	Base Detector Temp 250 °C	Base Detector Temp 300 °C
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Temperature Collecte

246.2

296.4

Calibrated

Temperature °C	Base Detector Temp 250 °C	Base Detector Temp 300 °C
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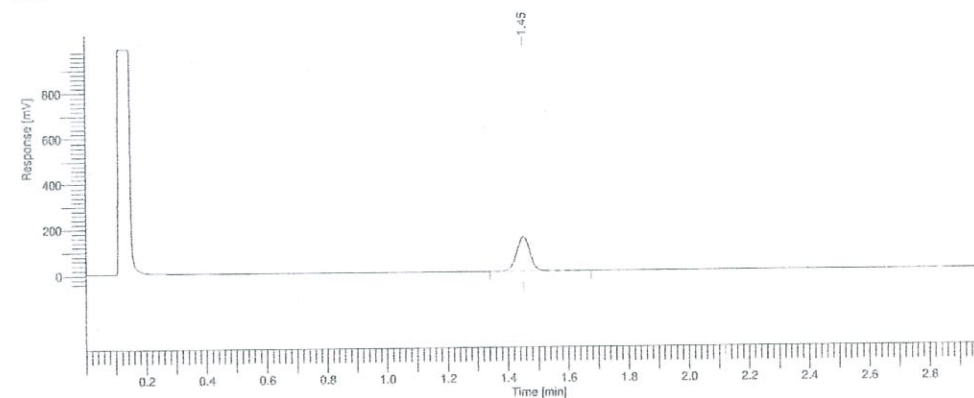
Temperature Collecte

246.2

296.4

Software Version : 6.3.2.0646 Date : 31-Mar-22 5:41:09 PM :
 Operator : manager Sample Name : Carry Over 1 :
 Sample Number : Study 0/40
 AutoSampler : BUILT-IN Rack/Vial : A
 Instrument Name : Clarus580 Channel : 1000
 Instrument Serial # : None A/D mV Range : 3.00 min
 Delay Time : 0.00 min End Time
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 3:56:18 PM Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-001.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-001.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Hexadecane	1.452	437386.67	148455.88	100.00	100.00	0.4374
			437386.67	148455.88	100.00	100.00	0.4374

Missing Component Report
 Component Expected Retention (Calibration File)
 Tetradecane 0.659

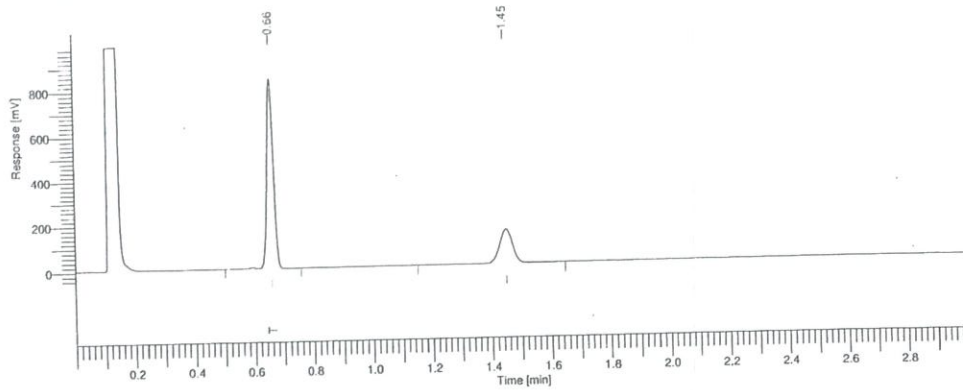
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Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:04:51 PM

Date : 31-Mar-22 5:21:03 PM
 Sample Name :
 Study : Carry Over Standard
 Rack/Vial : 0/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-015.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-015.raw
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 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.659	1293719.17	838328.50	74.64	74.64	1.2937
2	Hexadecane	1.449	439533.62	149444.56	25.36	25.36	0.4395
			1733252.80	987773.06	100.00	100.00	1.7333

Missing Component Report
 Component Expected Retention (Calibration File)

All components were found

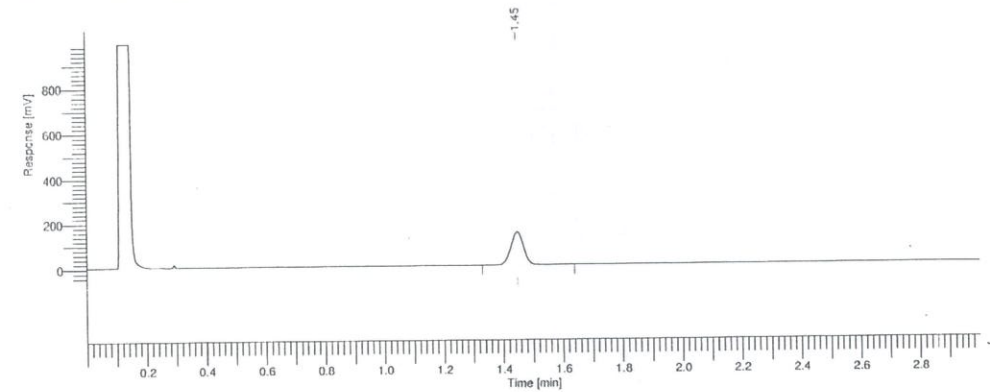
Page 1 of 1

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:09:50 PM

Date : 31-Mar-22 5:22:28 PM
 Sample Name :
 Study : Carry Over 2
 Rack/Vial : 0/40
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-016.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-016.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

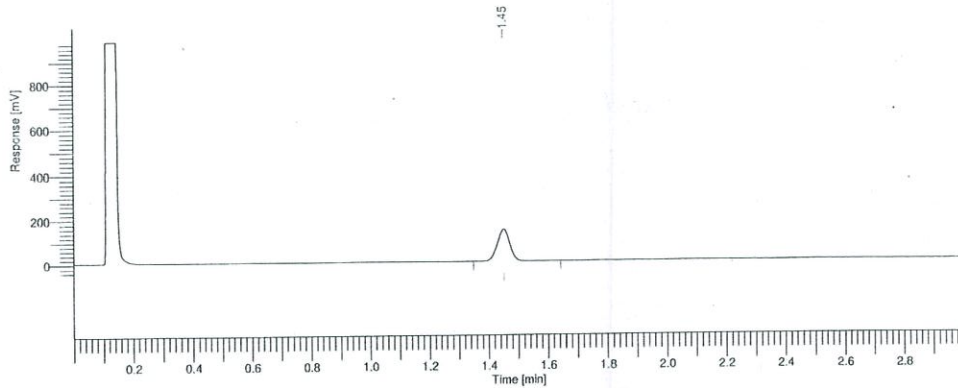
Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Hexadecane	1.448	430994.62	146800.20	100.00	100.00	0.4310
			430994.62	146800.20	100.00	100.00	0.4310

Missing Component Report
 Component Expected Retention (Calibration File)
 Tetradecane 0.659

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:14:45 PM

Date : 31-Mar-22 5:23:28 PM
 Sample Name : FID linearity1 :
 Study : 0/40
 Rack/Vial : A
 Channel : 1000
 A/D mV Range : 3.00 min
 End Time :
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-017.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-017.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Hexadecane	1.451	426884.25	145527.00	100.00	100.00	0.4269
			426884.25	145527.00	100.00	100.00	0.4269

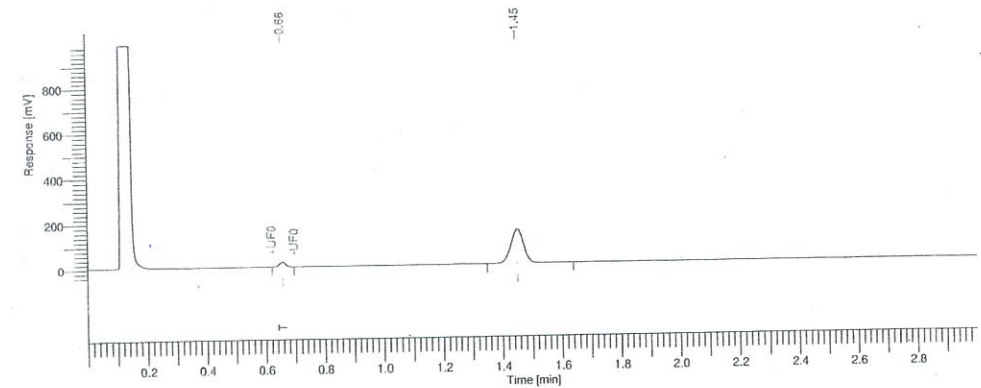
Missing Component Report
 Component Expected Retention (Calibration File)

Tetradecane	0.659
-------------	-------

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:19:42 PM

Date : 31-Mar-22 5:24:15 PM
 Sample Name : FID linearity2 :
 Study : 0/41
 Rack/Vial : A
 Channel : 1000
 A/D mV Range : 3.00 min
 End Time :
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-018.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-018.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.657	31908.96	21085.46	6.77	6.77	0.0319
2	Hexadecane	1.451	439305.86	149309.44	93.23	93.23	0.4393
			471214.82	170394.89	100.00	100.00	0.4712

Missing Component Report
 Component Expected Retention (Calibration File)

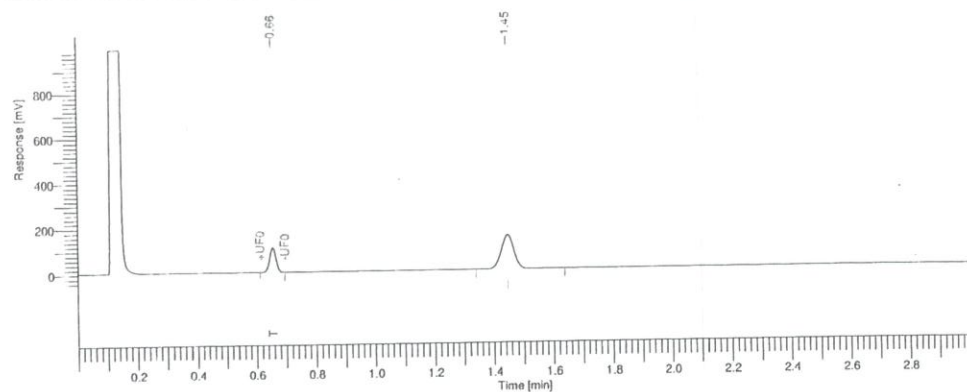
All components were found

Page 1 of 1

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number : BUILT-IN
 AutoSampler : Clarus580
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:24:37 PM

Date : 31-Mar-22 5:28:45 PM :
 Sample Name : FID linearity3
 Study : 0/42
 Rack/Vial : A
 Channel : 1000
 A/D mV Range : 3.00 min
 End Time :
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-019.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-019.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.656	161321.27	106965.09	26.87	26.87	0.1613
2	Hexadecane	1.447	439151.76	149579.21	73.13	73.13	0.4392
		600473.03	256544.30	100.00	100.00		0.6005

Missing Component Report
 Component Expected Retention (Calibration File)

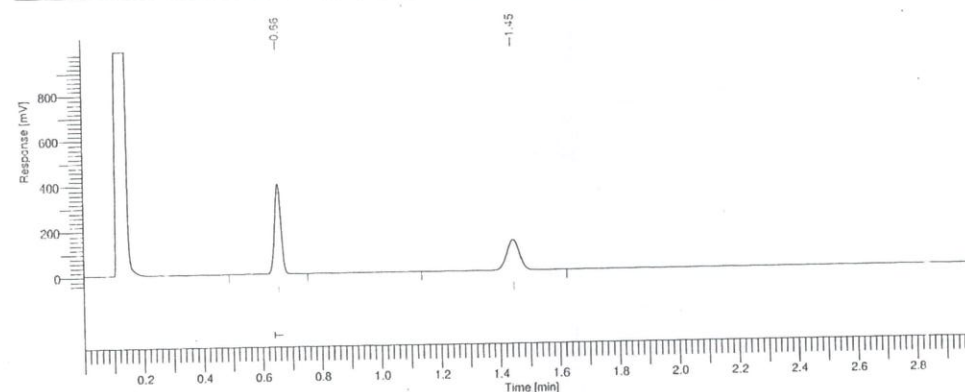
All components were found

Page 1 of 1

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number : BUILT-IN
 AutoSampler : Clarus580
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:29:32 PM

Date : 31-Mar-22 5:33:23 PM :
 Sample Name : FID linearity4
 Study : 0/43
 Rack/Vial : A
 Channel : 1000
 A/D mV Range : 3.00 min
 End Time :
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-020.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-020.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.656	600175.03	395620.48	59.96	59.96	0.6002
2	Hexadecane	1.446	400859.08	136615.25	40.04	40.04	0.4009
		1001034.11	532235.74	100.00	100.00		1.0010

Missing Component Report
 Component Expected Retention (Calibration File)

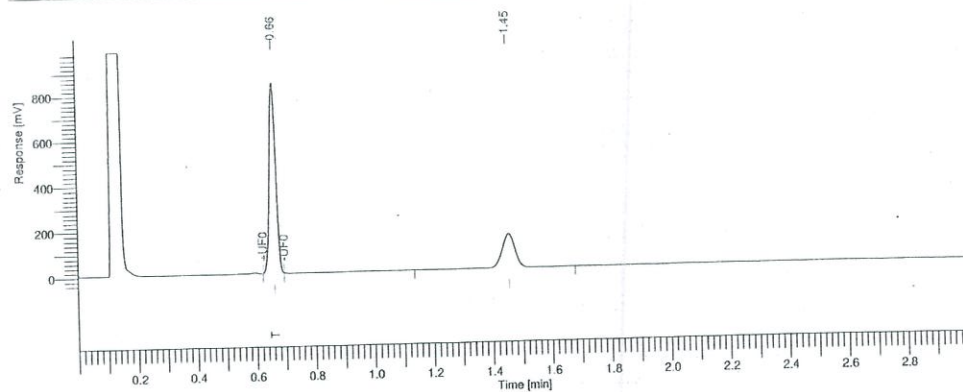
All components were found

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 5:34:28 PM

Date : 31-Mar-22 5:46:13 PM
 Sample Name : FID linearity5
 Study : 0/44
 Rack/Vial : A
 Channel : 1000
 A/D mV Range : 3.00 min
 End Time

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-021.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-021.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.661	1283315.85	840769.25	74.25	74.25	1.2833
2	Hexadecane	1.454	445139.42	150519.76	25.75	25.75	0.4451
			1728455.27	991289.01	100.00	100.00	1.7285

Missing Component Report
 Component Expected Retention (Calibration File)

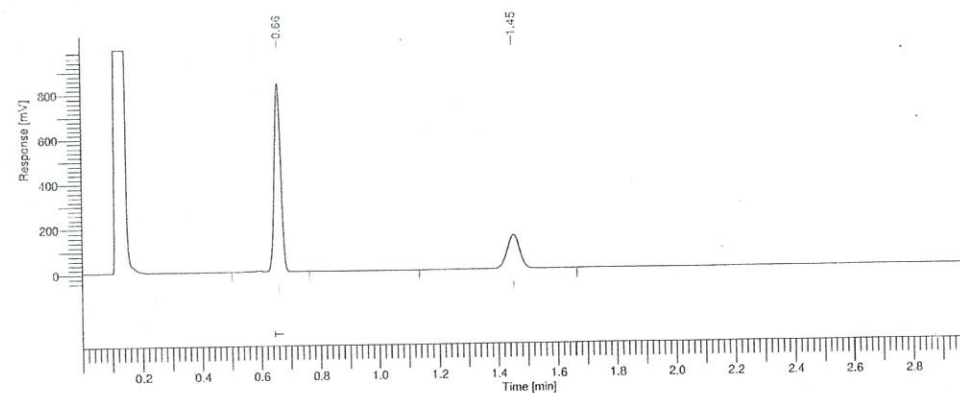
All components were found

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 4:35:32 PM

Date : 31-Mar-22 5:16:14 PM
 Sample Name :
 Study : Precision1
 Rack/Vial : 0/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-009.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-009.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.660	1295673.69	838084.18	74.58	74.58	1.2957
2	Hexadecane	1.453	441611.21	150261.32	25.42	25.42	0.4416
			1737284.89	988345.50	100.00	100.00	1.7373

Missing Component Report
 Component Expected Retention (Calibration File)

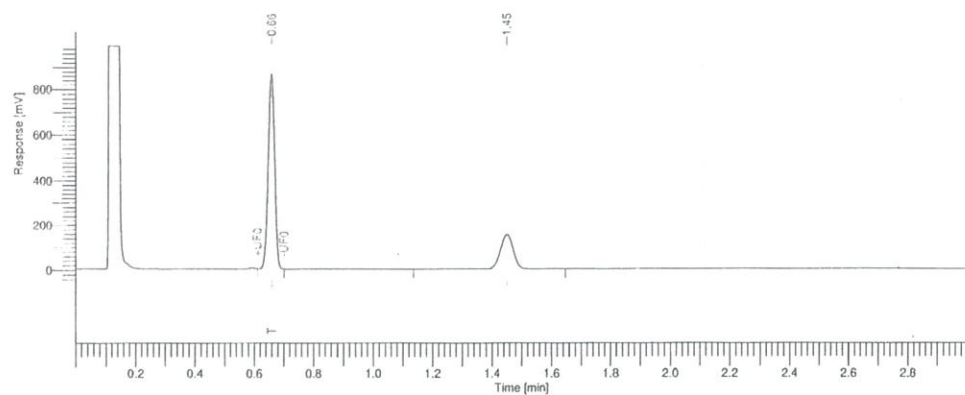
All components were found

Page 1 of 1

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 4:40:23 PM

Date : 31-Mar-22 5:17:02 PM
 Sample Name :
 Study : Precision2
 Rack/Vial : n/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-010.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-010.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File: d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.660	1305770.17	863096.94	74.29	74.29	1.3058
2	Hexadecane	1.451	451788.58	153530.11	25.71	25.71	0.4518
			1757558.75	1.02e+06	100.00	100.00	1.7576

Missing Component Report
 Component Expected Retention (Calibration File)

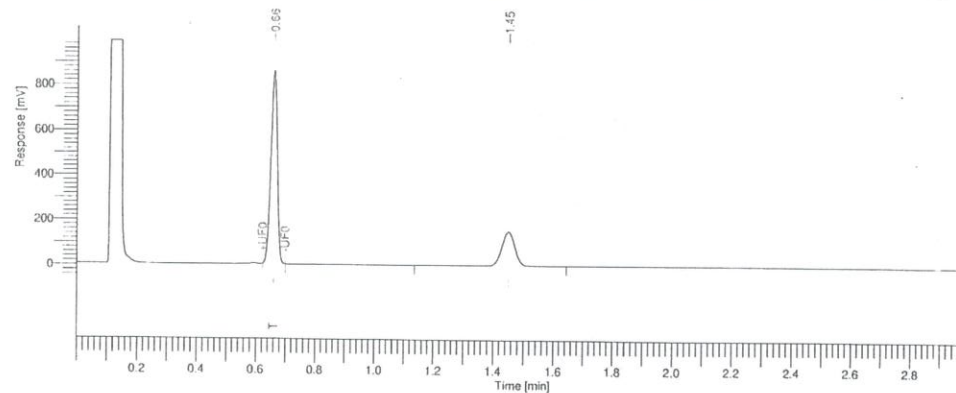
All components were found

Page 1 of 1

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 4:45:16 PM

Date : 31-Mar-22 5:18:00 PM
 Sample Name :
 Study : Precision3
 Rack/Vial : n/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-011.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-011.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File: d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.660	1308936.14	857593.27	74.23	74.23	1.3089
2	Hexadecane	1.450	454492.18	154321.94	25.77	25.77	0.4545
			1763428.32	1.01e+06	100.00	100.00	1.7634

Missing Component Report
 Component Expected Retention (Calibration File)

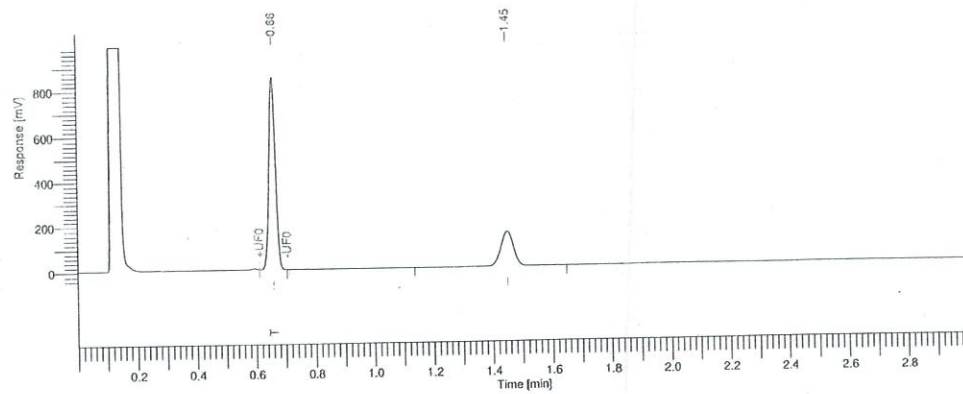
All components were found

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 4:50:12 PM

Date : 31-Mar-22 5:19:22 PM
 Sample Name :
 Study : Precision4
 Rack/Vial : 0/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-012.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-012.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.660	1298993.84	847080.22	74.25	74.25	1.2990
2	Hexadecane	1.449	450473.22	153386.07	25.75	25.75	0.4505
		1749467.06	1.00e+06	100.00	100.00	1.7495	

Missing Component Report
 Component Expected Retention (Calibration File)

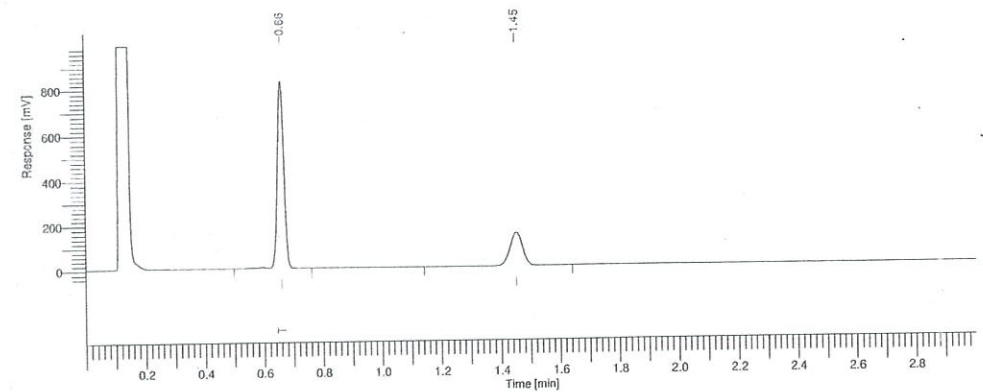
All components were found

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 4:55:04 PM

Date : 31-Mar-22 5:19:55 PM
 Sample Name :
 Study : Precision5
 Rack/Vial : 0/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-013.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-013.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.660	1294187.56	829446.52	74.54	74.54	1.2942
2	Hexadecane	1.452	442153.32	150151.79	25.46	25.46	0.4422
		1736340.88	979598.31	100.00	100.00	1.7363	

Missing Component Report
 Component Expected Retention (Calibration File)

All components were found

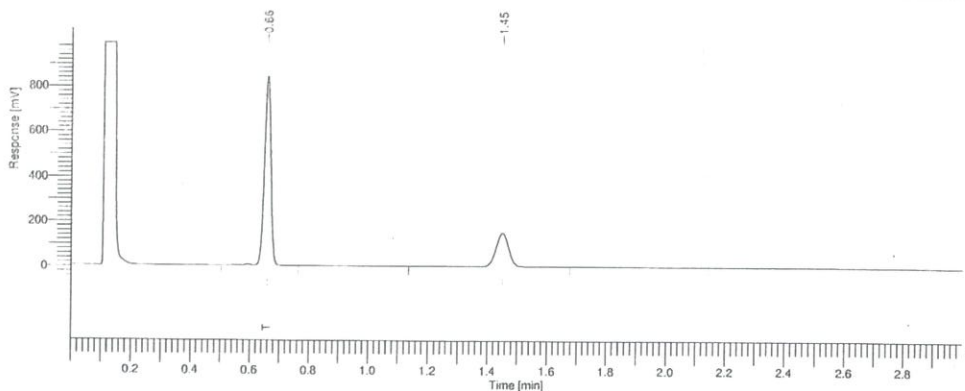
Page 1 of 1

Software Version : 6.3.2.0646
 Operator : manager
 Sample Number :
 AutoSampler : BUILT-IN
 Instrument Name : Clarus580
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Sample Volume : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 4:59:59 PM

Date : 31-Mar-22 5:20:27 PM
 Sample Name :
 Study : Precision6
 Rack/Vial : 0/44
 Channel : A
 A/D mV Range : 1000
 End Time : 3.00 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\DATA\DATA\2022\Calibration_-014.raw
 Inst Method : d:\data\method\2022\calibrationgc from D:\DATA\DATA\2022\Calibration_-014.raw
 Proc Method : d:\data\method\2022\calibrationgc.mth from
 Calib Method : d:\data\method\2022\calibrationgc.mth from
 Report Format File : d:\data\report\format\analysis report.rpt
 Sequence File : D:\DATA\SEQUENCE\Calibration2022_2.seq



ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	0.659	1306199.98	842067.32	74.59	74.59	1.3062
2	Hexadecane	1.451	445075.87	150878.30	25.41	25.41	0.4451
		1751275.85	992945.62	100.00	100.00	1.7513	

Missing Component Report
 Component Expected Retention (Calibration File)

All components were found

Page 1 of 3

Software Version : 6.3.2.0646
 Operator : service
 Sample Number :
 AutoSampler :
 Instrument Name :
 Interface Serial # :
 Delay Time : 0.00 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 uL
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 9:35:10 AM

Date : 31-Mar-22 1:11:33 PM
 Sample Name :
 Study :
 Rack/Vial : 0/1
 Channel : A
 A/D mV Range : 1000
 End Time : 8.50 min
 12:55:15

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 4-1dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 4-1dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [uV*s]	Height [uV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.113	24993.50	10002.00	0.02	0.02	BB	2.4989
2	0.193	49998.30	20003.00	0.04	0.04	BB	2.4995
3	0.285	75003.50	30004.00	0.06	0.06	BB	2.4998
4	0.365	100006.60	40004.00	0.08	0.08	BB	2.4999
5	0.462	125005.80	50004.53	0.10	0.10	BB	2.4999
6	0.543	150011.10	60006.00	0.12	0.12	BB	2.4999
7	0.623	175009.50	70005.00	0.14	0.14	BB	2.5000
8	0.698	200007.90	80003.00	0.16	0.16	BB	2.5000
9	0.800	225010.20	90004.06	0.18	0.18	BB	2.5000
10	0.865	250015.55	100006.38	0.20	0.20	BB	2.5000
11	0.955	275014.15	110004.48	0.22	0.22	BB	2.5000
12	1.037	300014.80	120004.00	0.24	0.24	BB	2.5000
13	1.120	325018.30	130005.06	0.26	0.26	BB	2.5000
14	1.203	350020.25	140006.36	0.28	0.28	BB	2.5000
15	1.303	375017.70	150004.44	0.30	0.30	BB	2.5000
16	1.368	400024.40	160005.06	0.32	0.32	BB	2.5001
17	1.465	425022.00	170004.67	0.34	0.34	BB	2.5001
18	1.537	450021.90	180004.49	0.36	0.36	BB	2.5001
19	1.623	475028.30	190006.49	0.38	0.38	BB	2.5001
20	1.714	500025.85	200005.14	0.40	0.40	BB	2.5001
21	1.794	525019.65	210002.03	0.42	0.42	BB	2.5001
22	1.868	550025.70	220004.44	0.44	0.44	BB	2.5001
23	1.952	575026.20	230003.37	0.46	0.46	BB	2.5001
24	2.038	600028.10	240003.12	0.48	0.48	BB	2.5001
25	2.127	625027.30	250002.84	0.50	0.50	BB	2.5001
26	2.209	650021.86	260002.43	0.51	0.51	BB	2.5001
27	2.295	675024.01	270002.06	0.53	0.53	BB	2.5001
28	2.384	700038.70	281599.30	0.55	0.55	BB	2.4859

5/6/2564 12:55:15 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
29	2.452	725032.26	290001.64	0.57	0.57	BB	2.5001
30	2.548	750028.46	300003.60	0.59	0.59	BB	2.5001
31	2.625	775027.91	310002.06	0.61	0.61	BB	2.5001
32	2.705	800045.46	320005.98	0.63	0.63	BB	2.5001
33	2.787	825042.61	330004.52	0.65	0.65	BB	2.5001
34	2.873	850037.61	340005.72	0.67	0.67	BB	2.5001
35	2.960	875036.91	350005.35	0.69	0.69	BB	2.5001
36	3.043	900041.41	360003.49	0.71	0.71	BB	2.5001
37	3.123	925041.81	370003.06	0.73	0.73	BB	2.5001
38	3.215	950038.41	380005.12	0.75	0.75	BB	2.5001
39	3.290	975035.61	390002.44	0.77	0.77	BB	2.5001
40	3.375	1000037.11	400000.84	0.79	0.79	BB	2.5001
41	3.463	1025046.51	410003.61	0.81	0.81	BB	2.5001
42	3.538	1050035.21	420001.49	0.83	0.83	BB	2.5001
43	3.630	1075028.31	429999.68	0.85	0.85	BB	2.5001
44	3.715	1100038.91	440000.06	0.87	0.87	BB	2.5001
45	3.790	1125037.81	449998.44	0.89	0.89	BB	2.5001
46	3.874	1150028.51	459996.88	0.91	0.91	BB	2.5001
47	3.958	1175030.21	469999.06	0.93	0.93	BB	2.5001
48	4.037	1200031.91	479996.98	0.95	0.95	BB	2.5001
49	4.125	1225027.41	489994.06	0.97	0.97	BB	2.5001
50	4.218	1250027.81	499996.99	0.99	0.99	BB	2.5001
51	4.300	1275024.61	509996.49	1.01	1.01	BB	2.5001
52	4.380	1300023.96	519993.03	1.03	1.03	BB	2.5001
53	4.458	1325033.61	529994.64	1.05	1.05	BB	2.5001
54	4.545	1350033.16	539997.42	1.07	1.07	BB	2.5001
55	4.628	1375023.61	549996.61	1.09	1.09	BB	2.5001
56	4.708	1400033.51	559996.06	1.11	1.11	BB	2.5001
57	4.803	1425032.31	569994.06	1.13	1.13	BB	2.5001
58	4.875	1450020.16	579991.43	1.15	1.15	BB	2.5001
59	4.955	1475018.11	589993.16	1.17	1.17	BB	2.5001
60	5.047	1500027.76	599994.14	1.19	1.19	BB	2.5001
61	5.123	1525029.16	609991.62	1.21	1.21	BB	2.5001
62	5.216	1550032.06	619995.56	1.23	1.23	BB	2.5001
63	5.295	1575009.52	629990.37	1.25	1.25	BB	2.5001
64	5.375	1600031.21	639993.06	1.27	1.27	BB	2.5001
65	5.461	1625039.36	649994.62	1.29	1.29	BB	2.5001
66	5.546	1650033.26	659993.58	1.31	1.31	BB	2.5001
67	5.620	1675013.72	669990.49	1.33	1.33	BB	2.5001
68	5.715	1700032.87	679996.01	1.35	1.35	BB	2.5001
69	5.790	1725041.12	689994.78	1.37	1.37	BB	2.5001
70	5.874	1750034.22	699993.99	1.39	1.39	BB	2.5001
71	5.960	1775019.02	709992.60	1.41	1.41	BB	2.5001
72	6.039	1800033.02	719992.75	1.43	1.43	BB	2.5001
73	6.123	1825049.12	729996.12	1.45	1.45	BB	2.5001
74	6.210	1850041.87	739995.60	1.47	1.47	BB	2.5001
75	6.291	1875028.32	749995.66	1.49	1.49	BB	2.5001
76	6.382	1900036.02	759996.98	1.50	1.50	BB	2.5001
77	6.457	1925040.62	769993.79	1.52	1.52	BB	2.5001
78	6.548	1950047.77	780631.83	1.54	1.54	BB	2.4980

5/6/2564 12:55:15 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
79	6.623	1975030.12	789994.06	1.56	1.56	BB	2.5001
80	6.710	2000041.32	799996.06	1.58	1.58	BB	2.5001
81	6.788	2025048.42	809994.61	1.60	1.60	BB	2.5001
82	6.877	2050051.42	819996.97	1.62	1.62	BB	2.5001
83	6.968	2075036.42	829996.57	1.64	1.64	BB	2.5001
84	7.042	2100040.62	839996.61	1.66	1.66	BB	2.5001
85	7.128	2125050.32	849995.05	1.68	1.68	BB	2.5001
86	7.208	2150054.12	859996.12	1.70	1.70	BB	2.5001
87	7.286	2175039.47	869995.92	1.72	1.72	BB	2.5001
88	7.367	2200043.22	879994.61	1.74	1.74	BB	2.5001
89	7.466	2225057.62	889995.06	1.76	1.76	BB	2.5001
90	7.545	2250051.12	899994.59	1.78	1.78	BB	2.5001
91	7.625	2275041.92	909996.23	1.80	1.80	BB	2.5001
92	7.702	2300041.57	919995.29	1.82	1.82	BB	2.5001
93	7.786	2325058.92	929995.41	1.84	1.84	BB	2.5001
94	7.877	2350060.07	939994.44	1.86	1.86	BB	2.5001
95	7.958	2375042.12	949993.25	1.88	1.88	BB	2.5001
96	8.045	2400049.52	959996.12	1.90	1.90	BB	2.5001
97	8.128	2425055.22	969992.63	1.92	1.92	BB	2.5001
98	8.208	2450062.72	979995.09	1.94	1.94	BB	2.5001
99	8.290	2475049.12	989993.96	1.96	1.96	BB	2.5001
100	8.368	2500048.47	999993.66	1.98	1.98	BB	2.5001

1.26e+08 5.05e+07 100.00 100.00

Warning -- Signal level out-of-range in peak

Missing Component Report
 Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-22 1:25:44 PM
 Operator : service Sample Name :
 Sample Number : Study :
 AutoSampler : Rack/Vial : 0/1
 Instrument Name : Channel : A
 Interface Serial # : A/D mV Range : 1000
 Delay Time : 0.00 min End Time : 8.50 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 µL Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 9:45:11 AM Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 4-2dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 4-2dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.134	24995.90	10002.12	0.02	0.02	BB	2.4991
2	0.197	49999.40	20002.84	0.04	0.04	BB	2.4996
3	0.271	75001.15	30003.44	0.06	0.06	BB	2.4998
4	0.375	100003.15	40002.66	0.08	0.08	BB	2.4999
5	0.447	125004.10	50002.82	0.10	0.10	BB	2.4999
6	0.542	150008.65	60004.60	0.12	0.12	BB	2.5000
7	0.613	175000.00	70000.81	0.14	0.14	BB	2.5000
8	0.705	200001.30	79999.87	0.16	0.16	BB	2.5000
9	0.788	225008.30	90003.06	0.18	0.18	BB	2.5000
10	0.869	250013.30	100004.00	0.20	0.20	BB	2.5000
11	0.967	275008.50	110001.49	0.22	0.22	BB	2.5000
12	1.047	300006.90	120000.98	0.24	0.24	BB	2.5000
13	1.125	325010.70	130003.07	0.26	0.26	BB	2.5000
14	1.220	350011.45	140002.53	0.28	0.28	BB	2.5000
15	1.290	375008.20	150000.06	0.30	0.30	BB	2.5001
16	1.366	400019.50	160002.98	0.32	0.32	BB	2.5001
17	1.455	425011.70	170001.84	0.34	0.34	BB	2.5000
18	1.540	450010.60	180000.06	0.36	0.36	BB	2.5001
19	1.628	475019.00	190002.06	0.38	0.38	BB	2.5001
20	1.714	500016.95	200001.35	0.40	0.40	BB	2.5001
21	1.788	525004.51	209996.66	0.42	0.42	BB	2.5001
22	1.880	550014.20	219999.61	0.44	0.44	BB	2.5001
23	1.954	575018.40	229999.84	0.46	0.46	BB	2.5001
24	2.031	600016.41	239997.98	0.48	0.48	BB	2.5001
25	2.137	625009.61	249998.06	0.50	0.50	BB	2.5001
26	2.209	650008.31	259996.61	0.51	0.51	BB	2.5001
27	2.295	675017.01	269997.37	0.53	0.53	BB	2.5001
28	2.370	700020.96	279998.41	0.55	0.55	BB	2.5001

5/6/2564 12:56:43 Result:

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
29	2.457	725011.31	289996.44	0.57	0.57	BB	2.5001
30	2.553	750017.81	299999.12	0.59	0.59	BB	2.5001
31	2.625	775016.21	309995.49	0.61	0.61	BB	2.5001
32	2.701	800026.61	319998.33	0.63	0.63	BB	2.5001
33	2.797	825016.31	329997.45	0.65	0.65	BB	2.5001
34	2.876	850017.61	339997.98	0.67	0.67	BB	2.5001
35	2.956	875021.61	349996.14	0.69	0.69	BB	2.5001
36	3.050	900019.81	359996.06	0.71	0.71	BB	2.5001
37	3.118	925016.81	369995.61	0.73	0.73	BB	2.5001
38	3.217	950018.06	383410.24	0.75	0.75	BB	2.4778
39	3.287	975016.81	389992.63	0.77	0.77	BB	2.5001
40	3.369	1000014.91	399990.98	0.79	0.79	BB	2.5001
41	3.465	1025015.61	409994.59	0.81	0.81	BB	2.5001
42	3.547	1050009.91	419992.57	0.83	0.83	BB	2.5001
43	3.625	1075012.61	429990.40	0.85	0.85	BB	2.5001
44	3.712	1100018.56	439992.16	0.87	0.87	BB	2.5001
45	3.792	1125003.91	449987.17	0.89	0.89	BB	2.5001
46	3.870	1150002.81	459988.12	0.91	0.91	BB	2.5001
47	3.958	1175014.31	469989.44	0.93	0.93	BB	2.5001
48	4.037	1200013.11	479986.77	0.95	0.95	BB	2.5001
49	4.132	1224994.21	489984.61	0.97	0.97	BB	2.5001
50	4.210	1249997.21	499986.06	0.99	0.99	BB	2.5001
51	4.292	1275007.71	509987.23	1.01	1.01	BB	2.5001
52	4.382	1300000.71	519983.12	1.03	1.03	BB	2.5001
53	4.458	1324998.91	529984.22	1.05	1.05	BB	2.5001
54	4.550	1349997.51	539985.84	1.07	1.07	BB	2.5001
55	4.626	1375005.51	549984.90	1.09	1.09	BB	2.5001
56	4.705	1400008.86	559983.52	1.11	1.11	BB	2.5001
57	4.798	1424996.31	569982.06	1.13	1.13	BB	2.5001
58	4.877	1449981.97	579980.15	1.15	1.15	BB	2.5001
59	4.959	1474993.42	589979.98	1.17	1.17	BB	2.5001
60	5.043	1499995.72	599979.06	1.19	1.19	BB	2.5001
61	5.123	1524991.62	609979.66	1.21	1.21	BB	2.5001
62	5.213	1549988.52	619981.84	1.23	1.23	BB	2.5001
63	5.289	1574987.32	629976.50	1.25	1.25	BB	2.5001
64	5.380	1600006.12	639980.62	1.27	1.27	BB	2.5001
65	5.463	1624999.32	649981.61	1.29	1.29	BB	2.5001
66	5.545	1649984.67	659980.14	1.31	1.31	BB	2.5001
67	5.631	1674991.22	669978.66	1.33	1.33	BB	2.5001
68	5.703	1700006.02	679982.12	1.35	1.35	BB	2.5001
69	5.786	1724999.42	689980.59	1.37	1.37	BB	2.5001
70	5.877	1749985.52	699978.84	1.39	1.39	BB	2.5001
71	5.963	1774989.52	709977.57	1.41	1.41	BB	2.5001
72	6.043	1800004.42	719978.76	1.43	1.43	BB	2.5001
73	6.122	1825000.57	729979.98	1.45	1.45	BB	2.5001
74	6.213	1849991.82	739981.08	1.47	1.47	BB	2.5001
75	6.295	1875004.72	749982.06	1.49	1.49	BB	2.5001
76	6.378	1900013.82	759981.59	1.50	1.50	BB	2.5001
77	6.452	1925002.92	769977.94	1.52	1.52	BB	2.5001
78	6.538	1949999.42	779981.84	1.54	1.54	BB	2.5001

5/6/2564 12:56:43 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
79	6.623	1975000.52	789981.18	1.56	1.56	BB	2.5001
80	6.707	2000020.02	799982.61	1.58	1.58	BB	2.5001
81	6.798	2025012.32	809982.12	1.60	1.60	BB	2.5001
82	6.868	2049997.82	819980.84	1.62	1.62	BB	2.5001
83	6.965	2075005.42	829981.61	1.64	1.64	BB	2.5001
84	7.045	2100019.67	839982.75	1.66	1.66	BB	2.5001
85	7.125	2125012.92	849979.42	1.68	1.68	BB	2.5001
86	7.205	2150008.67	859983.24	1.70	1.70	BB	2.5001
87	7.286	2175006.37	869981.77	1.72	1.72	BB	2.5001
88	7.370	2200025.72	879981.12	1.74	1.74	BB	2.5001
89	7.454	2225025.02	889981.44	1.76	1.76	BB	2.5001
90	7.536	2250005.12	899980.12	1.78	1.78	BB	2.5001
91	7.623	2275007.42	909981.19	1.80	1.80	BB	2.5001
92	7.715	2300020.37	919981.18	1.82	1.82	BB	2.5001
93	7.796	2325023.02	929981.54	1.84	1.84	BB	2.5001
94	7.875	2350007.12	939980.12	1.86	1.86	BB	2.5001
95	7.963	2375003.02	949979.29	1.88	1.88	BB	2.5001
96	8.040	2400027.57	959980.78	1.90	1.90	BB	2.5001
97	8.130	2425022.02	969977.22	1.92	1.92	BB	2.5001
98	8.211	2450009.42	979978.10	1.94	1.94	BB	2.5001
99	8.293	2475007.43	989978.67	1.96	1.96	BB	2.5001
100	8.371	2500031.52	999979.49	1.98	1.98	BB	2.5001

1.26e+08 5.05e+07 100.00 100.00

Warning -- Signal level out-of-range in peak

Missing Component Report
Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646
 Operator : service
 Sample Number :
 AutoSampler :
 Instrument Name :
 Interface Serial # :
 Delay Time : 0.00 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 μL
 Sample Amount : 1.0000
 Data Acquisition Time : 31-Mar-22 9:55:45 AM

Date : 31-Mar-22 1:38:24 PM
 Sample Name :
 Study :
 Rack/Vial : 0/1
 Channel : A
 A/D mV Range : 1000
 End Time : 8.50 min

Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 1

Raw Data File : D:\TC Data\Calibration2021\Software Calibration 4-3dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 4-3dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.073	24997.90	10003.00	0.02	0.02	BB	2.4990
2	0.137	50000.60	20003.00	0.04	0.04	BB	2.4997
3	0.227	75001.55	30003.25	0.06	0.06	BB	2.4998
4	0.313	100005.10	40004.00	0.08	0.08	BB	2.4999
5	0.393	125008.90	50004.32	0.10	0.10	BB	2.5000
6	0.493	150010.75	60005.59	0.12	0.12	BB	2.4999
7	0.567	175006.40	70003.00	0.14	0.14	BB	2.5000
8	0.670	200001.80	80002.00	0.16	0.16	BB	2.5000
9	0.732	225011.30	90004.00	0.18	0.18	BB	2.5000
10	0.837	250014.20	100006.00	0.20	0.20	BB	2.5000
11	0.907	275010.00	110004.00	0.22	0.22	BB	2.5000
12	0.982	300011.80	120003.00	0.24	0.24	BB	2.5000
13	1.067	325018.00	130005.00	0.26	0.26	BB	2.5000
14	1.160	350017.20	140005.00	0.28	0.28	BB	2.5000
15	1.240	375012.70	150003.00	0.30	0.30	BB	2.5000
16	1.330	400022.00	160006.00	0.32	0.32	BB	2.5000
17	1.415	425025.90	170006.00	0.34	0.34	BB	2.5001
18	1.498	450024.30	180005.55	0.36	0.36	BB	2.5001
19	1.584	475024.40	190006.33	0.38	0.38	BB	2.5000
20	1.668	500023.40	200005.06	0.40	0.40	BB	2.5001
21	1.747	525021.00	210002.00	0.42	0.42	BB	2.5001
22	1.818	550026.20	220004.00	0.44	0.44	BB	2.5001
23	1.915	575027.20	230006.00	0.46	0.46	BB	2.5001
24	2.000	600027.20	240004.00	0.48	0.48	BB	2.5001
25	2.080	625029.30	250004.00	0.50	0.50	BB	2.5001
26	2.158	650029.80	260003.00	0.51	0.51	BB	2.5001
27	2.253	675021.21	270002.47	0.53	0.53	BB	2.5001
28	2.334	700033.31	282093.00	0.55	0.55	BB	2.4816

5/6/2564 12:57:24 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
29	2.415	725036.11	290005.00	0.57	0.57	BB	2.5001
30	2.492	750037.56	300004.61	0.59	0.59	BB	2.5001
31	2.575	775025.51	310002.70	0.61	0.61	BB	2.5001
32	2.660	800041.71	320007.00	0.63	0.63	BB	2.5001
33	2.753	825043.21	330006.00	0.65	0.65	BB	2.5001
34	2.818	850043.51	340004.71	0.67	0.67	BB	2.5001
35	2.915	875034.61	350004.06	0.69	0.69	BB	2.5001
36	2.997	900033.91	360003.06	0.71	0.71	BB	2.5001
37	3.077	925041.11	370003.45	0.73	0.73	BB	2.5001
38	3.167	950044.41	382175.47	0.75	0.75	BB	2.4859
39	3.243	975036.21	390002.55	0.77	0.77	BB	2.5001
40	3.326	1000032.21	400000.56	0.79	0.79	BB	2.5001
41	3.413	1025039.91	410001.26	0.81	0.81	BB	2.5001
42	3.492	1050045.71	420001.06	0.83	0.83	BB	2.5001
43	3.582	1075027.61	431962.21	0.85	0.85	BB	2.4887
44	3.649	1100028.41	439998.98	0.87	0.87	BB	2.5001
45	3.746	1125031.51	449998.21	0.89	0.89	BB	2.5001
46	3.823	1150032.86	459997.47	0.91	0.91	BB	2.5001
47	3.907	1175030.61	469999.20	0.93	0.93	BB	2.5001
48	3.997	1200020.31	479996.16	0.95	0.95	BB	2.5001
49	4.080	1225024.31	489994.02	0.97	0.97	BB	2.5001
50	4.156	1250033.16	499995.89	0.99	0.99	BB	2.5001
51	4.249	1275025.91	509996.61	1.01	1.01	BB	2.5001
52	4.327	1300015.66	519993.62	1.03	1.03	BB	2.5001
53	4.415	1325031.61	529996.06	1.05	1.05	BB	2.5001
54	4.493	1350032.06	539995.07	1.07	1.07	BB	2.5001
55	4.585	1375025.06	590495.36	1.09	1.09	BB	2.3286
56	4.661	1400021.41	559995.49	1.11	1.11	BB	2.5001
57	4.742	1425024.41	569993.57	1.13	1.13	BB	2.5001
58	4.820	1450027.81	579991.12	1.15	1.15	BB	2.5001
59	4.910	1475019.41	589991.84	1.17	1.17	BB	2.5001
60	4.993	1500016.51	599993.04	1.19	1.19	BB	2.5001
61	5.081	1525022.51	609992.04	1.21	1.21	BB	2.5001
62	5.160	1550029.71	619992.06	1.23	1.23	BB	2.5001
63	5.238	1575012.42	629988.11	1.25	1.25	BB	2.5001
64	5.319	1600017.47	639991.70	1.27	1.27	BB	2.5001
65	5.406	1625023.12	649992.06	1.29	1.29	BB	2.5001
66	5.486	1650034.76	659991.83	1.31	1.31	BB	2.5001
67	5.580	1675020.02	669990.67	1.33	1.33	BB	2.5001
68	5.665	1700022.52	679995.06	1.35	1.35	BB	2.5001
69	5.745	1725032.62	689994.84	1.37	1.37	BB	2.5001
70	5.827	1750035.97	699992.70	1.39	1.39	BB	2.5001
71	5.906	1775026.12	709990.26	1.41	1.41	BB	2.5001
72	5.996	1800018.87	719992.62	1.43	1.43	BB	2.5001
73	6.072	1825036.02	729995.40	1.45	1.45	BB	2.5001
74	6.155	1850044.02	739994.61	1.47	1.47	BB	2.5001
75	6.237	1875039.52	749993.65	1.49	1.49	BB	2.5001
76	6.326	1900026.02	759994.06	1.50	1.50	BB	2.5001
77	6.412	1925030.42	769993.18	1.52	1.52	BB	2.5001
78	6.497	1950050.12	779995.68	1.54	1.54	BB	2.5001

5/6/2564 12:57:24 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
79	6.573	1975045.62	789994.70	1.56	1.56	BB	2.5001
80	6.666	2000034.12	799996.06	1.58	1.58	BB	2.5001
81	6.747	2025038.42	809996.50	1.60	1.60	BB	2.5001
82	6.823	2050055.82	819995.84	1.62	1.62	BB	2.5001
83	6.915	2075052.02	829995.59	1.64	1.64	BB	2.5001
84	6.996	2100035.07	839995.64	1.66	1.66	BB	2.5001
85	7.074	2125036.82	849993.78	1.68	1.68	BB	2.5001
86	7.163	2150054.17	859995.60	1.70	1.70	BB	2.5001
87	7.241	2175053.72	869995.55	1.72	1.72	BB	2.5001
88	7.330	2200043.47	879996.05	1.74	1.74	BB	2.5001
89	7.411	2225041.02	889995.17	1.76	1.76	BB	2.5001
90	7.491	2250062.22	899995.77	1.78	1.78	BB	2.5001
91	7.578	2275059.92	909995.63	1.80	1.80	BB	2.5001
92	7.658	2300046.52	919996.29	1.82	1.82	BB	2.5001
93	7.752	2325046.32	979736.98	1.84	1.84	BB	2.3731
94	7.829	2350057.42	939994.61	1.86	1.86	BB	2.5001
95	7.913	2375055.52	949993.08	1.88	1.88	BB	2.5001
96	8.001	2400049.52	959995.01	1.90	1.90	BB	2.5001
97	8.071	2425039.82	969992.76	1.92	1.92	BB	2.5001
98	8.151	2450063.52	979994.32	1.94	1.94	BB	2.5001
99	8.234	2475068.42	989993.98	1.96	1.96	BB	2.5001
100	8.319	2500063.07	999996.27	1.98	1.98	BB	2.5001

1.26e+08 5.06e+07 100.00 100.00

Warning -- Signal level out-of-range in peak

Missing Component Report

Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-22 1:48:53 PM
 Operator : service Sample Name :
 Sample Number : Study :
 AutoSampler : Rack/Vial : 0/1
 Instrument Name : Channel : A
 Interface Serial # : A/D mV Range : 1000
 Delay Time : 0.00 min End Time : 8.50 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 µL Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 10:05:45 AM Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 4-4dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 4-4dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.105	24992.60	10001.00	0.02	0.02	BB	2.4990
2	0.220	49998.20	20003.00	0.04	0.04	BB	2.4995
3	0.300	75002.10	30004.00	0.06	0.06	BB	2.4997
4	0.363	100003.10	40003.00	0.08	0.08	BB	2.4999
5	0.455	125005.40	50004.00	0.10	0.10	BB	2.4999
6	0.547	150006.70	60005.00	0.12	0.12	BB	2.4999
7	0.630	175005.90	70003.00	0.14	0.14	BB	2.5000
8	0.712	200006.10	80003.00	0.16	0.16	BB	2.5000
9	0.800	225010.30	90005.00	0.18	0.18	BB	2.5000
10	0.870	250016.30	100006.00	0.20	0.20	BB	2.5000
11	0.967	275012.90	110004.00	0.22	0.22	BB	2.5000
12	1.050	300011.25	120002.50	0.24	0.24	BB	2.5000
13	1.133	325018.00	130006.00	0.26	0.26	BB	2.5000
14	1.218	350019.00	140005.49	0.28	0.28	BB	2.5000
15	1.290	375018.40	150003.14	0.30	0.30	BB	2.5001
16	1.377	400023.35	160005.39	0.32	0.32	BB	2.5001
17	1.462	425020.60	170005.57	0.34	0.34	BB	2.5000
18	1.543	450019.90	180004.06	0.36	0.36	BB	2.5001
19	1.637	475028.95	190006.50	0.38	0.38	BB	2.5001
20	1.722	500024.75	200005.59	0.40	0.40	BB	2.5001
21	1.798	525018.70	210003.00	0.42	0.42	BB	2.5001
22	1.885	550020.20	220003.06	0.44	0.44	BB	2.5001
23	1.972	575027.45	230004.43	0.46	0.46	BB	2.5001
24	2.050	600027.45	240003.62	0.48	0.48	BB	2.5001
25	2.132	625022.01	250002.53	0.50	0.50	BB	2.5001
26	2.217	650023.11	260002.53	0.51	0.51	BB	2.5001
27	2.304	675022.61	270000.77	0.53	0.53	BB	2.5001
28	2.383	700036.15	280005.52	0.55	0.55	BB	2.5001

5/6/2564 12:57:53 Result:

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
29	2.469	725029.21	290003.00	0.57	0.57	BB	2.5001
30	2.553	750030.01	300004.06	0.59	0.59	BB	2.5001
31	2.630	775035.11	310003.00	0.61	0.61	BB	2.5001
32	2.718	800023.91	320001.15	0.63	0.63	BB	2.5001
33	2.793	825031.56	330002.73	0.65	0.65	BB	2.5001
34	2.880	850033.81	340003.49	0.67	0.67	BB	2.5001
35	2.970	875037.51	350003.49	0.69	0.69	BB	2.5001
36	3.041	900039.01	360002.02	0.71	0.71	BB	2.5001
37	3.138	925032.01	370002.57	0.73	0.73	BB	2.5001
38	3.215	950033.21	380003.31	0.75	0.75	BB	2.5001
39	3.298	975036.66	390001.68	0.77	0.77	BB	2.5001
40	3.381	1000031.71	399998.49	0.79	0.79	BB	2.5001
41	3.470	1025031.51	410001.06	0.81	0.81	BB	2.5001
42	3.548	1050031.46	420000.88	0.83	0.83	BB	2.5001
43	3.628	1075028.86	429997.12	0.85	0.85	BB	2.5001
44	3.723	1100033.71	439997.94	0.87	0.87	BB	2.5001
45	3.800	1125027.86	449997.18	0.89	0.89	BB	2.5001
46	3.883	1150019.41	459996.04	0.91	0.91	BB	2.5001
47	3.960	1175039.06	469998.71	0.93	0.93	BB	2.5001
48	4.052	1200031.61	479995.06	0.95	0.95	BB	2.5001
49	4.133	1225016.06	489992.60	0.97	0.97	BB	2.5001
50	4.218	1250021.01	499996.12	0.99	0.99	BB	2.5001
51	4.298	1275028.31	509995.39	1.01	1.01	BB	2.5001
52	4.377	1300020.71	519990.68	1.03	1.03	BB	2.5001
53	4.472	1325022.26	540816.56	1.05	1.05	BB	2.4500
54	4.548	1350017.81	539994.48	1.07	1.07	BB	2.5001
55	4.633	1375025.81	549994.06	1.09	1.09	BB	2.5001
56	4.712	1400028.01	559992.69	1.11	1.11	BB	2.5001
57	4.793	1425015.56	569990.75	1.13	1.13	BB	2.5001
58	4.873	1450011.01	579989.63	1.15	1.15	BB	2.5001
59	4.960	1475022.61	589990.49	1.17	1.17	BB	2.5001
60	5.045	1500030.21	599991.16	1.19	1.19	BB	2.5001
61	5.138	1525019.16	609990.58	1.21	1.21	BB	2.5001
62	5.220	1550012.72	619991.57	1.23	1.23	BB	2.5001
63	5.293	1575017.82	629988.49	1.25	1.25	BB	2.5001
64	5.387	1600030.41	639991.84	1.27	1.27	BB	2.5001
65	5.465	1625021.07	649990.62	1.29	1.29	BB	2.5001
66	5.555	1650018.52	670545.57	1.31	1.31	BB	2.4607
67	5.627	1675018.32	669989.40	1.33	1.33	BB	2.5001
68	5.707	1700034.52	679992.34	1.35	1.35	BB	2.5001
69	5.800	1725031.87	689993.42	1.37	1.37	BB	2.5001
70	5.883	1750013.92	699990.61	1.39	1.39	BB	2.5001
71	5.962	1775022.62	709989.84	1.41	1.41	BB	2.5001
72	6.040	1800035.72	719989.70	1.43	1.43	BB	2.5001
73	6.130	1825036.62	729993.24	1.45	1.45	BB	2.5001
74	6.223	1850024.12	808107.99	1.47	1.47	BB	2.2893
75	6.297	1875026.97	749992.21	1.49	1.49	BB	2.5001
76	6.377	1900043.32	759994.60	1.50	1.50	BB	2.5001
77	6.457	1925034.27	769990.30	1.52	1.52	BB	2.5001
78	6.543	1950024.62	779993.48	1.54	1.54	BB	2.5001

5/6/2564 12:57:53 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
79	6.624	1975033.87	789993.48	1.56	1.56	BB	2.5001
80	6.718	2000045.72	799995.06	1.58	1.58	BB	2.5001
81	6.796	2025040.07	809993.65	1.60	1.60	BB	2.5001
82	6.886	2050035.62	819996.48	1.62	1.62	BB	2.5001
83	6.960	2075036.57	829994.49	1.64	1.64	BB	2.5001
84	7.048	2100046.02	839993.61	1.66	1.66	BB	2.5001
85	7.138	2125045.37	849992.58	1.68	1.68	BB	2.5001
86	7.211	2150038.42	859995.06	1.70	1.70	BB	2.5001
87	7.295	2175046.72	869996.06	1.72	1.72	BB	2.5001
88	7.376	2200057.32	879995.15	1.74	1.74	BB	2.5001
89	7.466	2225055.52	889995.58	1.76	1.76	BB	2.5001
90	7.557	2250039.42	979534.91	1.78	1.78	BB	2.2970
91	7.624	2275038.67	909994.96	1.80	1.80	BB	2.5001
92	7.710	2300054.22	919995.37	1.82	1.82	BB	2.5001
93	7.800	2325063.12	929997.06	1.84	1.84	BB	2.5001
94	7.880	2350043.52	939995.66	1.86	1.86	BB	2.5001
95	7.962	2375044.17	949995.78	1.88	1.88	BB	2.5001
96	8.053	2400063.22	967335.46	1.90	1.90	BB	2.4811
97	8.134	2425056.12	969992.05	1.92	1.92	BB	2.5001
98	8.219	2450056.42	979995.49	1.94	1.94	BB	2.5001
99	8.299	2475047.07	989995.56	1.96	1.96	BB	2.5001
100	8.369	2500078.62	999996.54	1.98	1.98	BB	2.5001

1.26e+08 5.07e+07 100.00 100.00

Warning -- Signal level out-of-range in peak

Missing Component Report

Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-22 1:58:14 PM
 Operator : service Sample Name :
 Sample Number : Study :
 AutoSampler : Rack/Vial : 0/1
 Instrument Name : Channel : A
 Interface Serial # : A/D mV Range : 1000
 Delay Time : 0.00 min End Time : 8.50 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 μL Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 10:05:04 PM Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 4-5dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 4-5dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.113	25032.15	10005.56	0.02	0.02	BB	2.5018
2	0.208	49996.25	20001.55	0.04	0.04	BB	2.4996
3	0.295	74997.10	30002.06	0.06	0.06	BB	2.4997
4	0.367	99998.30	40000.79	0.08	0.08	BB	2.4999
5	0.450	124999.35	50000.89	0.10	0.10	BB	2.4999
6	0.549	150001.25	60002.40	0.12	0.12	BB	2.4999
7	0.627	174998.00	69999.49	0.14	0.14	BB	2.5000
8	0.703	199999.90	79999.49	0.16	0.16	BB	2.5000
9	0.799	225004.58	90001.31	0.18	0.18	BB	2.5000
10	0.872	250005.70	100000.86	0.20	0.20	BB	2.5000
11	0.968	275000.60	109999.49	0.22	0.22	BB	2.5000
12	1.044	300000.50	119997.84	0.24	0.24	BB	2.5000
13	1.133	325004.70	129999.06	0.26	0.26	BB	2.5001
14	1.205	350004.20	139998.35	0.28	0.28	BB	2.5001
15	1.286	374998.70	149996.10	0.30	0.30	BB	2.5001
16	1.387	400007.60	162117.58	0.32	0.32	BB	2.4674
17	1.454	425003.15	169996.11	0.34	0.34	BB	2.5001
18	1.542	449999.45	179996.25	0.36	0.36	BB	2.5000
19	1.625	475004.30	189997.55	0.38	0.38	BB	2.5001
20	1.716	500001.21	199994.38	0.40	0.40	BB	2.5001
21	1.805	524997.01	229064.18	0.42	0.42	BB	2.2919
22	1.880	549999.31	219994.06	0.44	0.44	BB	2.5001
23	1.958	574996.21	229992.68	0.46	0.46	BB	2.5001
24	2.048	600000.11	239992.49	0.48	0.48	BB	2.5001
25	2.132	625000.81	249991.46	0.50	0.50	BB	2.5001
26	2.208	649992.81	259989.06	0.51	0.51	BB	2.5001
27	2.300	674987.96	269988.59	0.53	0.53	BB	2.5001
28	2.385	700004.51	279993.49	0.55	0.55	BB	2.5001

5/6/2564 12:58:25 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
29	2.473	725001.31	289990.53	0.57	0.57	BB	2.5001
30	2.547	749997.06	299990.07	0.59	0.59	BB	2.5001
31	2.625	774987.51	309987.06	0.61	0.61	BB	2.5001
32	2.721	800006.21	319992.44	0.63	0.63	BB	2.5001
33	2.793	824998.96	329987.09	0.65	0.65	BB	2.5001
34	2.877	849998.76	339988.47	0.67	0.67	BB	2.5001
35	2.967	874994.06	349988.07	0.69	0.69	BB	2.5001
36	3.052	899994.31	359986.05	0.71	0.71	BB	2.5001
37	3.137	925002.01	369987.12	0.73	0.73	BB	2.5001
38	3.210	949996.36	379986.75	0.75	0.75	BB	2.5001
39	3.298	974981.11	389983.65	0.77	0.77	BB	2.5001
40	3.380	999985.01	399981.06	0.79	0.79	BB	2.5001
41	3.470	1024991.91	409983.03	0.81	0.81	BB	2.5001
42	3.547	1049987.31	419981.06	0.83	0.83	BB	2.5001
43	3.632	1074974.51	429979.31	0.85	0.85	BB	2.5001
44	3.712	1099981.51	439978.24	0.87	0.87	BB	2.5001
45	3.794	1124982.11	449977.02	0.89	0.89	BB	2.5001
46	3.885	1149979.41	459976.49	0.91	0.91	BB	2.5001
47	3.960	1174972.46	469976.65	0.93	0.93	BB	2.5001
48	4.054	1199973.61	482953.47	0.95	0.95	BB	2.4847
49	4.128	1224971.71	489971.72	0.97	0.97	BB	2.5001
50	4.210	1249977.01	499974.61	0.99	0.99	BB	2.5001
51	4.302	1274962.42	509973.06	1.01	1.01	BB	2.5001
52	4.382	1299955.77	519968.38	1.03	1.03	BB	2.5001
53	4.461	1324972.02	529970.49	1.05	1.05	BB	2.5001
54	4.543	1349967.57	539970.52	1.07	1.07	BB	2.5001
55	4.627	1374954.52	549968.44	1.09	1.09	BB	2.5001
56	4.715	1399962.42	559969.61	1.11	1.11	BB	2.5001
57	4.790	1424965.92	569966.92	1.13	1.13	BB	2.5001
58	4.878	1449956.02	579964.06	1.15	1.15	BB	2.5001
59	4.955	1474945.52	589963.00	1.17	1.17	BB	2.5001
60	5.050	1499946.67	599963.58	1.19	1.19	BB	2.5001
61	5.135	1524955.82	609963.84	1.21	1.21	BB	2.5001
62	5.216	1549956.27	619964.03	1.23	1.23	BB	2.5001
63	5.301	1574932.02	629959.03	1.25	1.25	BB	2.5001
64	5.390	1599947.52	639963.06	1.27	1.27	BB	2.5001
65	5.465	1624955.32	649962.60	1.29	1.29	BB	2.5001
66	5.538	1649960.02	659962.12	1.31	1.31	BB	2.5001
67	5.629	1674937.77	669959.40	1.33	1.33	BB	2.5001
68	5.715	1699949.22	679963.10	1.35	1.35	BB	2.5001
69	5.800	1724963.07	689963.23	1.37	1.37	BB	2.5001
70	5.872	1749955.72	699959.95	1.39	1.39	BB	2.5001
71	5.964	1774933.52	709957.86	1.41	1.41	BB	2.5001
72	6.047	1799941.92	719959.84	1.43	1.43	BB	2.5001
73	6.126	1824957.02	729961.11	1.45	1.45	BB	2.5001
74	6.210	1849959.32	739961.24	1.47	1.47	BB	2.5001
75	6.293	1874942.42	749959.33	1.49	1.49	BB	2.5001
76	6.377	1899942.57	759960.45	1.50	1.50	BB	2.5001
77	6.470	1924950.92	771892.94	1.52	1.52	BB	2.4938
78	6.539	1949957.42	779957.00	1.54	1.54	BB	2.5001

5/6/2564 12:58:25 Result:

Peak #	Time [min]	Area [μV·s]	Height [μV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
79	6.623	1974944.22	789958.13	1.56	1.56	BB	2.5001
80	6.715	1999944.22	799959.91	1.58	1.58	BB	2.5001
81	6.789	2024956.12	809957.65	1.60	1.60	BB	2.5001
82	6.879	2049963.62	819959.77	1.62	1.62	BB	2.5001
83	6.963	2074944.02	829957.65	1.64	1.64	BB	2.5001
84	7.046	2099933.43	839956.19	1.66	1.66	BB	2.5001
85	7.128	2124947.23	849955.47	1.68	1.68	BB	2.5001
86	7.206	2149958.17	859956.47	1.70	1.70	BB	2.5001
87	7.295	2174947.73	869957.28	1.72	1.72	BB	2.5001
88	7.386	2199939.98	879956.58	1.74	1.74	BB	2.5001
89	7.467	2224949.73	889954.84	1.76	1.76	BB	2.5001
90	7.548	2249960.13	899955.06	1.78	1.78	BB	2.5001
91	7.635	2274948.63	911159.52	1.80	1.80	BB	2.4968
92	7.708	2299935.63	919954.25	1.82	1.82	BB	2.5001
93	7.795	2324952.93	929954.28	1.84	1.84	BB	2.5001
94	7.881	2349957.23	939953.49	1.86	1.86	BB	2.5001
95	7.959	2374940.13	949951.21	1.88	1.88	BB	2.5001
96	8.054	2399930.48	959952.49	1.90	1.90	BB	2.5001
97	8.127	2424938.43	969949.22	1.92	1.92	BB	2.5001
98	8.209	2449956.88	979951.65	1.94	1.94	BB	2.5001
99	8.298	2474944.83	989949.84	1.96	1.96	BB	2.5001
100	8.379	2499943.63	999952.56	1.98	1.98	BB	2.5001

1.26e+08 5.05e+07 100.00 100.00

Warning -- Signal level out-of-range in peak

Missing Component Report
Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-22 11:25:36 AM
 Operator : service Sample Name : 0/1
 Sample Number : Study :
 AutoSampler : Rack/Vial : A
 Instrument Name : Channel :
 Interface Serial # : A/D mV Range : 1000
 Delay Time : 0.00 min End Time : 8.50 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 µL Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 9:25:25 AM Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 3dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 3dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.140	75059.75	6114.95	0.37	0.37	BB	12.2748
2	0.375	2412.40	960.52	0.01	0.01	BB	2.5116
3	0.816	31677.92	8722.98	0.16	0.16	BB	3.6315
4	1.063	22743.54	5936.90	0.11	0.11	BB	3.8309
5	1.251	241161.37	54213.34	1.20	1.20	BB	4.4484
6	1.481	12969.00	4121.17	0.06	0.06	BV	3.1469
7	1.642	325541.48	79056.51	1.62	1.62	VV	4.1178
8	1.783	1275456.99	339121.35	6.36	6.36	VB	3.7611
9	2.117	75688.86	21614.92	0.38	0.38	BB	3.5017
10	2.294	11800.99	5119.66	0.06	0.06	BB	2.3050
11	2.583	3209416.67	985550.68	15.99	15.99	BV	3.2565
12	2.732	747452.78	209593.52	3.72	3.72	VB	3.5662
13	2.965	5906.86	1953.57	0.03	0.03	BV	3.0236
14	3.079	37537.31	11841.07	0.19	0.19	VB	3.1701
15	3.204	4447.52	1698.68	0.02	0.02	BB	2.6182
16	3.385	1012208.88	341306.28	5.04	5.04	BB	2.9657
17	3.654	262229.98	79249.38	1.31	1.31	BV	3.3089
18	3.753	96607.99	27366.22	0.48	0.48	VV	3.5302
19	3.855	1263770.97	368495.70	6.30	6.30	VE	3.4295
20	3.953	101332.82	33007.59	0.51	0.51	EV	3.0700
21	4.113	1027061.72	275593.32	5.12	5.12	VE	3.7267
22	4.234	37844.88	11795.20	0.19	0.19	EB	3.2085
23	4.409	8895.63	2569.62	0.04	0.04	BB	3.4618
24	4.614	1638106.44	436251.52	8.16	8.16	BE	3.7550
25	4.797	61823.24	16436.59	0.31	0.31	EV	3.7613
26	4.933	1104020.96	323177.58	5.50	5.50	VV	3.4161
27	5.129	3484988.16	792540.94	17.37	17.37	VV	4.3972
28	5.279	97222.22	26377.83	0.48	0.48	VV	3.6858

5/6/2564 12:50:36 Result:

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
29	5.373	75581.66	20913.50	0.38	0.38	VV	3.6140
30	5.519	2104907.22	508420.84	10.49	10.49	VV	4.1401
31	5.689	127702.84	33766.59	0.64	0.64	VB	3.7819
32	5.911	21954.20	7049.17	0.11	0.11	BB	3.1144
33	6.398	664156.39	182077.28	3.31	3.31	BV	3.6477
34	6.604	183920.90	51092.16	0.92	0.92	VB	3.5998
35	6.868	10487.13	3393.11	0.05	0.05	BB	3.0907
36	7.037	108588.35	29820.09	0.54	0.54	BB	3.6414
37	7.375	193487.18	54260.78	0.96	0.96	BV	3.5659
38	7.496	117946.32	28239.44	0.59	0.59	VV	4.1767
39	7.641	28524.65	7482.11	0.14	0.14	VB	3.8124
40	7.873	11049.39	2971.79	0.06	0.06	BB	3.7181
41	8.060	28202.40	6247.06	0.14	0.14	BB	4.5145
42	8.280	101123.28	26936.90	0.50	0.50	BB	3.7541
43	8.434	12878.38	3888.66	0.06	0.06	BB	3.3118

20065897.59 5.44e+06 100.00 100.00

Warning -- Signal level out-of-range in peak

Missing Component Report

Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-22 11:15:14 AM
 Operator : service Sample Name :
 Sample Number : Study :
 AutoSampler : Rack/Vial : 0/1
 Instrument Name : Channel : A
 Interface Serial # : A/D mV Range : 1000
 Delay Time : 0.00 min End Time : 8.50 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 µL Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 9:15:01 AM Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 2dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 2dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	1.745	51000866.54	499991.97	33.33	33.33	MM	102.0034
2	5.120	1.02e+08	999998.79	66.67	66.67	MM	102.0009
		1.53e+08	1.50e+06	100.00	100.00		

Warning -- Signal level out-of-range in peak

Missing Component Report
 Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-22 11:05:49 AM
 Operator : service Sample Name :
 Sample Number : Study :
 AutoSampler : Rack/Vial : 0/1
 Instrument Name : Channel : A
 Interface Serial # : A/D mV Range : 1000
 Delay Time : 0.00 min End Time : 8.50 min
 Sampling Rate : 10.0006 pts/s
 Sample Volume : 1.000000 µL Area Reject : 0.000000
 Sample Amount : 1.0000 Dilution Factor : 1.00
 Data Acquisition Time : 31-Mar-22 9:00:01 AM Cycle : 1

Raw Data File : D:\TC Data\Calibration2022\Software Calibration 1dat-SS420x.raw
 Inst Method : DEFAULT from D:\TC Data\Calibration2021\Software Calibration 1dat-SS420x.raw
 Proc Method : D:\TC DATA\default.mth from
 Calib Method : D:\TC DATA\default.mth from
 Report Format File: DEFAULT.rpt
 Sequence File :

DEFAULT REPORT

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
1	0.476	488979.31	31252.58	1.59	1.59	BB	15.6460
2	1.897	978276.95	62494.05	3.17	3.17	BB	15.6539
3	3.318	1957224.71	124987.37	6.35	6.35	BB	15.6594
4	4.738	3915596.74	250000.77	12.70	12.70	BB	15.6623
5	6.159	7832807.33	499999.35	25.40	25.40	BB	15.6656
6	7.580	15667145.16	999990.13	50.80	50.80	BB	15.6673
		30840030.21	1.97e+06	100.00	100.00		

Warning -- Signal level out-of-range in peak

Missing Component Report
 Component Expected Retention (Calibration File)

All components were found

Certificate Reference Index



Certificate of Calibration Gas Flowmeter

Issued by V:KIT Ltd

Certificate No: 3186-GFM

Issue Date: 04-Jun-2021

V:KIT Ltd
Glasshouse B2F4
Alderley Park
Macclesfield
Cheshire, SK10 4ZE, UK
Tel: +44 (0) 1260 274266
www.v-kit.com - info@v-kit.com

Customer: Accesssco Co., Ltd

Address: 21/60 M3, Rangsit-Pathumthani

Bangpoon, Mueng, Pathumthani 12000

Thailand

Customer PO No.: 064/05/001

Date of Receipt: 25-May-2021

Calibration performed by: J. Stead

Calibration Date: 03-Jun-2021

Expiry Date: 02-Jun-2022

Manufacturer: V:KIT Ltd

Model: VKIT-GFM

Equipment Condition: Clean

Serial Number: US13E56913

Calibration Range: 5 - 1000 mL/min

Test Media: Air

Laboratory Temperature: 21.8°C

Laboratory Barometric Pressure: 29.59 Inches Hg

Reference Equipment: Traceable to National Standards

Calibration Method

The electronic Flowmeter was tested at the required flow rates and compared with NIST Traceable primary standards.

Test Equipment Used

Barometer: PIN:51107

Thermometer: PIN:21259

Flow Reference 1: PIN:71573

Flow Reference 2: PIN:50433

Calibration Results

Actual Flow (mL/min)	Indicated Flow (mL/min)
5.17	5.09
50.61	50.86
101.2	101.4
506.5	509.2
759.6	765.1
961.7	965.6

Approved By: Tom Gowans

Approval Date: 04-Jun-2021



Certificate of Calibration Simulated Calibration of Thermometer

Issued by V:KIT Ltd

Certificate No: 3194-DTM

Issue Date: 08-Jun-2021

V:KIT Ltd
Glasshouse B2F4
Alderley Park
Macclesfield
Cheshire, SK10 4ZE, UK
Tel: +44 (0) 1260 274266
www.v-kit.com - info@v-kit.com

Customer: Accesssci Co., Ltd
Address: 21/60 M3, Rangsit-Pathumthani
Bangpoon, Mueng, Pathumthani 12000
Thailand

Unit Under Test: 2-Ch Thermometer Type K
Serial Number: 1531-0234
Manufacturer: V:KIT Ltd
Model: VKIT-1531

Customer PO No.: 064/05/001
Date of Receipt: 25-May-2021
Calibration performed by: Daniel John
Calibration Date: 07-Jun-2021

Equipment Condition: Acceptable
Calibration Range: 0 - 400°C
Ambient Temperature: 23.2°C
Expiry Date: 06-Jun-2022

Calibration Method

The unit under test was calibrated using V:Kit Quality Management System procedure ref 06.09.002. The test equipment used are certified and traceable to recognised National Standards. The unit under test was tested 'As Found'. If required the unit under test was adjusted to bring it within a pre-defined specification and re-tested to provide the Calibration Results ("As Left").

Test Equipment Used

Calibration Equipment:	Identification:	Certificate ID:	Calibration Date:	Expiry Date:
Signal Calibrator	Ametek 1371098	U100594-19	23-Nov-2019	22-Nov-2021
Digital Thermometer	Ametek 1293031	U100586-19	21-Nov-2019	20-Nov-2021
Temperature Probe	Ametek 585197-02	U100586-19	21-Nov-2019	20-Nov-2021

Calibration Results ("As Found")

T1	Applied Temp. °C	Indicated Temp. °C	Deviation °C	Specification °C	Uncertainty °C
	0.0	0.2	0.2	± 0.7	0.47
	25.0	25.2	0.2	± 0.7	0.47
	50.0	50.2	0.2	± 0.8	0.47
	100.0	100.1	0.1	± 1.0	0.47
	250.0	250.0	0.0	± 1.4	0.47
	400.0	399.9	0.1	± 1.9	0.47
T2	Applied Temp. °C	Indicated Temp. °C	Deviation °C	Specification °C	Uncertainty °C
	0.0	0.1	0.1	± 0.7	0.47
	25.0	25.1	0.1	± 0.7	0.47
	50.0	50.1	0.1	± 0.8	0.47
	100.0	100.0	0.0	± 1.0	0.47
	250.0	249.9	0.1	± 1.4	0.47
	400.0	399.8	0.2	± 1.9	0.47

Approved By: Tom Gowans
Approval Date: 08-Jun-2021



Certificate of Analysis
177-FID

Product Description:

Product Name:	GC FID Standards	Composition:	Zero to 1600µg/mL tetradecane and 250µg/mL hexadecane in n-Hexane
Batch Number:	177-FID	Part Code:	VSOL-GC100

Certified Values:

Standard	Tetradecane Concentration µg/mL	Hexadecane Concentration µg/mL
GC FID Standard 1	0.000	254.5
GC FID Standard 2	20.2	254.5
GC FID Standard 3	100.2	254.5
GC FID Standard 4	398.6	254.5
GC FID Standard 5	802.3	254.5
GC FID Standard 6	1196.4	254.5
GC FID Standard 7	1585.5	254.5

Preparation Information:

The standards are prepared using high purity materials, and tested for conformity by analytical methods, developed by V:KIT Ltd.

Homogeneity Information:

The standard is considered homogeneous for typically used aliquots of approximately 1µL to 1.5mL.

Intended Use:

The standards are intended for use to qualify a capillary gas chromatograph equipped with FID for injection precision, carryover, response linearity and retention time reproducibility.

Instruction for Use:

Ensure the ampoule is intact and undamaged. To open hold the ampoule with both hands, with one thumb against the narrow top section. Pull the bottom of the ampoule towards you while pushing the top section away from you with easy, even pressure. Caution! Appropriate PPE should be worn whilst handling the ampoules. Using a clean pipette transfer an appropriate amount of each standard, to separate GC autosampler vials, ensuring each is capped to prevent contamination.

Traceability Information:

- Gravimetric Calibration**
The weighing instruments used were calibrated with weights that are certified traceable to NIST (NBS) test no. 822/254143 using NIST HB44 calibration procedure and tolerances.
- GC Instrumentation Calibration**
The GC equipment is calibrated internally every 12 months, using appropriate certified test and measuring equipment. The GC is further calibrated prior to use.

Confidentiality Statement

This document is classified as 'V:Kit Public Circulation'. This document can be circulated in the public domain, in its entirety, without unauthorised modification.

01.08.002 F014 v002

Page 1 of 1

Packaging and Storage Conditions:

The standard is contained in brown glass ampoules, with a fill volume of approximately 1.5ml.
Standards are supplied in a cardboard box, with vial dividers to protect vials during shipping.
The standards should be retained in their box prior to use, and stored at ambient temperature, avoiding extremes of temperature and humidity.

Hazard Information:

Refer to the product Safety Datasheet (SDS) for relevant hazardous information.

Quality Information:

V:Kit Ltd. operate a quality management system the scope of which covers the manufacture, certification and sales of chemical standard solutions, software, measuring and test equipment (including calibration) used in the qualification of chemical analysis equipment.



Certificate No: 2596
ISO 9001

Validity Information:

Preparation date:	20-Aug-2018
Certification date:	13-Sep-2018
Expiry date:	13-Sep-2023

Certifying Officer:	Neil Gowans BSc (Hons), Quality Manager
Date of Approval:	13-Sep-2018

Contact Details:	V:KIT Ltd Congleton, CW12 1LB UK Tel: +44 (0)1260 274266 info@v-kit.com www.v-kit.com
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Confidentiality Statement

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01.08.002 F014 v002

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Chromatography Data System Validator Certificate of Calibration

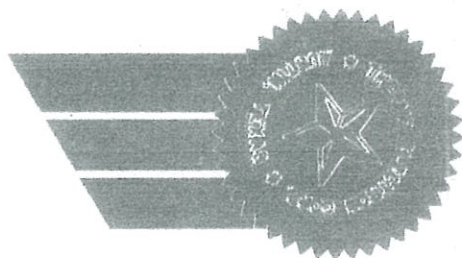
Validator™ Chromatography Data System Validator

The undersigned officers of Axxiom Chromatography, Inc. certify that this Validator™ unit, Serial Number 2455103, has been tested and calibrated to an NIST traceable standard on 11/10/2009.

Specific test data for this instrument is on file at Axxiom's home office location at 11968 Challenger Court, Moorpark, California, USA....and will be supplied upon request of an authorized distributor or end user

Presented by

Axxiom Chromatography Inc
11968 Challenger Court
Moorpark, California 93021-7121
USA



Thermo
ELECTRON CORPORATION



Training Certificate

'Qualification with HPLC v-kit'

This is to certify that

Prasittisent Maliphan
ACCESSSCI CO., LTD.

is trained in the use of HPLC v-kit™ version 3.1

**Certification covers qualification of HPLC instruments using v-kit™
standard operating procedures:**

VKIT.HPLC.FLOW – Flow Rate
VKIT.HPLC.TEMP – Temperature Accuracy
VKIT.HPLC.UVWAV – UV Wavelength Accuracy
VKIT.HPLC.AUTOPRC – Autosampler Precision
VKIT.HPLC.UVLIN.INJ – UV Linearity
VKIT.HPLC.AUTOLIN – Autosampler Linearity
VKIT.HPLC.GRAD – Gradient Accuracy

Date 16 February 2010



Certificate number 2596

NLG Analytical Ltd
16 John Bradshaw Court, Alexandria Way, Congleton, Cheshire, CW12 1LB
Tel: 44+ (0) 1260 274266, Fax: 44+ (0) 1260 273319
Email: info@nlg-analytical.co.uk, Web: www.nlg-analytical.co.uk

**TRACE DSQ GC/MS
SERVICE &
INSTALLATION COURSE**

Prasittisent Maliphan

Certificate No: 146

*Has successfully completed 32 hours training and is
qualified to install and conduct service on*



Certificate of Training

Certificate ID 1080

This is to certify that:	Prasittisent Maliphan ACCESSSCI CO.,LTD. 807/266 ,Moo8,Kukot Lamlukka Pathum thani THAILAND
The above named has received training in the use of V:KIT 5 software, standards and HPLC protocol and procedures.	
The trainee has successfully completed:	
Module 1 (Software and Protocols) Module 3 (Data Structure, Licensing and Synchronisation) Module 4 (Use of Protocols)	
The trainee completed a written assessment and demonstrated Competency in the tasks of Protocol Creation and Protocol Execution.	
The training was delivered by Neil Gowans of V:Kit Ltd. between 25-Jul-2016 and 05-Aug-2016	
Issue Date:	05-Aug-2016

Authorised on behalf of V:Kit Ltd by:

Name: Neil Gowans
Position: Managing Director
Date: 05-Aug-2016



Certificate of Registration

This is to certify that the Management System of:

V:Kit Limited

16 John Bradshaw Court, Alexandria Way, Congleton Business Park, Congleton CW12 1LB

has been approved by Alcumus ISOQAR and is compliant with the requirements of:

ISO 9001: 2015



Certificate Number: 2596-QMS-001
Initial Registration Date: 20/03/2001
Previous Expiry Date: 20/03/2022
Recertification Audit Date: 01/02/2022
Re-issue Date: 04/02/2022
Current Expiry Date: 20/03/2025

Scope of Registration:

The manufacture, certification and sales of chemical standard solutions, software, measuring and test equipment (including calibration) used in the qualification of chemical analysis equipment.

Signed:
Alyn Franklin, Chief Executive Officer
(on behalf of Alcumus ISOQAR)

This certificate will remain current subject to the company maintaining its system to the required standard. This will be monitored regularly by Alcumus ISOQAR. Further clarification regarding the scope of this certificate and the applicability of the relevant standards' requirement may be obtained by consulting Alcumus ISOQAR



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,

Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280

Tel: +66 2709 4860 Fax: +66 2324 0917



Certificate No.: CP20220051EA
Operation No.: CP2022010026

Certificate of Calibration

Equipment: Sound Calibrator
Manufacturer: Scarlet Tech
Model/Type: ST-120
Serial No.: ST120C0247E
ID No.:
Customer: M Green Group Co.,Ltd.
Address: 188/46, Pracha-Utd Rd.,
Thungkru, Bangkok 10140 Thailand.
Received Date: 26 January 2022
Calibrated Date: 28 January 2022
Issued Date: 2 February 2022
Calibrated by: Ms. Juntaporn Kunhakom

Approved by:

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor (k) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20220051EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: Scarlet Tech
Model/Type: ST-120
Serial No.: ST120C0247E
ID No.:
Ambient Temperature: $(23 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 15) \%$
Pressure: $(101.3 \pm 1.5) \text{ kPa}$
Method of Calibration :-
IEC 60942:2017

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1010-21	13 June 2022
2) Waveform Generator	33511B	MY52302264	0144RF21	17 June 2022
3) Audio Analyzing DMM	2015-P	000136E	E1U214805	16 November 2022
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P210047 0255TE21	16 June 2022 7 July 2022

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

3. This certification is traceable to the international system of unit maintained at :-

- Reference standards instrument for Acoustic function
 - National Institute of Metrology (Thailand)
- Reference standards instrument for Electrical function
 - Electrical and Electronics Institute; ONSC Accredited Calibration No.0119

Result of Calibration:-

1. Function : Sound pressure level

Normal Frequency (Hz)	Specified Sound Pressure level (dB)	Measured value (dB)	Deviated value ^[1] (dB)	Acceptance limit ^[3] (dB)
1000	94	94.04	0.04	± 0.25
1000	114	114.10	0.10	± 0.25

2. Function : Frequency

Normal Sound Pressure level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
94	1000	1000.0	0.0	± 0.7
114	1000	1000.0	0.0	± 0.7

Certificate No.: CP20220051EA

Calibration Report

3. Function : Total distortion + noise

Normal	Normal	Measured value ^[4]	Acceptance limit ^[5]
Sound Pressure level (dB)	Frequency (Hz)	(%)	(%)
94	1000	0.3	2.5
114	1000	0.2	2.5

Uncertainty of measurement

Function	Uncertainty	Maximum-permitted uncertainty of measurement
Sound pressure level	0.10 dB	0.15 dB
Frequency	0.10 %	0.20 %
Total distortion + noise	0.40 %	0.50 %

- Note:
- [1] The deviated value is the absolute value of the difference between the measured value and the corresponding specified sound pressure level.
 - [2] The deviated value is the absolute value of the difference in percent between the measured value and the corresponding specified frequency.
 - [3] The acceptance limit is for the deviated value.
 - [4] The measured value is the total distortion + noise, measured over the frequency range from 20 Hz to 20 kHz.
 - [5] The acceptance limit is for the Measured value.

- Remarks:
- 1. Using the 1/2-inch microphone adaptor -
 - 2. Acceptance limit was IEC 60942:2017 Class 1.
 - 3. The coverage factor $k = 2.00$

-- End of Report --

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VIBRATION METER
MANUFACTURER : N/A
MODEL / TYPE : V9000
SERIAL NO. : 2364
CLID. NO. : 252102170
JOB CONTROL NO. : 211022102584

CUSTOMER : P SET ENVI TECHNOLOGY CO., LTD.
28/63 MOO 1, RAI KHING SUBDISTRICT,
SAMPRAN DISTRICT, NAKHON PATHOM PROVINCE 73210

DATE OF RECEIVED : 22 October 2021

DATE OF ISSUED : 28 October 2021

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

Calibrated By : Chanwit Chongtham
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
28 October 2021



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

Certificate No. Q21102584

F3-011-04/01-12

page 1 of 3





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



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



REPORT OF CALIBRATION

FOR

NOMENCLATURE : VIBRATION METER
MANUFACTURER : N/A
MODEL / TYPE : V9000
SERIAL NO. : 2364
DATE OF CALIBRATION : 26 October 2021

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$ Relative Humidity : $(55 \pm 15) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-127 based on ISO 16063-21 as calibration guideline.
The calibration was performed by using Digital Multimeter, High Resolution Programmable Timer/Counter, Accelerometer and Measuring Amplifier which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

- Digital Multimeter, Agilent Technologies Model 34401A S/N. US36044686.
- High Resolution Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
- Accelerometer with Measuring Amplifier, Bruel & Kjaer Model 8305, 2525 S/N. 397018, 2434988.

TRACEABILITY :

- The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0070-21, Due Date 23 July 2022.
- The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0002/21, Due Date 04 January 2022.
- The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0047-20, Due Date 05 November 2021.

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:2013)"

Certificate No. Q21102584

F3-011-04/01-12

page 2 of 3



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

CALIBRATION DATA

VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
(mm/s)	(frequency)		(mm/s)	(mm/s)	(mm/s)	\pm (% of rdg.)
10	160 Hz	peak	10.00	10.02	-0.02	1.1
20	160 Hz		20.00	19.95	+0.05	1.0
40	160 Hz		40.00	39.12	+0.88	1.0
60	160 Hz		60.00	57.87	+2.13	1.0
80	160 Hz		80.00	77.17	+2.83	1.0
100	160 Hz		100.00	96.05	+3.95	1.0

Note. The Scope of Accredited TISI Certificate No. 19C087/0655 Issue 1 Page 57 of 111

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

End of Certificate

Certificate No. Q21102584

F3-011-04/01-12

page 3 of 3



@clc: calibration



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No. : 21M1550
Page : 1 of 2

Equipment : Standard Weight

Manufacturer: -

Model: -

Serial No.: M 0030/11

ID No.: EQL-139

Condition As-Received: Used Item

Received Date: 25 August 2021

Calibration Date: 01 September 2021

Reference: 2108-0772WN

Submitted by: TEST TECH CO.,LTD (HEAD Office)

Ambient Temperature: (23 ± 2) °C

Relative Humidity: (50 ± 15) %

Atmospheric Pressure: 1006 mbar

30,32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-M01 according to comparison method against standard weights on the basis of weighings at an average air density of 1.2 kg/m³ and a temperature of 23.0 °C material density of weight is 8000 kg/m³.

Condition of this result of calibration

1. Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard weight Set (E2)	YCS31-712-00	50202965	MM-0102-20	13 Jul 2022

2. This certificate is not certified for any commercial transaction.

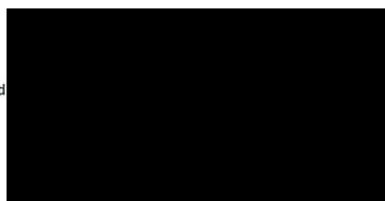
3. The certificate is valid only to the item calibrated on date and place of calibration.

4. This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Chaowalit Rittirak
Issue Date : 02 September 2021

Approved



Cert No.: 21M1550
Page: 2 of 2

Result of calibration

Without adjustment

Nominal Value	Conventional mass	Uncertainty of Measurement (±)	Maximum Permissible error (±)
2 g	2.000024 g	0.040 mg	0.12 mg

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No. : 21M1549

Page : 1 of 2

Equipment : Standard Weight

Manufacturer: Mettler Toledo

Model : -

Serial No.: 11119459

ID No.: EQL-149

Condition As-Received: Used Item

Received Date: 25 August 2021

Calibration Date: 01 September 2021

Reference: 2108-0772WN

Submitted by: TEST TECH CO.,LTD (HEAD Office)

Ambient Temperature: (23 ± 2) °C

Relative Humidity: (50 ± 15) %

Atmospheric Pressure: 1006 mbar

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.

30,32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-M01 according to comparison method
against standard weights on the basis of weighings at an average air density of 1.2 kg/m³ and a temperature
of 23.0 °C material density of weight is 8000 kg/m³.

Condition of this result of calibration

1.Reference standards instruments :

Instrument

Model

Serial No.

Certificate No.

Due Date

1) Standard weight Set (E2)

YCS31-712-00

50202965

MM-0102-20

13 Jul 2022

2.This certificate is not certified for any commercial transaction.

3.The certificate is valid only to the item calibrated on date and place of calibration.

4.This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Chaowalit Rittirak
Issue Date : 02 September 2021

Approved Signat

B 0268025



Cert No.: 21M1549

Page: 2 of 2

Result of calibration

Without adjustment

Nominal Value	Conventional mass	Uncertainty of Measurement (±)	Maximum Permissible error (±)
20 g	20.000018 g	0.080 mg	0.25 mg

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

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CERTIFICATE No : 21T8207
REFERENCE No : 62206-3

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
MODEL : WNE45
SERIAL No : L720.0266
ID No : EQL-241
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : TETNITHI W.
CALIBRATION DATE : 24-Aug-21

APPROVED BY :
ISSUED DATE :
RECEIVED DATE : 24-Aug-21

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.



CERTIFICATE No : 21T8207

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
ID NUMBER : EQL-241
RECEIVED DATE : 24-Aug-21
AMBIENT TEMPERATURE : 29 °C ± 1 °C
MODEL : WNE45
SERIAL NUMBER : L720.0266
CALIBRATION DATE : 24-Aug-21
RELATIVE HUMIDITY : 56 %RH ± 10 % RH

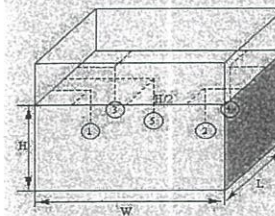
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO ASTM E715-80 (REAPPROVED 2001) BY COMPARISON WITH CALIBRATED RTD. THE PROBES WERE PLACED ON FIVE POINTS AND LOCATED ONE PROBE IN EACH OF THE FOUR CORNERS OF THE BATH AND PLACED THE FIFTH RTD WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE WATER VOLUME (REFERENCE LOCATION) UNDER NO LOAD CONDITION.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	2625A	6603614	21T6761	05-Jul-22
3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.				
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.				
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:- - NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.				

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



PROBE INSTALLATION
POSITION IN THE BATH

GENERAL INFORMATION

Overall Variation of Ambient Temperature around the Bath (°C) : 0.6
Overall Variation of Line Voltage (V) : 5
Instrument Condition : Normal
Bath Inner Size (W*L*H) : 59*35*22 cm

BATH PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
83.0	83.0	83.0	83.32	0.19	0.06	0.39
92.0	92.0	92.0	92.34	0.22	0.26	0.57

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	
83.0	83.0	83.31	83.32	83.35	83.32	83.29	0.26
92.0	92.0	92.30	92.51	92.25	92.37	92.28	0.29

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE BATH.

NOTE 2 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY COVERAGE FACTOR k = 2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21T7073
REFERENCE No : 61873-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
MODEL : WPE 45
SERIAL No : L711.0024
ID No : EQL-147
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 20-Jul-21

APPROVED BY :

ISSUED DATE : 21-Jul-21

RECEIVED DATE : 20-Jul-21

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

F-G010 REV : 02



CERTIFICATE No : 21T7073

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
ID NUMBER : EQL-147
RECEIVED DATE : 20-Jul-21
AMBIENT TEMPERATURE : 24 °C ± 1 °C
MODEL : WPE 45
SERIAL NUMBER : L711.0024
CALIBRATION DATE : 20-Jul-21
RELATIVE HUMIDITY : 50 %RH ± 10 % RH

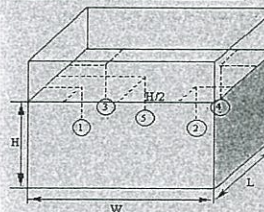
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO ASTM E715-80 (REAPPROVED 2001) BY COMPARISON WITH CALIBRATED RTD. THE PROBES WERE PLACED ON FIVE POINTS AND LOCATED ONE PROBE IN EACH OF THE FOUR CORNERS OF THE BATH AND PLACED THE FIFTH RTD WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE WATER VOLUME (REFERENCE LOCATION) UNDER NO LOAD CONDITION.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	2625A	6603614	21T6761	05-Jul-22

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



PROBE INSTALLATION
POSITION IN THE BATH

GENERAL INFORMATION

Overall Variation of Ambient Temperature around the Bath (°C) : 1.8
Overall Variation of Line Voltage (V) : 2
Instrument Condition : Normal
Bath Inner Size (W*L*H) : 60*42*24 cm

BATH PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
41.5	41.5	41.5	41.52	0.05	0.03	0.12
44.5	44.5	44.5	44.51	0.05	0.03	0.13

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	
41.5	41.5	41.53	41.52	41.51	41.52	41.54	0.14
44.5	44.5	44.51	44.50	44.50	44.51	44.53	0.14

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE BATH.

NOTE 2 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT QC LABORATORY AREA. THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21M9564
REFERENCE No : 62575-2

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : SARTORIUS
MODEL : BP210S
SERIAL No : S0736477
ID No : EQL-008
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD.,
SAMAEDAM, BANGKHUNTHIAN, BANGKOK
10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 23-Sep-21
APPROVED BY :
ISSUED DATE : 27-Sep-21
RECEIVED DATE : 23-Sep-21

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

F-G010 REV 02

CERTIFICATE No : 21M9564

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : SARTORIUS
ID No : EQL-008
AIR PRESSURE : 1010mbar \pm 1mbar
AMBIENT TEMPERATURE : 25° C \pm 1° C
MODEL : BP210S
S/N : S0736477
RECEIVED DATE : 23-Sep-21
CALIBRATION DATE : 23-Sep-21
RELATIVE HUMIDITY : 51 %RH \pm 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS ADJUSTED USING INTERNAL WEIGHT TO ADJUST. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN. THE INTERNAL WEIGHT WAS CHECKED BY USING

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02210415	09-Feb-23
2) STANDARD WEIGHT	E2	15843	C02210419	10-Feb-23
3) STANDARD WEIGHT	E2	QK-I-349	M2103235S	26-Mar-23

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL

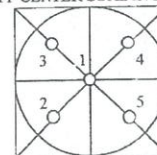
2. TARE FUNCTION : NORMAL

3. REPEATABILITY OF READING AT 200 g WAS 0.000048 g

4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (\pm g)
0.000	0.0000	0.0000	0.000078
0.100	0.1000	0.0000	0.000078
0.20	0.2000	0.0000	0.000078
1.0	1.0000	0.0000	0.000079
2.0	2.0000	0.0000	0.000080
20.0	19.9999	0.0001	0.000089
45.0	44.9999	0.0001	0.00014
65.0	64.9999	0.0001	0.00016
80.0	79.9999	0.0001	0.00019
100.0	99.9998	0.0002	0.00019
120.0	119.9998	0.0002	0.00022
140.0	139.9998	0.0002	0.00025
160.0	159.9998	0.0002	0.00027
180.0	179.9999	0.0001	0.00030
200.0	199.9995	0.0005	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	99.9997
2	99.9996
3	99.9994
4	99.9998
5	99.9997
OFF-CENTER LOADING	0.0003

6. INTERNAL WEIGHT ERROR : 0.000400000000013279 g

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY
COVERAGE FACTOR $k=2$, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21T8205
REFERENCE No : 62206-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : ---
MODEL : ---
SERIAL No : ---
ID No : EQL-166
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : TETNITHI W.

CALIBRATION DATE : 24-Aug-21

APPROVED BY :

ISSUED DATE : 24-Aug-21

RECEIVED DATE : 24-Aug-21



CERTIFICATE No : 21T8205

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : ---
ID No : EQL-166
RECEIVED DATE : 24-Aug-21
AMBIENT TEMPERATURE : 24 °C ± 1 °C
MODEL : ---
SERIAL NUMBER : ---
CALIBRATION DATE : 24-Aug-21
RELATIVE HUMIDITY : 53 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED THERMOCOUPLE TYPE K UNDER NO LOAD CONDITION. THE THERMOCOUPLES WERE PLACED ON 13 POINTS AND LOCATED AS THE PICTURE BELOW AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE SEVENTH THERMOCOUPLE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH TC TYPE K	HYDRA 2635A	7903007	21T6763	05-Jul-22

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0

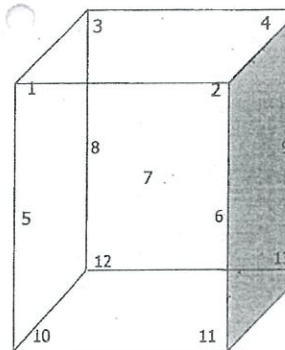
Overall Line Voltage (V) variation : 3

Instrument Condition : Normal

Chamber Size (W*L*H): 190*70*170 cm

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20.0	20.0	20.0	19.8	0.0	0.4	0.5



FRONT

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller temperature (°C)		20.0
Indicating Temperature		20.0
Measured Temperature (°C) at Spread Locations	1	19.7
	2	20.0
	3	19.8
	4	19.9
	5	19.6
	6	19.6
	7 Ref.	19.6
	8	19.6
	9	19.6
	10	19.6
	11	19.9
	12	19.9
	13	19.9
Uncertainty of Measurement (± °C)		0.48

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.
NOTE 2 : LOCATION 7 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.
END OF CALIBRATION REPORT



CERTIFICATE No : 21T2164
REFERENCE No : 60338-4

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 110
SERIAL No : D415.0802
ID No : EQL-190
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 02-Mar-21

APPROVED BY :

ISSUED DATE : 08-Mar-21

RECEIVED DATE : 02-Mar-21



CERTIFICATE No : 21T2164

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 110
ID No : EQL-190
RECEIVED DATE : 02-Mar-21
AMBIENT TEMPERATURE : 25 °C ± 1 °C
S/N : D415.0802
CALIBRATION DATE : 02-Mar-21
RELATIVE HUMIDITY : 49 %RH ± 10 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

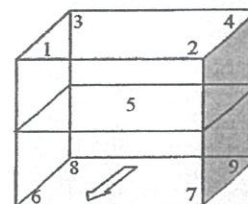
1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	HYDRA 2635A	7301307	20T7220	11-Jul-21

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 1
Overall Line Voltage (V) variation : 0
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*48 cm

CHAMBER PERFORMANCE

Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
37.0	37.0	36.98	0.10	0.28	0.31
44.0	44.0	44.10	0.14	0.45	0.66

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
37.0	37.0	36.91	36.98	37.00	36.91	37.10	37.02	36.97	37.00	36.87	0.25
44.0	44.0	43.91	44.06	44.13	43.96	44.27	44.15	44.34	44.15	43.93	0.36

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21T2165
REFERENCE No : 60338-5

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
SERIAL No : D518.0082
ID No : EQL-205
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.
CALIBRATION DATE : 02-Mar-21

APPROVED BY :
ISSUED DATE : 08-Mar-21
RECEIVED DATE : 02-Mar-21



CERTIFICATE No : 21T2165

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
ID No : EQL-205
RECEIVED DATE : 02-Mar-21
AMBIENT TEMPERATURE : 25 °C ± 1 °C
S/N : D518.0082
CALIBRATION DATE : 02-Mar-21
RELATIVE HUMIDITY : 49 %RH ± 10 %RH

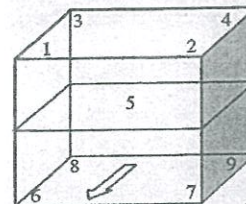
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	HYDRA 2635A	7301307	20T7220	11-Jul-21
2. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.				
3. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.				
4. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.				

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0

Overall Line Voltage (V) variation : 0

Instrument Condition : Normal

Chamber Size (W*L*H): 56*40*72 cm

CHAMBER PERFORMANCE

Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.04	0.03	0.30	0.31
36.0	36.0	36.03	0.05	0.29	0.34
41.5	41.5	41.49	0.03	0.35	0.39

TEMPERATURE MEASUREMENT ACCURACY TEST

TEMPERATURE MEASUREMENT ACCURACY TEST											
Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
35.0	35.0	34.90	34.99	34.91	34.98	35.16	35.17	34.99	35.14	35.14	0.25
36.0	36.0	35.90	35.98	35.91	35.97	36.15	36.15	35.97	36.12	36.13	0.25
41.5	41.5	41.36	41.43	41.29	41.38	41.62	41.63	41.45	41.61	41.63	0.36

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21T7075
REFERENCE No : 61873-3

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : INB 400
SERIAL No : E405.0946
ID No : EQL-087
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.
CALIBRATION DATE : 20-Jul-21

APPROVED BY : 

ISSUED DATE : 21-Jul-21

RECEIVED DATE : 20-Jul-21



CERTIFICATE No : 21T7075

PAGE : 2 OF 2

Calibration Report

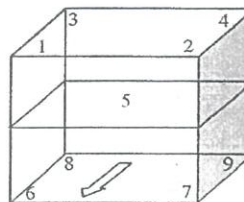
EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : INB 400
ID No : EQL-087
RECEIVED DATE : 20-Jul-21
AMBIENT TEMPERATURE : 24 °C ± 1 °C
S/N : E405.0946
CALIBRATION DATE : 20-Jul-21
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	HYDRA 2635A	7301307	21T6764	10-Jul-22
3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.				
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.				
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:- - NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.				
RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT				



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 1
Overall Line Voltage (V) variation : 9
Instrument Condition : Normal
Chamber Size (W*L*H): 40*33*40 cm

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.0	43.5	43.5	44.15	0.17	1.25	1.27
55.0	54.5	54.5	55.06	0.27	1.47	1.50

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
43.5	43.5	43.75	43.82	43.87	43.82	43.62	44.62	44.52	44.61	44.68	0.36
54.5	54.5	54.63	54.67	54.77	54.68	54.46	55.47	55.64	55.52	55.67	0.36

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

**QUALITY CALIBRATION CO.,LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com

CERTIFICATE No : 22T1730
REFERENCE No : 64109-6

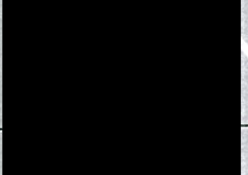
PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : AUTOCLAVE
MANUFACTURER : HIRAYAMA
MODEL : HVE-50
SERIAL No : 30612085166
ID No : EQL-155
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD.,
SAMAEDAM, BANGKHUNTHIAN, BANGKOK
10150

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 21-Feb-22

APPROVED BY : 

ISSUED DATE : 22-Feb-22

RECEIVED DATE : 21-Feb-22

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

F-G010 REV : 02

**QUALITY CALIBRATION CO.,LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com

CERTIFICATE No : 22T1730

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : AUTOCLAVE
MANUFACTURER : HIRAYAMA
ID NUMBER : EQL-155
RECEIVED DATE : 21-Feb-22
AMBIENT TEMPERATURE : 30° C ± 1° C
MODEL : HVE-50
SERIAL NUMBER : 30612085166
CALIBRATION DATE : 21-Feb-22
RELATIVE HUMIDITY : 50 %RH ± 10 % RH

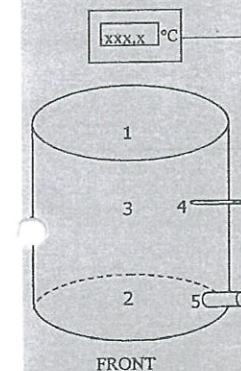
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON BS 2646 : Part 5 : 1993 BY COMPARISON WITH CALIBRATED THERMOCOUPLE TYPE K UNDER NO LOAD CONDITION. THE THERMOCOUPLES WERE PLACED ON FIVE LOCATIONS AS SHOWN IN THE PICTURE. TWO PROBES WERE PLACES NEAR TOP AND BOTTOM WALL AND EACH PROBE WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE THIRD PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE INSTRUMENT CHAMBER. PROBE NUMBER 4 WAS ATTACHED TO THE LOAD TEMPERATURE PROBE, IF FITTED, WITHIN 20 mm OF ITS TIP. PROBE NUMBER 5 WAS PLACED IN THE CHAMBER DRAIN OR VENT WITHIN 100 mm OF ITS CONNECTION TO THE CHAMBER.

REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER	VALPROBE	S350, DV35, DN94	22T0541	31-Jan-23

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT**GENERAL INFORMATION**

Overall Ambient Temperature around the Chamber variation : 1.2 °C

Autoclave Condition : Normal

Chamber Size (Diameter*H): 30 * 71 cm

CHAMBER PERFORMANCE

Controller Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)	Pressure (MPa)	Holding time (min)	Operating Cycle time (min)
116	116.48	0.09	0.10	0.27	0.090	15	60
122	122.43	0.09	0.13	0.27	0.130	15	60

TEMPERATURE MEASUREMENT ACCURACY TEST (°C)

Cont Temp	Ind Temp	Measured Temperature (°C) at Spread Locations					Uncertainty (± °C)
		#1	#2	#3	#4	#5	
116	116	116.45	116.50	116.53	116.45	116.45	0.59
122	122	122.40	122.46	122.50	122.39	122.39	0.59

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT OF TEMPERATURE MEASUREMENT ACCURACY TEST EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : THE STABILITY TERM IN THE UNCERTAINTY BUDGET WAS REPLACED BY THE STANDARD REPEATABILITY.

NOTE 3 : LOCATION 3 WAS REFERENCE LOCATION.

NOTE 4 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

F-G0



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851 , +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T220021

Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cooling Room)

Manufacturer : -

Model : -

Serial No. : -

Customer Code : EQL-167

ID No. : T1447A1

Customer : Test Tech Co.,Ltd

30, 32 Rama II Soi 63, Rama II Rd., Samaedam,

Bangkhunthian Bangkok 10150

Customer Location : LABORATORY FLOOR 3

Date of Receipt : 12 January 2022

Calibrated By : [Redacted] Gngtong (Technician)

Approved By : [Redacted] jjar Naknakred (Site Calibration Manager)

Date of Issue : 19 JAN 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 standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

FM-L14 I17/01-02-64



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T220021

Page 2 of 4

Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 19 January 2022
Environment : Temperature : 24.2-26.8 °C
Line Voltage : 221.6-225.5 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN161-TN170	T210009	31 January 2022
DATA LOGGER	34970A	T149	T210009	31 January 2022

3. This certificate is traceable to :

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

4. Condition of calibrated item : good

Equipment Description :

Time Constant 1 Hour 30 Minute At 3 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

() without adjustment (X) after adjustment

Approved By

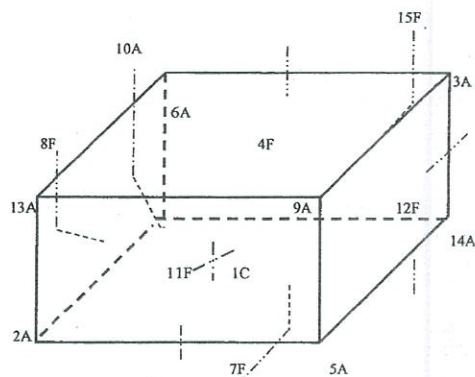
FM-L15 I17/15-05-63



Certificate No. T220021

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Calibration Report

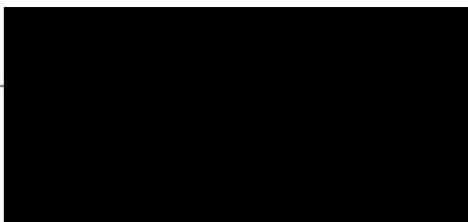


C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C	=	TN161
2A	=	TN162
3A	=	TN163
4F	=	TN164
5A	=	TN165
6A	=	TN166
7F	=	TN167
8F	=	TN168
9A	=	TN169
10A	=	TN170

11F	=	TN171
12F	=	TN172
13A	=	TN173
14A	=	TN174
15F	=	TN175

Approved By.



TN-15 11/7/15-05-63



Certificate No. T220021

Page 4 of 4

Calibration Report

Measurement Results:

Calibration Point	Average Standard Reading at each position (°C)									
	TN161	TN162	TN163	TN164	TN165	TN166	TN167	TN168	TN169	TN170
3	3.15	3.01	3.03	3.25	3.15	3.32	3.15	2.50	3.02	2.93
	TN171	TN172	TN173	TN174	TN175					
	2.99	2.47	2.60	2.95	2.60					

Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage
	Min , Max	Average					Factor k
3.0	2.9 , 3.1	3.0	2.94	0.47	1.02	0.93	2.00

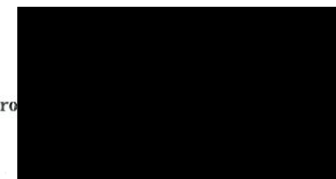
* The quoted uncertainty exclude " uniformity "

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 % .

Appro





Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851 , +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T220242

Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cooling Room)

Manufacturer : -

Model : -

Serial No. : -

Customer Code : EQL-181

ID No. : T0399A5

Customer : Test Tech Co.,Ltd

30, 32 Rama II Soi 63, Rama II Rd., Samaedam,

Bangkhunthian Bangkok 10150

Customer Location : LABORATORY FLOOR 4

Date of Receipt : 3 February 2022

Calibrated By : [Redacted] (Technician)

Approved By : [Redacted] Suriyawong (Site Calibration Manager)

Date of Issue

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

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

FM-L14 117/01-02-64



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T220242

Page 2 of 4

Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 7 February 2022
Environment : Temperature : 16.4-17.9 °C
Line Voltage : 221.4-230.2 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 15 standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN141-TN150	T210743	21 April 2022
TC	TYPE T	TN151-TN160	T210743	21 April 2022
DATA LOGGER	34970A	T150	T210743	21 April 2022

3. This certificate is traceable to :

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

4. Condition of calibrated item : good

Equipment Description :

Time Constant 2 Hour 20 Minute At 3 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

(X) without adjustment () after adjustment

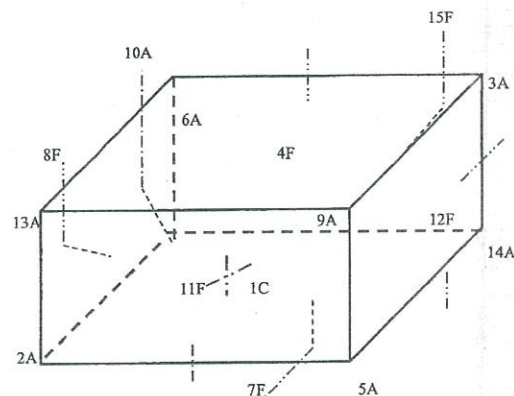
Approved

FM-L15 117/15-05-63

Certificate No. T220242

Page 3 of 4

Calibration Report



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

1C = TN141	12F = TN152
2A = TN142	13A = TN153
3A = TN143	14A = TN154
4F = TN144	15F = TN155
5A = TN145	
6A = TN146	
7F = TN147	
8F = TN148	
9A = TN149	
10A = TN150	
11F = TN151	

Certificate No. T220242

Page 4 of 4

Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)									
	TN141	TN142	TN143	TN144	TN145	TN146	TN147	TN148	TN149	TN150
3.0	3.03	2.89	2.89	3.39	2.90	3.05	3.02	3.00	2.89	3.13
	TN151	TN152	TN153	TN154	TN155					
	3.23	3.20	3.25	2.93	3.17					

Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage Factor k
	Min, Max	Average					
3.0	2.7, 3.3	3.0	3.07	1.09	1.30	1.50	2.00

* The Acuoted uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.



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.: 22CH120
Page.: 1 of 3

Certificate of Calibration

Equipment : Conductivity Meter
Manufacturer : TOA DKK
Model : CM-41X
Serial No. : 842572
ID No. : EQL-211
Condition As-Received: Used Item
Received Date : 24 January 2022
Calibration Date : 26 January 2022
Reference : 2201-0646DN-1
Submitted by : TEST TECH CO.,LTD (HEAD Office)
30,32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhunthian, Bangkok 10150
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure: In-house method :
- CP-CH6 by direct measurement
with certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer
Calibrated by : Warakorn Lemgagtrakul
Approved by :
(✓) Malee Butkruea
() Sathip Meangmai
() Warakorn Lemgagtrakul
Issue Date : 3 February 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.

A 0037370



Cert.No.: 22CH120
Page.: 2 of 3

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	1963878	130RC095	211977	17 Sep 2022
2) Ref. Std. Thermometer	4982054	110RC044	2111201	26 Oct 2022

This certification is traceable to the International System of Unit maintained at:-

- Traceable to National Institute of Metrology (Thailand), NIMT

2. Certified Reference Materials :-

- Conductivity calibration solution, CPA chem Ltd., The measurement results are traceable to SI
through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Conductivity Solution	Manufacturer	Lot No.	Exp. date
147.0 µS/cm	CPA Chem	761020	02 Aug 2022
1.413 mS/cm	CPA Chem	761021	02 Aug 2022
12.8806 mS/cm	CPA Chem	754037	28 June 2022

- Control Conductivity calibration solution temperature by Water bath (25±0.1) °C

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

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 147.0, 1413.0, 12880.6 µS/cm

Conductivity Electrode Serial No.: 806F0005

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor k
147.0 µS/cm	149.1 µS/cm	146.9 µS/cm	0.99 µS/cm	2.00
1.413 mS/cm	1.424 mS/cm	1.413 mS/cm	0.0092 mS/cm	2.00
12.8806 mS/cm	12.81 mS/cm	12.88 mS/cm	0.086 mS/cm	2.00

Remark

- UUC* = Unit Under Calibration

- 147.0 µS/cm Adjustment Cell constant = 98.4m⁻¹

- 1.413 mS/cm Adjustment Cell constant = 99.2m⁻¹

- 12.8806 mS/cm Adjustment Cell constant = 100.7m⁻¹

a 1092322



Cert.No.: 22CH120
Page.: 3 of 3

Calibration Results

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : CT-58101B

- Serial No. 806F0005

Dimension of probe;

- Length : 114 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (± °C)	Coverage factor k
25.0	25.003	25.1	0.097	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

-o0o-

Mali

a 1092321



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoh, Saraburi 18110, Thailand.

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851 , +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



Certificate No. T220021

Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cooling Room)

Manufacturer : -

Model : -

Serial No. : -

Customer Code : EQL-167

ID No. : T1447A1

Customer : Test Tech Co.,Ltd

30, 32 Rama II Soi 63, Rama II Rd., Samaedam,

Bangkhunthian Bangkok 10150

Customer Location : LABORATORY FLOOR 3

Date of Receipt : 12 January 2022

Calibrated By : [Redacted] (Technician)

Approved By : [Redacted] (Site Calibration Manager)

Date of Issue : 19 JAN 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 standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

FM-L14 I17/01-02-64



Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 19 January 2022
Environment : Temperature : 24.2-26.8 °C
Line Voltage : 221.6-225.5 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).
All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN161-TN170	T210009	31 January 2022
DATA LOGGER	34970A	T149	T210009	31 January 2022

3. This certificate is traceable to :

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

4. Condition of calibrated item : good

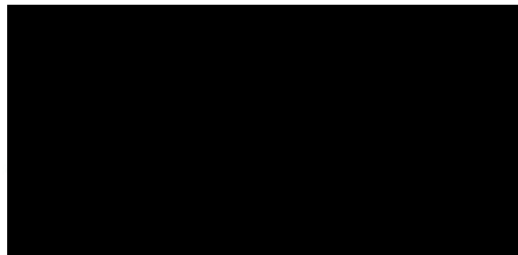
Equipment Description :

Time Constant 1 Hour 30 Minute At 3 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

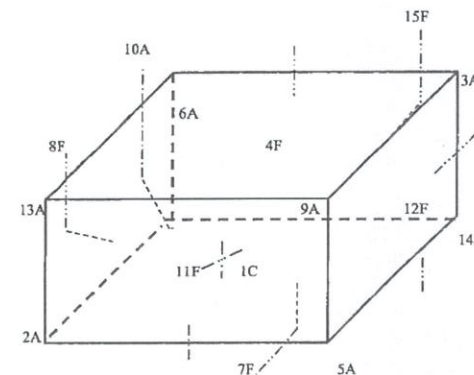
5. Adjustment :

() without adjustment

(X) after adjustment



Calibration Report

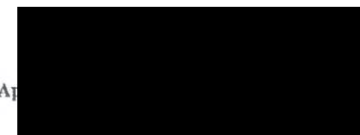


C = Centre , F = Centre of Face , A = Corner , E = Centre of Edge

1C	=	TN161
2A	=	TN162
3A	=	TN163
4F	=	TN164
5A	=	TN165
6A	=	TN166
7F	=	TN167
8F	=	TN168
9A	=	TN169
10A	=	TN170

11F	=	TN171
12F	=	TN172
13A	=	TN173
14A	=	TN174
15F	=	TN175

Aj





Metrological Center
SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T220021

Page 4 of 4

Calibration Report

Measurement Results:

Calibration Point	Average Standard Reading at each position (°C)									
	TN161	TN162	TN163	TN164	TN165	TN166	TN167	TN168	TN169	TN170
3	3.15	3.01	3.03	3.25	3.15	3.32	3.15	2.50	3.02	2.93
	TN171	TN172	TN173	TN174	TN175					
	2.99	2.47	2.60	2.95	2.60					

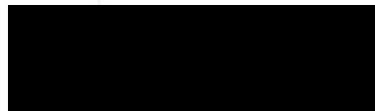
Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage
	Min , Max	Average					Factor k
3.0	2.9 , 3.1	3.0	2.94	0.47	1.02	0.93	2.00

* The quoted uncertainty exclude " uniformity "

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 % .



FM-L15 11/7/15-05-63



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkai, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com



CERTIFICATE No : 21T9568

REFERENCE No : 62575-6

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UF 110
SERIAL No : B414.0764
ID No : EQL-169
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 23-Sep-21

APPROVED BY :

ISSUED DATE : 27-Sep-21

RECEIVED DATE : 23-Sep-21

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

F-G010 REV : 02



CERTIFICATE No : 21T9568

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UF 110
ID No : EQL-169
RECEIVED DATE : 23-Sep-21
AMBIENT TEMPERATURE : 25 °C ± 1 °C
S/N : B414.0764
CALIBRATION DATE : 23-Sep-21
RELATIVE HUMIDITY : 51 %RH ± 10 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

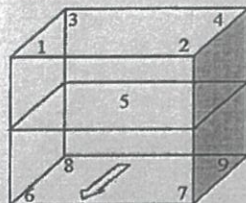
1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO ILAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	HYDRA 2635A	7301307	21T6764	10-Jul-22

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



FRONT

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
104.0	104.0	104.0	103.89	0.21	0.91	0.93
180.0	180.0	180.0	179.74	0.36	1.82	2.11

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
104.0	104.0	104.32	104.08	103.67	103.89	103.58	103.73	104.04	103.73	103.93	0.38
180.0	180.0	180.38	179.92	179.16	179.40	179.25	179.24	180.76	179.13	180.37	1.1

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21T9567/1
REFERENCE No : 62575-5

PAGE : 1 OF 2

Certificate of Calibration

THIS CALIBRATION CERTIFICATE WAS ISSUED TO SUPPLEMENT CALIBRATION CERTIFICATE NO.21T9567

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UFE 500
SERIAL No : G 512.2005
ID No : EQL-161
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 23-Sep-21

APPROVED BY :

ISSUED DATE : 05-Oct-21

RECEIVED DATE : 23-Sep-21



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

CERTIFICATE No : 21T9567/1

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UFE 500
ID No : EQL-161 S/N : G 512.2005
RECEIVED DATE : 23-Sep-21 CALIBRATION DATE : 23-Sep-21
AMBIENT TEMPERATURE : 25 °C ± 1 °C RELATIVE HUMIDITY : 51 %RH ± 10 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

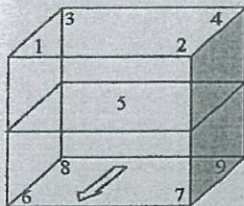
1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOMETER PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	HYDRA 2635A	6635300	21T6765	10-Jul-22

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 4
Overall Line Voltage (V) variation : 9
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*48 cm, Vent =50%

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
104.0	104.5	104.5	104.12	0.16	0.62	0.76
120.0	120.5	120.5	120.10	0.17	0.70	0.84
140.0	140.5	140.5	140.10	0.22	0.80	1.04
150.0	150.5	150.5	150.03	0.25	0.96	1.20

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
104.5	104.5	104.00	104.30	104.25	103.92	103.97	103.92	103.98	104.23	104.48	0.38
120.5	120.5	119.92	120.33	120.24	119.88	119.91	119.83	120.04	120.21	120.51	0.38
140.5	140.5	139.90	140.32	140.27	139.79	139.93	139.79	139.93	140.29	140.63	0.46
150.5	150.5	149.84	150.24	150.13	149.81	149.85	149.72	149.78	150.25	150.68	0.46

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA. THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.
END OF CALIBRATION REPORT



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584



CERTIFICATE No : 21E11277
REFERENCE No : 63049-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : pH METER
MANUFACTURER : TOA DKK
MODEL : HM-41X
SERIAL No : 784787
ID No : EQL-199
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 15-Oct-21

APPROVED BY :

ISSUED DATE : 15-Oct-21

RECEIVED DATE : 15-Oct-21

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CERTIFICATE No : 21E11277

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : pH METER
MANUFACTURER : TOA DKK
ID No : EQL-199
RECEIVED DATE : 15-Oct-21
AMBIENT TEMPERATURE : 25°C ± 1°C

MODEL : HM-41X
SERIAL NUMBER : 784787
CALIBRATION DATE : 15-Oct-21
RELATIVE HUMIDITY : 51 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

- THIS INSTRUMENT WAS CALIBRATED BY DIRECT MEASUREMENT METHOD BASED ON WI-TQ-062. THE DISPLAY UNIT WAS TESTED BY GENERATING STANDARD VOLTAGE TO THE UNIT AND READ THE VALUE COMPARED WITH CALCULATED VALUE. THE DISPLAY AND ELECTROD WAS CALIBRATED BY USING STANDARD pH BUFFER SOLUTION.
- REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No/ LOT No	CERTIFICATE No	DUE DATE
1) pH STANDARD SOLUTION	00651-06	CC719181	4880-12119147	05-Apr-23
2) pH STANDARD SOLUTION	00651-08	CC718727	4881-12110709	31-Mar-23
3) pH STANDARD SOLUTION	00651-10	CC717045	4882-12065386	17-Mar-23
4) PROCESS CALIBRATOR	744	7514008	21E1392	29-Apr-22
5) BATH	260014	1247 48074	21T9121	10-Sep-22
6) THERMOMETER WITH PROBE	421504	55000379	21T9129	14-Sep-22
7) STANDARD THERMOMETER	2560	A14546	PSL-T0049/64	23-Nov-22

- THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
- THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
- THIS CERTIFICATE IS TRACEABLE TO SI UNIT MAINTAINED AT :-
 - NATIONAL INSTITUTE OF STANDARD AND TECHNOLOGY, USA.
 - NATIONAL INSTITUTE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION : ADJUSTMENT

1. DISPLAY UNIT WITH pH ELECTRODE S/N: 903F0008MK

STANDARD pH BUFFER SOLUTION	UUC READING	CORRECTION	ACTUAL READING	UNCERTAINTY OF MEASUREMENT	COVERAGE FACTOR
(pH)	(pH)	(pH)	(mV)	(± pH)	k
4.007	4.01	-0.003	177	0.013	2.00
7.003	7.00	0.003	0	0.013	2.00
10.014	10.01	0.004	-177	0.014	2.00

2. DISPLAY UNIT MEASUREMENT TEMPERATURE WITH PROBE

STANDARD READING	UUC* READING	IMMERSION DEPTH	CORRECTION	UNCERTAINTY OF MEASUREMENT
(°C)	(°C)	(mm)	(°C)	(±°C)
25.008	25.0	80	0.008	0.21

UUC : UNIT UNDER CALIBRATION

THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



Bara Scientific
SOLUTION OF SCALES

Bara Scientific Co., Ltd.

968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-170/21
Equipment UV/Vis Spectrophotometer
Model UV-1900i
Manufacturer Shimadzu
Serial No. A12535780311ML
ID No. EQL-233
Date of receipt 7 June 2021
Date of calibration 7 June 2021
Date of issue 11 June 2021

Customer name Test Tech Co., Ltd.

Address 30,32 Rama II Soi 63, Rama II Rd., Samaedam, Bangkokhuthian, Bangkok 10150

Temperature (23.8 - 25.2) °C (On site)
Humidity (48.6 - 53.6) %RH (On site)

Equipment condition Good Operation

Calibration Location Water Room

Calibration Procedure In-house method WI-UV-702-01 based on ASTM E275-01

Traceability Wavelength Accuracy is traceable to certificate No. 80172 and 78888
Photometric Accuracy is traceable to certificate No. 80162 and 78898
Stray Light is traceable to certificate No. 78900
The above certificate are traceable to SI unit through Starna Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr.Wanchana Janloey

Mr.Kanchit Choothep
Technical Manager

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced
except in full, without written approval of the Bara Scientific Co., Ltd.

Certificate of Calibration

Certificate No. **BSCC-UV-170/21** Number of Page(s) **2 of 3**

Calibration Results:

1.Wavelength Accuracy

Certified Wavelength (nm)	UUC (nm)	Error (nm)	Uncertainty (\pm nm)
279.44	279.07	-0.37	0.18
418.53	418.41	-0.12	0.18
536.52	536.48	-0.04	0.18
684.50	684.53	0.03	0.18
879.41	879.37	-0.04	0.18

2.Photometric Accuracy (UV)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (\pm A)
235	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
257	0.0000	0.0000	0.0000	0.0075
	0.8671	0.8625	-0.0046	0.0075
313	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
350	0.0000	0.0000	0.0000	0.0075
	0.6443	0.6406	-0.0037	0.0075

*CNR = Customer not request

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced
except in full, without written approval of the Bara Scientific Co., Ltd.

Certificate of Calibration

Certificate No. **BSCC-UV-170/21** Number of Page(s) **3 of 3**

Calibration Results:

3.Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (\pm A)
420.0	0.0000	0.0000	0.0000	0.0042
	0.5808	0.5807	-0.0001	0.0042
	0.7651	0.7652	0.0001	0.0042
	1.0226	1.0235	0.0009	0.0042
440.0	0.0000	0.0000	0.0000	0.0042
	0.5644	0.5645	0.0001	0.0042
	0.7473	0.7476	0.0003	0.0042
	1.0001	1.0009	0.0008	0.0042
465.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
546.1	0.0000	0.0000	0.0000	0.0042
	0.5216	0.5215	-0.0001	0.0042
	0.6980	0.6970	-0.0010	0.0042
	0.9961	0.9955	-0.0006	0.0042
590.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
635.0	0.0000	0.0000	0.0000	0.0042
	0.5621	0.5617	-0.0004	0.0042
	0.6932	0.6920	-0.0012	0.0042
	1.0877	1.0867	-0.0010	0.0042

*CNR = Customer not request

4.Stray Light*

Standard cut-off wavelength (nm)	Unit Under Calibration(UUC) Wavelength (nm)	Transmission (%T)	Absorbance (A)
200.91 \pm 0.11nm	200.90	0.9822	2.0078

The Stray light transmission reference is less than 1.0%T and Stray light absorbance reference is greater than 2.00A

*Stray Light not NSC-ONSC Accredited.

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

End of Certificate

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced
except in full, without written approval of the Bara Scientific Co., Ltd.



Certificate of Calibration

Certificate No.: C06210259

Page 2 of 3

Equipment: SPECTROPHOTOMETER Certificate No.: C06210259
Model: DR6000 Issued Date: 10 June 2021
Serial No. (or ID.): 1693421 (EQL-197) Job No.: KSPR2107545
Manufacturer: HACH Page: 1 of 3
Condition: In Condition

Customer: TEST TECH CO., LTD.
30,32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhuntien Bangkok 10150 Thailand

Environment Condition: Temperature 25.6 °C ± 0.3 °C
Humidity 53.3 %RH ± 2.1 %RH

Calibration Place: TEST TECH CO., LTD. (แผนกน้ำดี)
30,32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhuntien Bangkok 10150 Thailand

Calibration By: Mr. Atachai Ngamchanat
Calibration Date: 10 June 2021
The Method used: In house method, SPCC-WI-24, base on ASTM E 275-08 and ASTM E 387-04
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.
The standard for Wavelength Certificate No. 85283 and 85282
The standard for Photometric Certificate No. 107642 and 85755
The standard for Stray light Certificate No. 85760 and 85761
The standard for Spectral resolution Certificate No. 85762

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
418.61	418.9	-0.29	0.13
536.66	536.9	-0.24	0.13
637.98	637.9	0.08	0.13
748.48	748.7	-0.22	0.13
807.03	807.4	-0.37	0.13

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2878	0.288	-0.0002	0.0045
	0.5157	0.517	-0.0013	0.0045
	1.0258	1.028	-0.0022	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2816	0.282	-0.0004	0.0045
	0.5059	0.507	-0.0011	0.0045
	1.0044	1.005	-0.0006	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2467	0.248	-0.0013	0.0045
	0.4579	0.459	-0.0011	0.0045
	0.9301	0.931	-0.0009	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2419	0.243	-0.0011	0.0045
	0.4646	0.465	-0.0004	0.0045
	0.9453	0.944	0.0013	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2560	0.257	-0.0010	0.0045
	0.5036	0.503	0.0006	0.0045
	1.0022	1.001	0.0012	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2553	0.256	-0.0007	0.0045
	0.4971	0.496	0.0011	0.0045
	0.9717	0.969	0.0027	0.0045

(Mr. Atachai Ngamchanat)

Person in charge

(Mr. Danrong Boonsaporn)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SPC RT Co., Ltd.

Calibration Results:

Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7342	0.736	-0.0018	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8569	0.857	-0.0001	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2859	0.288	-0.0021	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6379	0.636	0.0019	0.0080

Stray light *

Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)
260.73 +/- 0.11 nm	260.7	0.9	2.046
391.96 +/- 0.11 nm	392.0	1.1	1.959

The stray light transmission reference is less than 1.0 T(%) and absorbance is greater than 2.0 (A)

Spectral Resolution *

Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.77	266.84	1.37	2.00
UUC: Wavelength (nm)	268.7	266.7		
Std Absorbance (A)	0.4200	0.2484		
Absorbance (A)	0.380	0.278		

* Calibration Marked " Not TISI Accredited " in this Certificate have been included for completeness.

The End of Certificate



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No. : 21H2269
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer

Manufacturer: Barigo

Model : -

Serial No.: -

ID No.: EQL-064

Condition As-Received: Used Item

Received Date: 25 October 2021

Calibration Date: 27 October 2021
to 02 November 2021

Reference: 2110-0738DN

Submitted by: TEST TECH CO.,LTD (HEAD Office)

Ambient Temperature: (25 ± 3) °C

Relative Humidity: (50 ± 20) %

30,32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard Chilled Mirror Hygrometer Sensor	Dew Prime II	31863	19714	20 Sep 2022
2) Standard Humidity/Temperature Meter	400	10240757	TH-0076-20	07 Dec 2021

2.The 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 maintained at:-

- National Institute of Standards and Technology (NIST) , The United States of America
- National Institute of Metrology Thailand (NIMT)

Calibrated by : Viporn Tantiyawutti

Issue Date : 04 November 2021

Approved Signatory :

[√] Chakrit Waewanjua

[] Pornthippa Taneyakul

[] Pitak Srimongkol



Cert. No.: 21H2269

Page.: 2 of 2

Result of Calibration:-

Function:

Without Adjustment				
Humidity measurement.				
Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	Error (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	30.1	30.0	-0.1	1.5
25.0	40.1	40.0	-0.1	1.5
25.0	50.1	51.0	0.9	1.7
25.0	60.0	61.0	1.0	1.7
25.0	75.2	76.0	0.8	1.7

Result of Calibration:-

Function:

Without Adjustment				
Temperature measurement.				
Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (±°C)	
15.00	15.0	0.00	0.72	
20.00	20.0	0.00	0.72	
25.01	25.0	-0.01	0.72	
30.01	30.0	-0.01	0.72	

UUC* : Unit Under Calibration

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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a 1079790



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com



PAGE : 1 OF 2

CERTIFICATE No : 21T8009

REFERENCE No : 62147-2

Certificate of Calibration

EQUIPMENT : LIQUID IN GLASS THERMOMETER

MANUFACTURER : PRECISION

MODEL : ---

SERIAL No : 8925

ID No : EQL-103

RESOLUTION : 0.1 °C

TYPE : TOTAL IMMERSION

CONDITION AS RECEIVED : USED ITEM

SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

ALIBRATED BY : CHARUKIT L.

CALIBRATION DATE : 25-Aug-21

APPROVED BY : [Redacted Signature]

ISSUED DATE : 25-Aug-21

RECEIVED DATE : 18-Aug-21

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF QUALITY CALIBRATION CO., LTD.

F-G010 REV 02



CERTIFICATE No : 21T8009

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : ---
ID No : EQL-103 SERIAL NUMBER : 8925
RESOLUTION : 0.1 °C TYPE : TOTAL IMMERSION
RECEIVED DATE : 18-Aug-21 CALIBRATION DATE : 25-Aug-21
AMBIENT TEMPERATURE : 23 °C ± 3 °C RELATIVE HUMIDITY : 50 %RH ± 20 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON ASTM E77:1992 BY COMPARISON WITH STANDARD PLATINUM RESISTANCE THERMOMETER (SPRT) INTO LIQUID BATH TEMPERATURE CONTROLLER. THE TEMPERATURE SCALE USED WAS BASED ON TS-90.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD THERMOMETER	1529	A22167	20T12169	10-Dec-21
2) SPRT PROBE	5612	587312	20T12169	10-Dec-21
3) PRECISION BATH	7320	A21105	20T12163	16-Dec-21
4) PRECISION BATH	CTR-40	A68155	20T12164	22-Dec-21

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND).

RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

STANDARD READING (°C)	UUC* READING (°C)	IMMERSION DEPTH (mm)	CORRECTION (°C)	EMERGENT STEM TEMPERATURE (°C)	UNCERTAINTY OF MEASUREMENT (±°C)
19.9958	20.0	140	-0.0042	N/A	0.079
25.0038	25.0	160	0.0038	N/A	0.079
41.5059	41.5	225	0.0059	N/A	0.079
44.5075	44.5	235	0.0075	N/A	0.079
45.0125	45.0	240	0.0125	N/A	0.079
50.0154	50.0	260	0.0154	N/A	0.084

UUC* : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 21T8008
REFERENCE No : 62147-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : G13004
SERIAL No : ---
ID No : EQL-111
RESOLUTION : 1 °C
TYPE : TOTAL IMMERSION
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

ALIBRATED BY : CHARUKIT L.
CALIBRATION DATE : 25-Aug-21
APPROVED BY :
ISSUED DATE : 25-Aug-21
RECEIVED DATE : 18-Aug-21

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.



CERTIFICATE No : 21T8008

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : G13004
ID No : EQL-111
RESOLUTION : 1 °C
RECEIVED DATE : 18-Aug-21
AMBIENT TEMPERATURE : 23 °C ± 3 °C

SERIAL NUMBER : ---
TYPE : TOTAL IMMERSION
CALIBRATION DATE : 25-Aug-21
RELATIVE HUMIDITY : 50 %RH ± 20 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON ASTM E77:1992 BY COMPARISON WITH STANDARD PLATINUM RESISTANCE THERMOMETER (SPRT) INTO LIQUID BATH TEMPERATURE CONTROLLER. THE TEMPERATURE SCALE USED WAS BASED ON ITS-90.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD THERMOMETER	1529	A22167	20T12169	10-Dec-21
2) SPRT PROBE	5612	587312	20T12169	10-Dec-21
3) PRECISION BATH	7320	A21105	20T12163	16-Dec-21

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT - NATIONAL INSTITUTE OF METROLOGY (THAILAND).

RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

STANDARD READING (°C)	UUC* READING (°C)	IMMERSION DEPTH (mm)	CORRECTION (°C)	EMERGENT STEM TEMPERATURE (°C)	UNCERTAINTY OF MEASUREMENT (±°C)
114.9054	115.0	110	-0.0946	N/A	0.14
120.9149	121.0	120	-0.0851	N/A	0.14

* : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

Certificate of Calibration

Equipment: TURBIDIMETER
Model: 2100N
Serial No. (or ID.): 970400003415 (EQL-024)
Manufacturer: HACH
Condition: In Condition

Certificate No.: C08210219
Issued Date: 11 November 2021
Job No.: KSPR2114482
Page: 1 of 2

Customer: TEST TECH CO., LTD.
30,32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhuntien Bangkok 10150 Thailand

Environment Condition: Temperature 23 °C ± 2 °C
Humidity 50 %RH ± 15 %RH

Calibration Place: Environment Laboratory, SPC RT Co., Ltd.
1194 Soi Wachirathamsathit 57, Sukhumvit 101/1 Rd.,
Bangchak, Prakhonong, Bangkok 10260 Thailand

Calibration By: Miss. Kaewkan Suradech
Calibration Date: 11 November 2021
The Method used: In house method, SPCC-WI-23, base on Hach Manufacturer Method 8195
Traceability: This certificate is traceable to Primary standard Fromazin and StablCal accepted by United States Environmental Protection Agency (EPA) through Hach Company
Certificate No. A1075 , A1074 , A1091 , A1074 , A1074

(Miss Kaewkan Suradech)

Person in charge

(Mr. Dumrong Boonsopon)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SPC RT Co., Ltd.

Calibration Results:

Before Adjustment

Std Turbidity (NTU)	UUC Reading	Correction	Deviation	Uncertainty
0.050	0.055	-0.005	0.0005	0.070
20.40	18.8	1.60	0.05	1.0
205.0	196	9.0	0.0	10
1027.0	992	35.0	0.5	50
4020.0	3884	136.0	1.4	200

After Adjustment

Std Turbidity (NTU)	UUC Reading	Correction	Deviation	Uncertainty
0.050	0.058	-0.008	0.0004	0.070
20.40	20.4	0.00	0.00	1.0
205.0	205	0.0	0.0	10
1027.0	1027	0.0	0.0	50
4020.0	4018	2.0	0.8	200

The End of Certificate

Certificate of Calibration

Certificate No. : 64-420107-1

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

81/109 Pinthong Group Building, Moo 1, Rama 2 Road,
Tha Kham, Bang Khun Thian, Bangkok 10150

Equipment : pH Meter with electrode

pH meter

Manufacturer : Eutech Model : pH 700

Range : N/A pH Resolution : 0.01 pH

Serial No. : 2884323 ID No. : N/A

Electrode

Model : N/A Serial No. : 40417

Environment : On site calibration was carried out at the Laboratory, M Green Group Co.,Ltd.

Ambient Temperature : (25.0 to 25.8) °C

Relative Humidity : (55 to 58) %

Date of Received : 20 September 2021

Date of Calibration : 20 September 2021

Date of Issue : 21 September 2021

Calibrated by : Bunjerd Masri

Calibration Method : In-house method CAL-M4201 direct measurement by using standard voltage calibrator and using certified reference material (CRM)

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	SG-E-00473/64	27 Aug 2023	National Institute of Metrology Thailand (NIMT)

2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.004	61218215	753167	02 Feb 2022	CPA chem
6.987	61211742	758970	02 Feb 2022	CPA chem
9.961	61223868	753169	02 Feb 2022	CPA chem

Appro

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-420107-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Electrical measurement

pH meter

Performing standard curve by Multiproduct Calibrator at pH (4,7,10)

Adjustment Curve at nominal pH	Applied Voltage (mV)	Nominal Value (pH)	UUC Reading		Correction (mV)	Uncertainty (± mV)
			(pH)	(mV)		
4, 7, 10	177.4800	4	4.00	177.5	0.0	0.12
	0.0000	7	7.00	0.1	-0.1	0.086
	-177.4800	10	10.00	-177.4	-0.1	0.12

Function : pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (± pH)
4, 7, 10	4.004	4.00	0.00	0.011
	6.987	7.00	-0.01	0.020
	9.961	10.00	-0.04	0.053

Remark

UUC : Unit Under Calibration

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

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

- (U) -

Certificate of Calibration

Certificate No. : 64-410100-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatesuknakhon 25, Pracha-Utid Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Digital Thermo-Hygrometer

Manufacturer : Digicon Model : TH-02A

Range Temperature : 0 °C to 50 °C Resolution : 0.1 °C

Range Humidity : 20 %R.H. to 99 %R.H. Resolution : 1 %R.H.

Serial No. : 1819A0771796 ID No. : N/A

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 20 September 2021

Date of Calibration : 25 September to 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Chortip Samchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4013 by compared with standard probe sensor humidity/temperature into humidity/temperature chamber.

Reference Standard Instruments : This certification is traceable to the International System of Units

Digital Indicator with Standard Probe Temp&Hum

ID No.	Cert. No.	Due Date	Traceability
400034 & 400035	SG-H-00664/64	07 Jan 2022	Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268
400034 & 400036	SG-H-00664/64	07 Jan 2022	Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268

Ap

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-410100-1

Page : 2 of 2

UUC Condition As-Received : Good

Result of Calibration : Without Adjustment

Function : Temperature measurement

Reference Humidity @ 50 %R.H.

Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
20.00	19.8	0.2	0.46
24.99	24.7	0.3	0.46
29.98	29.6	0.4	0.46

Result of Calibration : Without Adjustment

Function : Humidity measurement

Reference Temperature @ 25 °C

Standard Humidity (%R.H.)	UUC Reading (%R.H.)	Correction (%R.H.)	Uncertainty (± %R.H.)
40.02	40	0	2.2
60.03	59	1	2.3

Remark

UUC : Unit Under Calibration

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

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

- 000 -



Certificate of Calibration

Certificate No. : 64-400489-1

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisetukhakhon 25, Pracha-Uttd Rd., Thungkru Bangkok 10140 Thailand

Equipment : Digital Thermometer with Thermistor probe

Temperature Indicator

Manufacturer : Eutech Model : pH 700

Range : N/A °C Resolution : 0.1 °C

Serial No. : 2884323 ID No. : N/A

Thermistor probe

Model : N/A Sheath Material : Stainless

Diameter : 3.2 mm. Length : 100 mm.

Serial No. : PH5TEMB01P ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co.,Ltd.

Ambient Temperature : (25.0 to 25.8) °C

Relative Humidity : (55 to 58) %

Line Voltage : (229.0 to 230.0) VAC

Date of Received : 20 September 2021

Date of Calibration : 20 September 2021

Date of Issue : 21 September 2021

Calibrated by : Bunjerd Masri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the dry-well calibrator at the constant controlled temperature.

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400002	TT-0050-20	18 Jun 2022	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400033	20E612	17 Feb 2022	National Institute of Metrology Thailand (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-400489-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
100	25.002	24.9	0.1	0.19

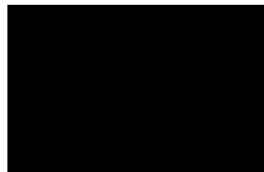
Remark

UUC : Unit Under Calibration

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

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

- 000 -



Certificate of Calibration

Certificate No. : 64-200274-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatesuknakhon 25, Pracha-Utid Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Electronic Balance

Manufacturer : SHIMADZU Model : AP225WD

Serial No. : D316300690

Capacity : 220 g Resolution : 0.00001g/102g, 0.0001g/220g

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.1 to 26.3) °C

Relative Humidity : (64.0 to 64.4) %

Air Pressure : 1009.0 mbar

Date of Received : 20 September 2021

Date of Calibration : 20 September 2021

Date of Issue : 23 September 2021

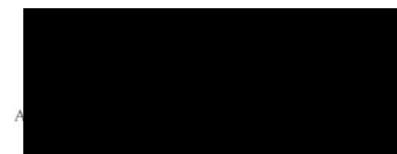
Calibrated by : Akaradath Thippichai

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref: LAB 14
Edition 5, July 2015

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02204101	17 Nov 2021	National Institute of Metrology (Thailand), (NIMT)



Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-200274-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty \pm (g)
0.001	0.00000	0.000014
0.01	0.00000	0.000016
0.1	0.00001	0.000018
1	0.00000	0.000027
10	0.00000	0.000053
20	0.00002	0.000071
50	0.00009	0.00011
100	0.00013	0.00020
150	0.0002	0.00038
200	0.0001	0.00038

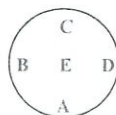
This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.23$, providing a level of confidence of approximately 95%

Eccentric error Load test : 50 g

A	B	C	D	E
-0.00005	0.00001	0.00005	-0.00004	0.00000

g



Repeatability Load test : 200 g

Stddev. : 0.000052 g

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Certificate of Calibration

Certificate No. : 64-400494-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatesukhakhon 25, Pracha-Uttd Rd., Thungkru Bangkok 10140 Thailand

Equipment : Liquid in Glass Thermometer

Manufacturer : N/A

Model : N/A

Range : 0 °C to 100 °C

Resolution : 1 °C

Serial No. : N/A

Immersion : Total

ID No. : 94-49747

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Line Voltage : (220 ± 22) VAC

Date of Received : 20 September 2021

Date of Calibration : 22 September to 24 September 2021

Date of Issue : 24 September 2021

Calibrated by : Chortip Samchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400001	TT-0016-20	04 Mar 2022	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400003	21E1850	14 Jun 2023	National Institute of Metrology Thailand (NIMT)
400004	21E1850	14 Jun 2023	National Institute of Metrology Thailand (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-400494-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Ice point check : UUC* reading 0 °C Standard reading 0.0520 °C

Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
39.7937	40	-0.2	0.31

Remark

UUC : Unit Under Calibration

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

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

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Certificate of Calibration

Certificate No. : 64-400488-2

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatesukhakhon 25, Pracha-Uttd Rd., Thungkru Bangkok 10140 Thailand

Equipment : Air Chamber (Oven)

Manufacturer : Memmert

Model : UF110

Range : N/A °C

Resolution : 0.1 °C

Serial No. : B419.1092

ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.5 to 27.5) °C

Relative Humidity : (50 to 55) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 20 September 2021

Date of Calibration : 20 September 2021

Date of Issue : 24 September 2021

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units
Standard Digital Thermometer with Thermocouple probe

ID No.	Cert. No.	Due Date	Traceability
400029 & 400030	64-400207-1	19 Oct 2021	National Institute of Metrology Thailand (NIMT)

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Certificate of Calibration

Certificate No. : 64-400488-2

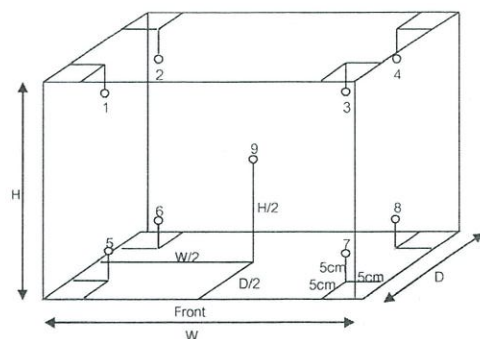
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber
W = 0.56 m
D = 0.40 m
H = 0.48 m
Capacity = 0.11 m³

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
104.0	104.0	104.0	104.5	104.8	104.9	104.5	104.5	104.2	104.8	103.5	104.4	0.73
180.0	180.0	180.0	180.5	179.5	181.9	180.6	180.5	179.9	180.1	179.0	180.6	0.97

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	104.0	104.0	1.1	0.2	1.8
180.0	180.0	180.0	1.7	0.3	3.3

Remark The uncertainty is not combine uniformity of the air chamber

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

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

- o0o -

Certificate of Calibration

Certificate No. : 64-400488-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatesukhakhon 25, Pracha-Utid Rd., Thungkru Bangkok 10140 Thailand

Equipment : Air Chamber (Refrigerator)

Manufacturer : Biobase

Model : BXC-V250M (II)

Range : N/A °C

Resolution : 0.1 °C

Serial No. : YC025025190108

ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.5 to 27.5) °C

Relative Humidity : (50 to 55) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 20 September 2021

Date of Calibration : 20 September 2021

Date of Issue : 24 September 2021

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Digital Thermometer with Thermocouple probe

ID No. Cert. No. Due Date Traceability

400029 & 400032 64-400106-1 30 Sep 2021 National Institute of Metrology Thailand (NIMT)

Approved by

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Certificate of Calibration

Certificate No. : 64-400488-1

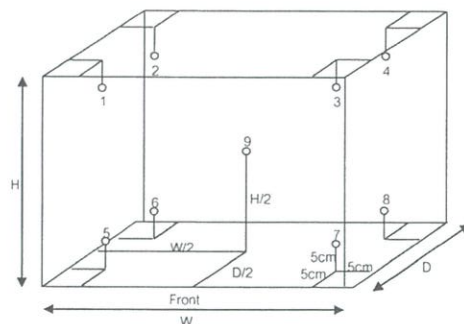
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.50 m

D = 0.40 m

H = 1.20 m

Capacity = 0.24 m³

Test Point (° C)	Setting Temperature (° C)	Indicating Temperature (° C)	Measured Temperature (° C) @ Sensor No.									Uncertainty (± ° C)
			1	2	3	4	5	6	7	8	9	
4.0	2.0	2.0	5.2	4.2	5.2	4.5	5.2	4.9	4.6	4.4	4.0	0.67

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
4.0	2.0	2.0	1.4	0.2	1.7

Remark The uncertainty is not combine uniformity of the air chamber

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

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

- o0o -

Certificate of Calibration

Certificate No. : 64-210435-1

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha Utid Rd., Thungkru Bangkok 10140 Thailand

Equipment : Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 1 g

ID No. : 63-210391-1

Assumed density of weight : 7950 kg / m³

Assumed Air density : 1.2 kg / m³

Environment : Ambient Temperature : (20 ± 2) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1006.7 mbar

Date of Received : 20 September 2021

Date of Calibration : 28 September 2021

Date of Issue : 28 September 2021

Calibrated by : Wuttichai Swatphong

Calibration Method : In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E2413-E2425	MM-0060-19	27 Mar 2022	National Institute of Metrology (Thailand), (NIMT)

Approved by

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CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 64-210435-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	1 g	none	1 g +0.026 mg	± 0.023 mg

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

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

- o0o -

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



Certificate of Calibration

Certificate No. : 64-210435-2

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha Utid Rd., Thungkru Bangkok 10140 Thailand

Equipment : Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 100 g

ID No. : 63-210391-2

Assumed density of weight : 7950 kg / m³

Assumed Air density : 1.2 kg / m³

Environment : Ambient Temperature : (20 \pm 2) °C

Relative Humidity : (50 \pm 10) %

Air Pressure : 1006.6 mbar

Date of Received : 20 September 2021

Date of Calibration : 28 September 2021

Date of Issue : 28 September 2021

Calibrated by : Wuttichai Swatphong

Calibration Method : In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E2413-E2425	MM-0060-19	27 Mar 2022	National Institute of Metrology (Thailand), (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

CAL-F0031-03



Certificate of Calibration

Certificate No. : 64-210435-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	100 g	none	100 g +0.17 mg	± 0.11 mg

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

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

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Certificate of Calibration

Certificate No. : 64-210435-3

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha Utid Rd., Thungkru Bangkok 10140 Thailand

Equipment : Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 200 g

ID No. : 63-210391-3

Assumed density of weight : 7950 kg / m³

Assumed Air density : 1.2 kg / m³

Environment : Ambient Temperature : (20 \pm 2) °C

Relative Humidity : (50 \pm 10) %

Air Pressure : 1006.5 mbar

Date of Received : 20 September 2021

Date of Calibration : 28 September 2021

Date of Issue : 28 September 2021

Calibrated by : Wuttichai Swatphong

Calibration Method : In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E2413-E2425	MM-0060-19	27 Mar 2022	National Institute of Metrology (Thailand), (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 64-210435-3

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	200 g	none	200 g -0.16 mg	\pm 0.17 mg

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

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

- o0o -

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



Certificate of Calibration

Certificate No. : 64-300672-1

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Uttd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Volumetric Flask

Manufacturer : GLASSCO Class : A

Capacity : 100 ml

ID No. : VF100/01/19

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Air Pressure : 1004.4 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	64-200165-4	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

Approved

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

CAL-F0031-03



Certificate of Calibration

Certificate No. : 64-300672-1

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
100	100.102

Uncertainty of measurement with in \pm 0.018 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-2

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Uttd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Volumetric Flask

Manufacturer : GLASSCO

Class : A

Capacity : 250 ml

ID No. : VF250/01/19

Environment : Ambient Temperature : (23 \pm 2) °C

Relative Humidity : (50 \pm 15) %

Air Pressure : 1004.4 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	64-200165-1	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

Approve

The Uncertainties are for a confidence probability of approximately 95%

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Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 64-300672-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
250	250.08

Uncertainty of measurement with in \pm 0.049 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$,

providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-3

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Uttd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Volumetric Flask

Manufacturer : GLASSCO

Class : A

Capacity : 1000 ml

ID No. : VF1000/01/19

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Air Pressure : 1004.4 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	64-200165-1	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

Approved by

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CAL-F0031-03

CAL-F0031-03



Certificate of Calibration

Certificate No. : 64-300672-3

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
1000	1000.33

Uncertainty of measurement with in \pm 0.14 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$,

providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-4

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Utid Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Cylinder

Manufacturer : GLASSCO

Class : A

Capacity : 100 ml

Graduation : 1 ml

ID No. : CY100/01/19

Environment : Ambient Temperature : (23 \pm 2) °C

Relative Humidity : (50 \pm 15) %

Air Pressure : 1004.2 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	64-200165-1	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

Approved by :

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-4

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
50	50.37
100	100.32

Uncertainty of measurement with in \pm 0.063 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-5

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Utid Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Cylinder

Manufacturer : GLASSCO

Class : A

Capacity : 250 ml

Graduation : 2 ml

ID No. : CY250/01/19

Environment : Ambient Temperature : (23 \pm 2) °C

Relative Humidity : (50 \pm 15) %

Air Pressure : 1004.2 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Areerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	64-200165-1	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

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The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-5

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
150	151.11
250	251.41

Uncertainty of measurement with in \pm 0.087 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-6

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Utid Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO Class : A

Capacity : 10 ml Graduation : 0.1 ml

ID No. : MP10/01/19

Environment : Ambient Temperature : (23 \pm 2) °C

Relative Humidity : (50 \pm 15) %

Air Pressure : 1004.5 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Areerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	64-200165-4	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

Approved by :

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 64-300672-6

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 12.23 sec.

Nominal Volume (ml)	Measuring Volume (ml)
2	1.9981
5	4.9793
10	9.9897

Uncertainty of measurement with in \pm 0.0039 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$,

providing a level of confidence of approximately 95%

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NSG-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 64-300672-7

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesukhakhon 25, Pracha-Utid Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO Class : A

Capacity : 25 ml Graduation : 0.1 ml

ID No. : MP25/01/19

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Air Pressure : 1004.5 mbar.

Date of Received : 20 September 2021

Date of Calibration : 27 September 2021

Date of Issue : 27 September 2021

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	64-200165-4	02 Dec 2021	National Institute of Metrology (Thailand) (NIMT)

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