

ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือตรวจวัด



## Certificate of Calibration

Certificate Number : SPR23030320-2

Page : 1 of 3

Customer : M Green Group Co.,Ltd

[Redacted] Rd., Thungkru, Bangkok 10140, Thailand

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 45

Serial Number : PN2448

ID. Number : N/A

### Environmental Conditions

Ambient Temperature : 23 °C ± 3 °C

Received Date : 20 Mar 2023

Relative Humidity : 50 % ± 15 %

Calibration Date : 22 Mar 2023

Location of Calibration : In-Lab

Recommend Due Date : 22 Mar 2024

Calibration Procedure : SP-CPE-04-01

Date of Issue : 23 Mar 2023

### Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Calibration Officer

Approved by

[Redacted Signature]

Authorized Signatory



## Calibration Report

Certificate Number : SPR23030320-2

Page : 2 of 3

### Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 114/0166	17 Jan 2024

### Traceability

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

TISTR - Thailand Institute of Scientific and Technological Research



## Result of Calibration

Certificate No. : SPR23030320-2

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A		Unit : dB			
Standard Setting	UUC Reading		Error		Uncertainty ( ± )
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select C		Unit : dB			
Standard Setting	UUC Reading		Error		Uncertainty ( ± )
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z		Unit : dB			
Standard Setting	UUC Reading		Error		Uncertainty ( ± )
	Fast	Slow	Fast	Slow	
94	94.1	94.1	0.1	0.1	0.15
114	114.0	114.0	0.0	0.0	0.15

### Note:

The result of calibration was found accurate as show on date and place of calibration only.  
This Certificate is not certified for any commercial transaction.

### Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor  $k = 2.00$ , providing a level of confidence approximately 95%.

- End of Certificate -



**METROLOGY SYSTEM ( THAILAND ) CO.,LTD.**



## Certificate of Calibration

Certificate Number : SPR23030320-1

Page : 1 of 3

Customer : M Green Group Co.,Ltd

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

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 45

Serial Number : PN2453

ID. Number : N/A

### Environmental Conditions

Ambient Temperature : 23 °C ± 3 °C Received Date : 20 Mar 2023

Relative Humidity : 50 % ± 15 % Calibration Date : 22 Mar 2023

Location of Calibration : In-Lab Recommend Due Date : 22 Mar 2024

Calibration Procedure : SP-CPE-04-01 Date of Issue : 23 Mar 2023

### Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Calibration Officer

Approved by



Authorized Signatory

SP-FM-04-15 rev.0



**METROLOGY SYSTEM ( THAILAND ) CO.,LTD.**



## Calibration Report

Certificate Number : SPR23030320-1

Page : 2 of 3

### Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 114/0166	17 Jan 2024

### Traceability

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

TISTR - Thailand Institute of Scientific and Technological Research

SP-FM-04-15 rev.0



## Result of Calibration

Certificate No. : SPR23030320-1

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty ( ± )
	Fast	Slow	Fast	Slow	
94	93.8	93.8	-0.2	-0.2	0.15
114	113.7	113.7	-0.3	-0.3	0.15

Select C Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty ( ± )
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Select Z Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty ( ± )
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

**Note:**

The result of calibration was found accurate as show on date and place of calibration only.  
This Certificate is not certified for any commercial transaction.

**Measurement Uncertainty**

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor  $k = 2.00$ , providing a level of confidence approximately 95%.

- End of Certificate -



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.: CP20230034EA  
Operation No.: CP2023010028

### 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-Utid Rd.,  
Thungkru, Bangkok 10140 Thailand.  
Received Date: 12 January 2023  
Calibrated Date: 16 January 2023  
Issued Date: 18 January 2023  
Calibrated by: Ms. Juntaporn Kunhakom

Approved by:



Group Manager

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.: CP20230034EA

### Calibration Report

Equipment: Sound Calibrator  
Manufacturer: Scarlet Tech  
Model/Type: ST-120  
Serial No.: ST120C0247E  
ID No.: -  
Ambient Temperature: (  $23 \pm 2$  ) °C  
Relative Humidity: (  $50 \pm 15$  ) %  
Pressure: (  $101.3 \pm 1.5$  ) 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-1020-22	14 June 2023
2) Waveform Generator	33511B	MY52302264	CK20220058EA	19 June 2023
3) Audio Analyzing DMM	2015-P	4079144	E1U221042	16 March 2023
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P220024 CD20220164EA	17 March 2023 24 July 2023

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; NSC Accredited Calibration No.0119

### Result of Calibration:-

1. Function : Sound pressure level

Normal	Specified Sound	Measured value	Deviated value <sup>[1]</sup>	Acceptance limit <sup>[3]</sup>
Frequency (Hz)	Pressure level (dB)	(dB)	(dB)	(dB)
1000	94	94.04	0.04	$\pm 0.25$
1000	114	114.10	0.10	$\pm 0.25$

2. Function : Frequency

Normal Sound	Specified Frequency	Measured value	Deviated value <sup>[2]</sup>	Acceptance limit <sup>[3]</sup>
Pressure level (dB)	(Hz)	(Hz)	(%)	(%)
94	1000	999.5	0.0	$\pm 0.7$
114	1000	999.6	0.0	$\pm 0.7$



ELECTRICAL AND ELECTRONICS INSTITUTE  
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20230034EA

Calibration Report

3. Function : Total distortion + noise

Normal Sound Pressure level (dB)	Normal Frequency (Hz)	Measured value <sup>[4]</sup> (%)	Acceptance limit <sup>[5]</sup> (%)
94	1000	0.5	2.5
114	1000	0.4	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. Acceptance limit was IEC 60942:2017 Class 1.  
2. The coverage factor  $k = 2.00$

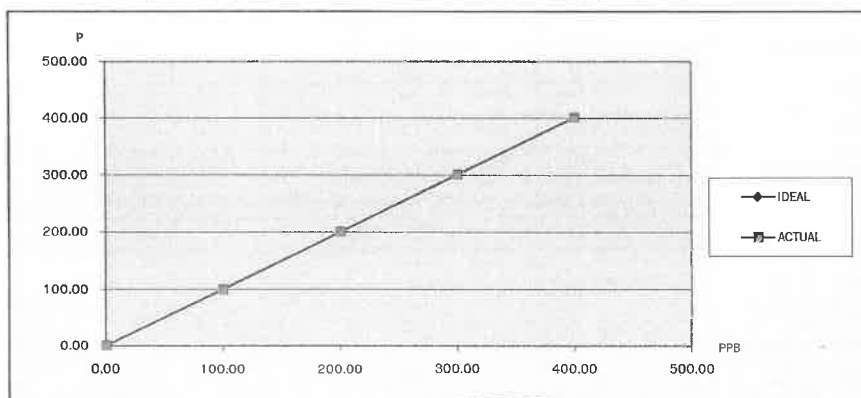
-- End of Report --

TEST REPORT

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED			
EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : HORIBA	MODEL : APSA-370	SERIAL NO : G8KGHRMX	
STANDARD GAS CONCENTRATION (PPM) : 53.29 PPM		CYLINDER NO : CC734373	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 12/05/2020	
CERTIFIED BY : AIRGAS		EXPIRED DATE : 12/05/2028	

TEST RESULTS

POINT NO	TEST RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.050	0.05	-
1	100.00	99.010	-1.0	-0.99
2	200.00	200.420	0.4	0.21
3	300.00	300.460	0.5	0.15
4	400.00	400.650	0.6	0.16
AVERAGE (%)				0.12



CALIBRATED BY : [REDACTED]

CHECKED BY : [REDACTED]

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15-16 , E-Mail : Engineer@iranatee.com

เลขที่ 63/14-15, 67/35-36 ถนน ซอยเพชรเกษม 7,7/1 เพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

CHECK LIST

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED		
EQUIPMENT NAME : SO <sub>2</sub> Analyzer		
MANUFACTURER : HORIBA	MODEL : APSA-370	SERIAL NO. : G8KGHRMX

TEST VALUES

NO.	Ambient SO <sub>2</sub> Monitor	UNIT	BEFORE	AFTER
1	SIGNAL	mV (Voltage of the measured SO <sub>2</sub> Value)	6.40	9.30
2	LAMP	mV (200mV to 1200 mV )	719.10	1001.70
3	CELL	°C (Ambient tembient temperature +(5°C to 15°C))	38.90	32.20
4	PUMP	kPa (65 kPa or less)	44.40	46.00
5	AMBIENT	kPa	101.50	101.80
6	SAMPLE	L/min ( 0.6 L/min to 1.0 L/min )	-	-
7	DC 24 V	V ( 24 V ± 0.5 V )	23.90	23.90
8	DC 5 V	V ( 5 V ± 0.5 V )	5.00	5.00
9	SAMPLE SO2 Reading	PPB	3.77	0.41
10	Zero	PPB	0.41	0.05
11	Span	PPB	420.10	400.65

Remark : Reference EX-EN-019-56 , Ambient SO<sub>2</sub> Monitor APSA-370 Operation Manual Page #78  
( Ambeint temperature = 5°C to 40°C )

อาการที่ตรวจพบ

-

รายละเอียดการดำเนินการ

-

ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY : [REDACTED]

CHECKED BY : [REDACTED]

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15-16 , E-Mail : Engineer@iranatee.com

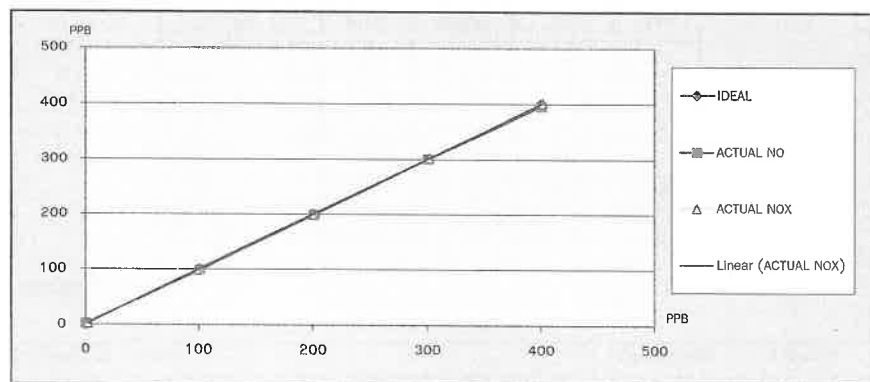
เลขที่ 63/14-15 , 67/35-36 ซอยเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

## TEST REPORT

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED			
EQUIPMENT NAME : NO <sub>x</sub> Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : RSBHK673	
STANDARD GAS CONCENTRATION (PPM) : 53.15 PPM		CYLINDER NO : CC734373	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 12/05/2020	
CERTIFIED BY : AIRGAS		EXPIRED DATE : 12/05/2028	

### TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	-0.43	-0.43	-	-0.13	-0.13	-
1	100.00	99.54	-0.46	-0.46	99.40	-0.60	-0.60
2	200.00	198.72	-1.28	-0.64	198.71	-1.29	-0.64
3	300.00	299.84	-0.16	-0.05	299.91	-0.09	-0.03
4	400.00	400.27	0.27	0.07	400.12	0.12	0.03
AVERAGE (%)				-0.27			-0.31



CALIBRATED BY : .....

CHECKED BY : .....

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15,16 , E-Mail : Engineer@jiranatee.com  
เลขที่ 63/14-15,67/35-36 ขอยนเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

## CHECK LIST

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED			
EQUIPMENT NAME : NO <sub>x</sub> Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO. : RSBHK673	

### TEST VALUES

NO.	NO <sub>x</sub> Analyzer ( APNA-370 )	UNIT	BEFORE	AFTER
1	Signal ( NO )	mV	4.300	2.900
2	Signal ( NO <sub>x</sub> )	mV	15.300	9.700
3	Detector	Temp °C , Standard Value : Ambient temp+(5°Cto15°C)	42.900	42.900
		Pressure kPa , Standard Value : (Ambient/1013x100-20)±4kPa	77.900	77.600
4	AMBIENT	kPa	101.500	101.200
5	SAMPLE	L/min ( 1.1 L/min ± 0.3 L/min )		
6	DC 24 V	V ( 24 V ± 0.5 V )	23.700	23.900
7	DC 5 V	V ( 5 V ± 0.5 V )	5.000	5.000
8	Sampling NO Reading	PPB	5.610	3.710
9	Sampling NO <sub>2</sub> Reading	PPB	15.280	12.560
10	Sampling NO <sub>x</sub> Reading	PPB	20.900	16.280
11	Zero (NO)	PPB	0.420	-0.430
12	Span(NO)	PPB	390.120	400.270
13	Zero (NO <sub>x</sub> )	PPB	4.150	-0.130
14	Span (NO <sub>x</sub> )	PPB	396.410	400.120

Remark : Reference EX-EN-022-56 , "Ambient NO<sub>x</sub> Monitor APNA-370 Operation Manual " Page #48

(Ambient temperature = 5°C to 40°C )

อาการที่ตรวจพบ

รายละเอียดการดำเนินการ

ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY : .....

CHECKED BY : .....

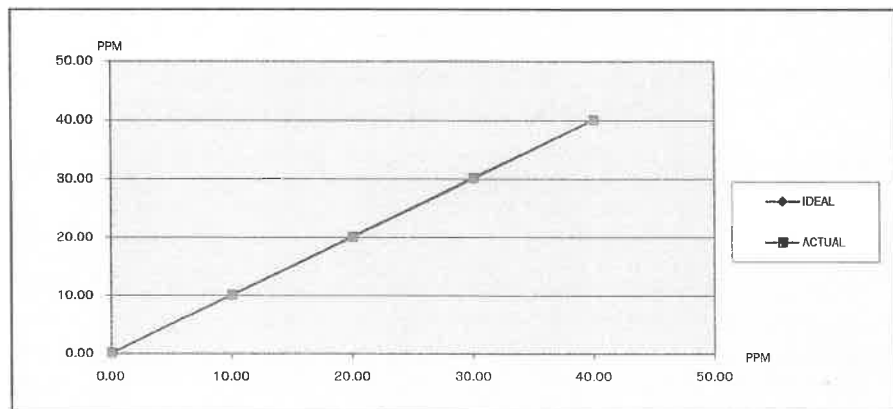
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15-16 , E-Mail : Engineer@jiranatee.com  
เลขที่ 63/14-15,67/35-36 ขอยนเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

# TEST REPORT

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED			
EQUIPMENT NAME : CO Analyzer			
MANUFACTURER : HORIBA	MODEL : APMA-370	SERIAL NO : 84XJ1GRC	
STANDARD GAS CONCENTRATION (PPM) : 4533 PPM		CYLINDER NO : CC734373	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 12/05/2020	
CERTIFIED BY : AIRGAS		EXPIRED DATE : 12/05/2028	

## TEST RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	10.00	10.0800	0.1	0.80
2	20.00	20.1200	0.1	0.60
3	30.00	30.1600	0.2	0.53
4	40.00	40.0100	0.0	0.02
AVERAGE (%)				0.49



CALIBRATED BY :

CHECKED BY :

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-8681246 , E-Mail : Sales@okla-testing.com  
63/14-15,67/35-36 ซอยเพชรเกษม 7,7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 เบอร์โทร 02-8681246 แฟกซ์ 02-8680860

# CHECK LIST

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED		
EQUIPMENT NAME : CO Analyzer		
MANUFACTURER : HORIBA	MODEL : APMA-370	SERIAL NO. : 84XJ1GRC

TEST VALUES				
NO.	CO Analyzer ( APMA-370 )	UNIT	BEFORE	AFTER
1	Signal ( MAIN )	mV	-0.200	4.000
2	Signal ( COMP )	mV	0.000	0.200
3	CELL	°C , Standard Value : Ambient temperature + (5°C to 15°C)	35.600	35.400
4	PUMP	kPa	39.600	39.700
5	AMBIENT	kPa	101.300	101.500
6	SAMPLE	L/min ( 1 L/min to L/min )	-	-
7	OVER FLOW	L/min ( 1.2 L/min or more )	0.000	0.000
8	DC 24 V	V ( 24 V ± 0.5 V )	23.900	23.900
9	DC 5 V	V ( 5 V ± 0.5 V )	4.900	4.900
10	Sample Reading	PPM	0.370	0.250
11	Zero	PPM	0.370	0.000
12	Span	PPM	37.000	40.010

Remark : Reference EX-5M-100-58 , "Ambient CO Monitor APMA-370 Operation Manual" Page #48  
( Ambient temperature = 5°C to 40°C )

อาการที่ตรวจพบ

รายละเอียดการดำเนินการ

- ทำ Check List Analyzer , ทำ Calibration Zero/Span , Multipoint , เช็ค Diagnostics

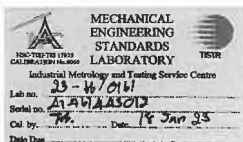
ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY :

CHECKED BY :

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15-16 , E-Mail : Engineer@jiranatee.com  
เลขที่ 63/14-15,67/35-36 ซอยเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Sol 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-66/0161

MTC.No.23-66/0161

Number of page(s) 2

## CALIBRATION CERTIFICATE

### Nomenclature : MASS FLOWMETER

Manufacturer : TSI

Serial No.: 41461443012

Model : 4199

Scale range : 0 l/min to 20 l/min

Subdivision : 0.001 l/min

Submitted by : M GREEN GROUP CO.,LTD

188/46, Pracha-Uttid Rd.,

Thungkru, Bangkok 10140, Thailand.

Received date : 10 January 2023

Condition of measured item : Normal

Calibration date : 18 January 2023

Standard :

Standard	Certificate No.	Date due	Traceability
RTD Thermometer	PSL-T 643/65	1-Jun-24	TISTR
Molbox/Pressure Transducer/UpStream	MP-0013-21	25-Jan-23	NIMT
Primary Flow Calibrator S/N 117982	MW-0011-21	8-Apr-23	NIMT
Primary Flow Calibrator S/N 119521	MW-0012-21	31-Mar-23	NIMT

Calibrated by :

Approved

Director  
Mechanical Engineering Standards Laboratory

Ref. 2013266011000059001

Issued Date 18 January 2023

The results relate only to the items tested/calibrated or value assigned.

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FM.BLMTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Sol 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-66/0161

2/2

MTC.No.23-66/0161

Calibration point : ( 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 1, 2, 3 ) l/min

Ambient condition : Temperature ( 23 ± 3 ) °C , Relative humidity ( 55 ± 15 ) %

Atmospheric pressure ( 1010±13 ) hPa

Calibration method : The flowmeter (UUC) was calibrated by comparison method with standard flowmeter according to CP-370.01.

The reported value is the value that converted to value at reference condition within pressure and temperature of the actual gas entering the UUC

### Measurement data :

UUC Value (l/min)	Standard Value (l/min)	Temperature (°C)	Pressure (hPa)	Deviation (%)	Uncertainty (%)
0.054	0.0572	24.920	1008.08	-5.52	1.42
0.105	0.1060	24.903	1008.16	-0.90	1.13
0.204	0.2058	24.897	1008.25	-0.88	1.02
0.304	0.3038	24.922	1008.32	-0.05	1.02
0.402	0.4039	24.937	1008.38	-0.47	1.03
0.504	0.5032	24.919	1008.45	+0.23	1.02
0.999	0.9948	24.906	1008.60	+0.45	0.92
2.003	1.9789	24.922	1009.20	+1.22	0.87
3.007	2.9759	24.923	1009.90	+1.04	0.87

The reported expanded uncertainties are based on standard uncertainties multiplied by a coverage factor  $k=2$ , which provides a level of confidence of approximately 95%.

The end of calibration certificate.

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# CAL

Calibratech Co.,Ltd.

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## Certificate of Calibration

Certificate No. : 65-400499-1

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 (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 : (30.0 to 31.0) °C

Relative Humidity : (45 to 50) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 23 September 2022

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 65-400274-1 25 Nov 2022 National Institute of Metrology Thailand (NIMT)

Approved

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

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## Certificate of Calibration

Certificate No. : 65-400499-1

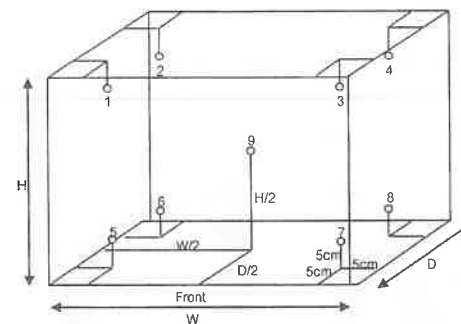
Page : 2 of 2

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 m<sup>3</sup>

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	3.9	4.8	5.2	5.0	5.2	4.7	5.2	4.1	5.1	0.75

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
4.0	2.0	2.0	1.6	0.3	1.9

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 -



CAL-F0031-03

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NSC-TISI-TIS 17025  
CALIBRATION 0030



## Certificate of Calibration

**Certificate No. :** 65-400499-2

**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 (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 :** (30.0 to 31.0) °C

**Relative Humidity :** (45 to 50) %

**Line Voltage :** (229.0 to 232.0) V

**Date of Received :** 21 September 2022

**Date of Calibration :** 21 September 2022

**Date of Issue :** 23 September 2022

**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 65-400272-1 24 Nov 2022 National Institute of Metrology Thailand (NIMT)

Approved by :

Supervisor

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## Certificate of Calibration

**Certificate No. :** 65-400499-2

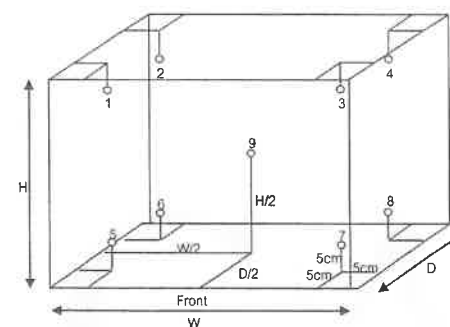
**Page : 2 of 2**

**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 m<sup>3</sup>

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	103.8	103.4	104.6	104.0	104.1	103.8	104.2	103.4	104.1	0.71
180.0	180.0	180.0	179.5	179.1	181.4	179.9	180.3	179.5	181.0	179.0	180.3	0.96

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	104.0	104.0	0.8	0.2	1.4
180.0	180.0	180.0	1.4	0.3	2.7

**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 -



CAL-F0031-03

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## Certificate of Calibration

Certificate No. : 65-400499-3

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

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

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB29

Range : N/A °C

Resolution : 0.1 °C

Serial No. : L619.0037

ID No. : N/A

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

Ambient Temperature : (30.0 to 31.0) °C

Relative Humidity : (45 to 50) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 23 September 2022

Calibrated by : Permpon Chanpu

Calibration Method : This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80  
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 RTD probe

ID No.	Cert. No.	Due Date	Traceability
400029 & 400031	65-400273-1	23 Nov 2022	National Institute of Metrology Thailand (NIMT)

Approve

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## Certificate of Calibration

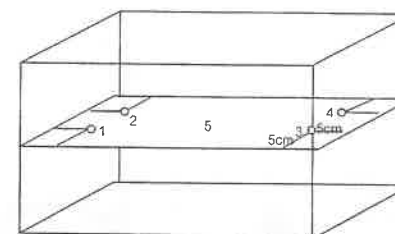
Certificate No. : 65-400499-3

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Front

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			1	2	3	4	5			
85.0	85.0	85.0	84.65	84.57	84.77	84.70	84.74	0.19	0.25	0.06

Remark The uncertainty is not combine uniformity of the water bath

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-F0031-03

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## Certificate of Calibration

**Certificate No. :** 65-420076-1

**Page : 1 of 2**

**Submitted by :** M Green Group Co.,Ltd.

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

**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 : (25.4 to 26.0)°C

Relative Humidity : (56 to 60) %

**Date of Received :** 21 September 2022

**Date of Calibration :** 21 September 2022

**Date of Issue :** 24 September 2022

**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
4.008	61235182	795894	14 Feb 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61243095	809356	21 Apr 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	795895	25 Feb 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved



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CAL-F0031-03

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## Certificate of Calibration

**Certificate No. :** 65-420076-1

**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	4.008	4.01	0.00	0.010
	6.985	7.00	-0.01	0.011
	10.008	10.01	0.00	0.014

**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 -



CAL-F0031-03

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## Certificate of Calibration

Certificate No. : 65-410112-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.  
188/46 Wisatesuknakhon 25, Pracha-Utd 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 : 21 September 2022

Date of Calibration : 22 September to 24 September 2022

Date of Issue : 24 September 2022

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-00713/65	07 Jan 2023	Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268

Approved

Supervisor

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CAL-F0031-03

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## Certificate of Calibration

Certificate No. : 65-410112-1

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 )
20.04	19.8	0.2	0.46
24.99	24.7	0.3	0.46
30.03	29.7	0.3	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. )
40.00	39	1	2.2
60.01	58	2	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%

- o0o -



CAL-F0031-03

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NSC-TISI-TIS 17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-200300-1

**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 :** (62.1 to 64.5) %

**Air Pressure :** 1007.0 mbar

**Date of Received :** 21 September 2022

**Date of Calibration :** 21 September 2022

**Date of Issue :** 24 September 2022

**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	C02213103	18 Nov 2022	National Institute of Metrology (Thailand), (NIMT)

Approved

(Signature Promoting)  
Laboratory Manager

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## Certificate of Calibration

**Certificate No. :** 65-200300-1

**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 ± (g)
0.001	0.00001	0.000012
0.01	0.00000	0.000014
0.1	0.00001	0.000018
1	0.00000	0.000026
10	0.00000	0.000053
20	-0.00001	0.000071
50	0.00001	0.00011
100	-0.00008	0.00020
150	-0.0001	0.00038
200	-0.0001	0.00038

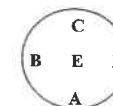
This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.15$ , providing a level of confidence of approximately 95%

**Eccentric error** Load test : 50 g

A	B	C	D	E
0.00001	0.00006	0.00004	-0.00006	0.00000

g



**Repeatability** Load test : 200 g

Stddev. : 0.000053 g

- o0o -



CAL-F0031-03

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## Certificate of Calibration

Certificate No. : 65-210457-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisasuknakhon25, 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 / m<sup>3</sup>

Assumed Air density : 1.2 kg / m<sup>3</sup>

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.1 mbar

Date of Received : 21 September 2022

Date of Calibration : 28 September 2022

Date of Issue : 28 September 2022

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
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

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CAL-F0031-03

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachasan 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. : 65-210457-1

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 -0.016 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-F0031-03

# CAL

Calibratech Co.,Ltd.

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

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



NSC-TIS1-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

Certificate No. : 65-210457-2

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisasuknakhon25, 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 / m<sup>3</sup>

Assumed Air density : 1.2 kg / m<sup>3</sup>

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.8 mbar

Date of Received : 21 September 2022

Date of Calibration : 28 September 2022

Date of Issue : 28 September 2022

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

E221-E2210 MM-0042-22 21 Mar 2025 National Institute of Metrology (Thailand), (NIMT)

Approved



The Uncertainties are for a confidence probability of approximately 95%

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AL-P0031-03

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachasan 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. : 65-210457-2

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%

- o0o -



AL-P0031-03

# CAL

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



## Certificate of Calibration

**Certificate No. :** 65-210457-3

**Page : 1 of 2**

**Submitted by :** M Green Group Co., Ltd.

188/46 Wisasuknakhon25, Pracha-Uttd 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 / m<sup>3</sup>

**Assumed Air density :** 1.2 kg / m<sup>3</sup>

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.8 mbar

**Date of Received :** 21 September 2022

**Date of Calibration :** 28 September 2022

**Date of Issue :** 28 September 2022

**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
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved



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

## Certificate of Calibration

**Certificate No. :** 65-210457-3

**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 +0.09 mg	± 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-F0031-03

# CAL

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## Certificate of Calibration

**Certificate No. :** 65-400500-1 **Page : 1 of 2**

**Submitted by :** M Green Group Co.,Ltd.  
188/46 Wisatesukhakon 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. :** PHSTEMB01P **ID No. :** N/A

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

**Ambient Temperature :** (25.4 to 26.0) °C

**Relative Humidity :** (56 to 60) %

**Line Voltage :** (224.0 to 225.2) VAC

**Date of Received :** 21 September 2022

**Date of Calibration :** 21 September 2022

**Date of Issue :** 24 September 2022

**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

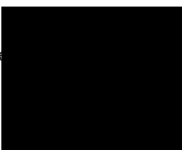
1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400002	TT-0074-22	20 Jun 2024	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400033	22E569	22 Feb 2024	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

Calibratech Co.,Ltd.

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

## Certificate of Calibration

**Certificate No. :** 65-400500-1 **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	25.004	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%

- oOo -



CAL-F0031-03

# CAL

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NGC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

Certificate No. : 65-400503-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.  
188/46 Wisatesuknakhon 25, Pracha-Utid 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 : 21 September 2022

Date of Calibration : 23 September to 26 September 2022

Date of Issue : 26 September 2022

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-0016-22	07 Feb 2024	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)

Approved by



The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-02

# CAL

Calibratech Co.,Ltd.

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

## Certificate of Calibration

Certificate No. : 65-400503-1

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 0.0327 °C

Standard Reading ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
39.7131	40	-0.3	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%

- o0o -



CAL-F0031-02

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrasan 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. : 65-300541-1

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

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

Equipment : Volumetric Flask

Manufacturer : GLASSCO

Class : A

Capacity : 100 ml

ID No. : VF100/01/19

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

Relative Humidity :  $(50 \pm 15)$  %

Air Pressure : 1007.5 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Areerat Sombun

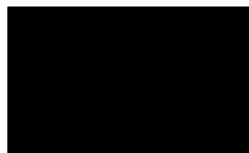
Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	65-200172-4	02 Dec 2022	National Institute of Metrology (Thailand) (NIMT)

Approved by :



The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrasan 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. : 65-300541-1

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	100.081

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%

-o0o-



CAL-F0031-03

# CAL

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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-300541-2

**Page : 1 of 2**

**Submitted by :** M Green Group Co.,Ltd.

188/46 Wisatesuknakhon 25, Pracha-Utid 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 : 1007.4 mbar.

**Date of Received :** 21 September 2022

**Date of Calibration :** 26 September 2022

**Date of Issue :** 26 September 2022

**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	65-200172-1	02 Dec 2022	National Institute of Metrology (Thailand) (NIMT)

Approved by

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0931-03

# CAL

Calibratech Co.,Ltd.

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

## Certificate of Calibration

**Certificate No. :** 65-300541-2

**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	250.11

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%

- o0o -



CAL-F0931-03

# CAL

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



## Certificate of Calibration

**Certificate No. :** 65-300541-3

**Page : 1 of 2**

**Submitted by :** M Green Group Co.,Ltd.

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

**Equipment :** Volumetric Flask

**Manufacturer :** GLASSCO

**Class :** A

**Capacity :** 1000 ml

**ID No. :** VF1000/01/19

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

Relative Humidity :  $(50 \pm 15)$  %

Air Pressure : 1007.4 mbar.

**Date of Received :** 21 September 2022

**Date of Calibration :** 26 September 2022

**Date of Issue :** 26 September 2022

**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	65-200172-1	02 Dec 2022	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

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## Certificate of Calibration

**Certificate No. :** 65-300541-3

**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	1000.47

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%

- o0o -



CAL-F0031-03

# CAL

Calibratech Co.,Ltd.

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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-300541-4

**Page : 1 of 2**

**Submitted by :** M Green Group Co.,Ltd.

188/46 Wisatesuknakhon 25, Pracha-Uttd 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 : 1007.4 mbar.

**Date of Received :** 21 September 2022

**Date of Calibration :** 26 September 2022

**Date of Issue :** 26 September 2022

**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
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241002	65-200172-1	02 Dec 2022	National Institute of Metrology (Thailand) (NIMT)
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Approved by :

Supervisor

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CAL-F0031-03

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

## Certificate of Calibration

**Certificate No. :** 65-300541-4

**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 )
150	151.08
250	251.34

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%

- o0o -



CAL-F0031-03

# CAL

Calibratech Co.,Ltd.

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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

Certificate No. : 65-300541-5

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesuknakhon 25, Pracha-Uttd 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 : 1002.7 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

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	65-200172-4	02 Dec 2022	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

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## Certificate of Calibration

Certificate No. : 65-300541-5

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

Delivery Time : 12.14 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
2	1.9942
5	4.9827
10	9.9888

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%

- o0o -



CAL-F0031-03

# CAL

Calibratech Co.,Ltd.

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

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



NSC-TISI-TIS 17025  
CALIBRATION 0030

## Certificate of Calibration

Certificate No. : 65-300541-6

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatesuknakhon 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 :  $(23 \pm 2)$  °C

Relative Humidity :  $(50 \pm 15)$  %

Air Pressure : 1002.7 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Areerat Sombun

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

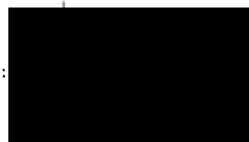
Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No. Cert. No. Due Date Traceability

241005 65-200172-4 02 Dec 2022 National Institute of Metrology (Thailand) (NIMT)

Approved by :



Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachasan 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. : 65-300541-6

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 : 12.14 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
5	5.0254
15	15.0847
25	25.0413

Uncertainty of measurement with in  $\pm$  0.0067 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%

- o0o -



CAL-F0031-01



S K SALES AND SERVICE CO.,LTD.  
194/56, 194/57 Thokham Rd. Samoe Dom  
Bang Khun Thian Bangkok 10150  
Tel. 02-417-2144 Fax : 02-417-2155



## Certificate of Calibration

Reference No. : 3484/2209-049 Certificate No. : S2209-3148  
Customer : M GREEN GROUP CO.,LTD Page 1 of 2  
: 188/46 Pracha-Utid Rd., Thungkru,  
: Bangkok 10140 Thailand  
Equipment : Incubator  
Manufacturer : BIOBASE  
Model : Biochemistry Incubator  
Serial No. : KYP1502202003  
ID No. : -  
Received Date : 14 September 2022  
Calibrated Date : 14 September 2022  
Issued Date : 16 September 2022  
Environment

	Minimum Value	Maximum Value
Ambient Temperature (°C)	25.1	25.8
Relative Humidity (% RH)	54	55
AC Line Voltage (VAC)	223	225

Place Of Calibration : Temperature Calibration Room  
Calibrated by : Mr. Teerasak Chaiyaporn

### Calibration Method

In-house method : SK-WI-23 base on Thai Laboratory Accreditation Scheme Publication Reference G-20

### Condition of this result of calibration

#### 1. Reference standard instrument

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Data acquisition/Switch unit	34972A	MY44021731	L2205-1241	27 Nov 22
2) Multiplexer Module	34901A	MY41085938	L2205-1241	27 Nov 22

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

3. This certificate can be traceable to International System of Unit :

- Through Thailand Institute of Scientific And Technological Research (TISTR)

Approved by

[Redacted Signature] ss Tantaraporn Pettong

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

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Certificate No. : S2209-3148

Page 2 of 2

Table1 General Information

Working Area (W*L*H)	45 *42 *84 cm
Fresh Air	OFF

Table2 Chamber Performance

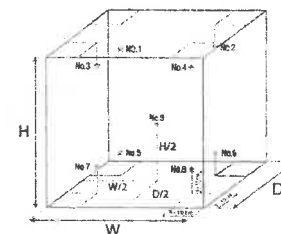
Setting Temperature (°C)	Average Indicating Temperature (°C)	Measured Stability (± °C)	Measured Uniformity (°C)	Overall Variation (°C)
20.0	20.0	0.96	0.55	1.92

Table3 Temperature Distribution

Setting Temperature (°C)	Average Standard Reading (°C)									Uncertainty (± °C)
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	
20.0	19.78	19.72	19.94	19.70	19.80	19.63	19.79	19.66	19.82	1.3

Resolution : 0.1 (°C)

\* Probe No. 9 is Reference Probe



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

\*\* End of Calibration Report \*\*



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.: 22CG4888  
Page.: 1 of 2

## Certificate of Calibration

Equipment : Burette  
Capacity : 10 mL  
Serial No. : -  
ID. No. : 2212-0344-1  
Manufacturer : Glassco  
Made in : -  
Submitted by : M GREEN GROUP CO., LTD.  
188/46 Precha-Utid Rd., Thungkru  
Bangkok 10140 Thailand  
Ambient Temperature : (20 ± 2.5) °C  
Relative Humidity : (50 ± 10) %  
Barometric Pressure : 759 mmHg  
Calibration Procedure : ASTM E 542 - 01  
Calibrated by : Panward Pramklam

Approved by :

( ) Pornthippa Tameyakul  
(✓) Malee Butkruea  
( ) Ponpan Paipim  
( ) Srisuda Khamtha

Issue Date : 16 December 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 0048588



Equipment : Burette  
Received Date : 13 December 2022  
Condition As-Received : New Item  
Calibration Date : 15 December 2022  
Reference : 2212-0344WN-1

Cert.No.: 22CG4888  
Page.: 2 of 2

### Condition of this result of calibration

#### 1. Reference Standard Instruments :

Instruments	Model	Serial No.	ID. No.	Certificate No.	Traceability	Due date
1) Balance	MS204TS	C226356983	140RC010	TH2068-012	METTLER	29 Sep 2023
2) Thermo-Hygrograph	THDX-CE	00016540	140EC001	22H1243	NIST,NIMT	09 June 2023
3) Thermometer	-	1594592	140EC010	221181	NIMT	10 Feb 2023

This certification is traceable to SI Unit

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

3. True value is converted to true volume at the standard temperature of 20 °C

### Calibration result :

Nominal capacity ( mL )	Reading ( mL )	Uncertainty ( ± mL )	k Factor
10	9.9867	0.0038	2.00

Remark mL = cm<sup>3</sup>

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 %.

-o-o-

a 1140298



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.: 22CG4889  
Page.: 1 of 2

## Certificate of Calibration

**Equipment :** Burette  
**Capacity :** 25 mL  
**Serial No. :** -  
**ID. No. :** 2212-0344-2  
**Manufacturer :** Glassco  
**Made in :** -  
**Submitted by :** M GREEN GROUP CO., LTD.  
188/46 Precha-Utid Rd., Thungkru  
Bangkok 10140 Thailand  
**Ambient Temperature :** (20 ± 2.5) °C  
**Relative Humidity :** (50 ± 10) %  
**Barometric Pressure :** 759 mmHg  
**Calibration Procedure :** ASTM E 542 - 01  
**Calibrated by :** Panward Pramklam

**Approved by :**

( ) Pornthippa Tameyakul  
(✓) Malee Butkruea  
( ) Ponpan Paipim  
( ) Srisuda Khamtha

**Issue Date :** 16 December 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 0048587



**Equipment :** Burette  
**Received Date :** 13 December 2022  
**Condition As-Received :** New Item  
**Calibration Date :** 15 December 2022  
**Reference :** 2212-0344WN-2

Cert.No.: 22CG4889

Page.: 2 of 2

### Condition of this result of calibration

#### 1. Reference Standard Instruments :

Instruments	Model	Serial No.	ID. No.	Certificate No.	Traceability	Due date
1) Balance	MS204TS	C226356983	140RC010	TH2088-012	METTLER	29 Sep 2023
2) Thermo-Hygrograph	THDX-CE	00016540	140EC001	22H1243	NIST,NIMT	09 June 2023
3) Thermometer	-	1594592	140EC010	221181	NIMT	10 Feb 2023

This certification is traceable to SI Unit

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

3. True value is converted to true volume at the standard temperature of 20 °C

### Calibration result :

Nominal capacity ( mL )	Reading ( mL )	Uncertainty ( ± mL )	k Factor
25	24.9569	0.0065	2.00

**Remark** mL = cm<sup>3</sup>

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-

a 1140299

## การดูแลบำรุงรักษาเชิงป้องกัน

## Preventive Maintenance



บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด

ฝ่ายบริการหลังการขาย

โทร 0 2 639 7000 E-mail: [service.tec.th@dksh.com](mailto:service.tec.th@dksh.com)

ฝ่ายขายและการตลาด

โทร 0 2 639 7000 E-Mail: [marketing.tec.th@dksh.com](mailto:marketing.tec.th@dksh.com)

Website : [www.dksh.co.th/technology/scientific-thailand](http://www.dksh.co.th/technology/scientific-thailand)

### เงื่อนไขการให้บริการ Preventive Maintenance

บริษัทฯ จะส่งวิศวกรผู้ชำนาญ เพื่อให้บริการตามขอบข่ายของการบริการ เฉพาะ ในวันและเวลา ราชการ หากมีความประสงค์ที่จะรับบริการนอกเหนือจากวัน เวลา ราชการ (วันหยุดเสาร์ – อาทิตย์ หรือวันหยุด นักชดถุณ) บริษัทฯ จะคิดค่าบริการเพิ่มเติมตามอัตราที่กฎหมายแรงงานกำหนดไว้

### ขอบข่ายการบริการ

- ตรวจสอบสภาพการทำงานต่าง ๆ ของเครื่องมือ
- ทดสอบประสิทธิภาพการทำงานของเครื่องมือ
- รายการผลการตรวจสอบเครื่องมือ

### หมายเหตุ

- ราคานี้ไม่รวมถึงค่าบริการซ่อม หรือ เปลี่ยนอะไหล่ที่ชำรุดเสียหาย หรือหมดสภาพการใช้งาน
- ในกรณีที่ผู้รับบริการอยู่นอกเขตพื้นที่ให้บริการ บริษัทฯ จำเป็นต้องคิดค่าใช้จ่ายเพิ่มเติม ได้แก่ ค่าเดินทาง เป็นต้น
- บริษัท ฯ ขอสงวนสิทธิ์ในการเปลี่ยนแปลงราคา โดยไม่แจ้งให้ทราบล่วงหน้า



### ช่องทางการติดต่อ

DKSH Technology Limited (บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด)  
เลขที่ 2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพฯ 10260  
เลขประจำตัวผู้เสียภาษี 010-555-001-4547 (สำนักงานใหญ่)



Call center 0 2 639 7000



DKSH Scientific



[www.dksh.com/scientific-thailand](http://www.dksh.com/scientific-thailand)



[marketing.tec.th@dksh.com](mailto:marketing.tec.th@dksh.com)



@dkshscientific

### Preventive Maintenance Contract

จำนวนในการทำสัญญาบริการ \_\_\_\_ 1 \_\_\_\_ ครั้ง ต่อ ปี

ครั้งที่ 1/1 วันที่ 28 Mar 2023

#### รายละเอียดผู้รับบริการ

หน่วยงาน	บริษัท เทค เทคโนโลยี จำกัด		
ที่อยู่	30,32 ซอยพระรามที่ 2 ซอย 63 ถนนพระรามที่ 2 แขวงสามยุค เขตบางขุนเทียน กรุงเทพมหานคร 10150		
โทรศัพท์	0-2893-4211-7	แฟกซ์	0-2893-4218

#### ผู้ติดต่อ

ชื่อ - นามสกุล	คุณปริษา วิเศษสังข์		
ตำแหน่ง	หัวหน้าส่วน		
โทรศัพท์	0-2893-4211-7	เบอร์ติดต่อ	แฟกซ์ 0-2893-4218
E-mail	Lab_center@testtech.co.th		

#### รายละเอียดผู้ให้บริการ

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด (ฝ่ายบริการหลังการขาย) (สำนักงานใหญ่)	
เลขที่ 2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพฯ 10260	
โทรศัพท์ 0 2 693 7000 Email: <a href="mailto:siriporn.sy@dksh.com">siriporn.sy@dksh.com</a> Line ID : siriporn3007	
เจ้าหน้าที่ประสานงาน : คุณศิริพร อยู่ทองจ้อย โทรศัพท์ 090 678 6924 , 02 301 7467	
เจ้าหน้าที่ผู้ให้บริการ	นายจิรายุส สเตอาค
ตำแหน่ง	Specialist, Technical Service.
โทรศัพท์	0938138736 แฟกซ์ -
E-mail	Jirayut.js@dksh.com

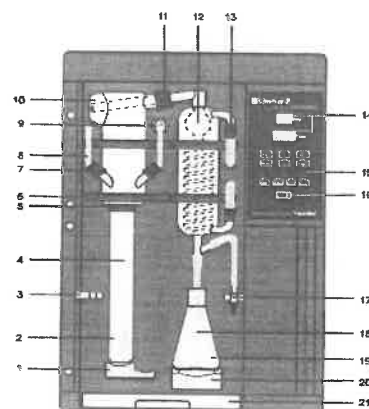
ลงนามผู้รับบริการ		ลงนามผู้ให้บริการ	
ตัวบรรจง		ตัวบรรจง	
ตำแหน่ง		ตำแหน่ง	
วันที่ / ประทับตราบริษัท		วันที่ / ประทับตราบริษัท	

JOB No: Lsr2302591 MODEL: Vap30 S/N: 003718

# Part : Operational Qualification (OQ)

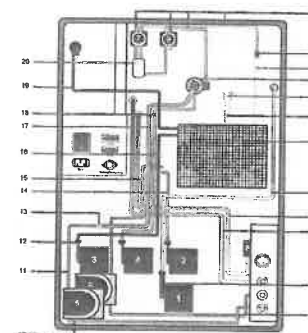
ตรวจสอบสภาพเครื่อง

FRONT



	Pass	Fail	N/A	Remark
1.Quick clamping device with wedge	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
2. Kjeldatherm digestion tube	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
3. Holder for steam inlet tubing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
4. PTFP-Inlet tubing, steam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
5. Viton-cone	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
6. Clamping for glassware	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
7. Screw cap GL18 with silicone seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
8. PTFP-Inlet tubing, NaOH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
9. PP-Distributor with PP-threaded joint	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
10. Distribution head, glass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
11. Screw cap GL32 with silicone seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
12. Distillation condenser	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
13. Screw cap GL14 with plastic screw connection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
14. Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
15. Keyboard, chemical-resistant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
16. Main switch, green	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
17. Ventilation valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
18. Distillate outlet tubing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
19. Erlenmeyer flask	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
20. Platform	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
21. Drip tray	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

REAR



	Pass	Fail	N/A	Remark
1. Diaphragm pump NaOH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
2. Diaphragm pump H <sub>3</sub> BO <sub>3</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	vap 40 only
3. Diaphragm pump H <sub>2</sub> O for steam generator	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
4. Diaphragm pump H <sub>2</sub> O for sample	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
5. Peristaltic pump for suction sample	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
6. Peristaltic pump for suction receiver	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	option
7. Pinch-solenoid valve, steam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
8. Magnetic valve with pressure control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
9. Pinch-solenoid valve, shut-off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
10. Verprene-tubing 4x8 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
11. Verprene-tubing 4x8 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
12. Non-return valve for diaphragm pumps	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
13. Tubing reduction PP 51x10x5 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
14. Silicone tubing 4x7 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	vap 40 only
15. Silicone tubing 4x7 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	option
16. Silicone -tubing 4x7 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
17. Verprene-tubing 8x12 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
18. Verprene tubing 4x7 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
19. Silicone tubing 4x7 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
20. Ventilation glass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
21. Novoprene-tubing 4.8x8 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
22. Tubing reduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
23. Silicone tubing 6x10 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
24. PP-distributor with PP-thread	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
25. SKT-valve (built in with brass fitting)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
26. Silicone tubing 8x16x80 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
27. Steam generator	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
28. PTFE-inlet tubing NaOH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
29. Silicone tubing 8x16 for cooling water inlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
30. Silicone tubing 8x16 for cooling water outlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
31. Viton-tubing 6x12*50 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
32. Silicone tubing 4x7 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	option

## รายละเอียดการตรวจสอบ

### ขั้นตอนการบริการ

#### ตรวจสอบระบบไฟฟ้า (Electrical Test)

- ความต้านทานทางไฟฟ้าของเครื่องกับกราวด์
- กระแสไฟฟ้าที่ใช้งาน

#### ตรวจสอบสภาพเครื่อง (Optical Test)

- Main cable
- Electric wiring
- Pumps
- Distribution Head
- Condensor
- Steam generator
- Tubing
- Viton cone

#### ตรวจสอบ Function การทำงาน (The Function Test)

- ระบบสร้างและควบคุมความดันของ Steam
- ระบบการเติมน้ำเข้า Sample Tube
- ระบบการเติม Na OH
- ระบบการ Suction ค้าง Sample Tube และ Receiver

## รายงานผลการให้บริการ

### 1. TECHNICAL DATA

	Pass	Fail	N/A	Remark
Main Supply 220 volt + 10% 50 Hz with ground	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Nominal current	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6 a.....

#### 1.1 COOLING WATER BATH

	Pass	Fail	N/A	Remark
Temperature 15-20 °C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Cooling Water Outlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Control Temperature	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

#### 1.2 OPTICAL TEST VAP..30..

	Pass	Fail	N/A	Remark
Screw cap GL14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Screw cap GL18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Screw cap GL32	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Distillation Head	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Condensor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Viton Cone	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Ventilation Valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Micro Switch Sample	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

### 2. SYSTEM COOLING WATER INLET

	Pass	Fail	N/A	Remark
Cooling Water Inlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Cooling Water Outlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Magnetic valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

### 3. SYSTEM CONTROL

	Pass	Fail	N/A	Remark
Key Board	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Adding H <sub>2</sub> O	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only
Adding NaOH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Adding H <sub>3</sub> BO <sub>3</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	vap 40 only
Suction Sample	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	vap 30,40 only

### 4. SYSTEM DISTILLATION

	Pass	Fail	N/A	Remark
Boiler	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Level Sensor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Novoprene-Tubing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Solenoid Valve Shut-Off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Solenoid Valve Steam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Excess Pressure Detector	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Ventilation Valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Heater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

### 5. PUMP

	Pass	Fail	N/A	Remark
Pump H <sub>2</sub> O Steam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
- Non-Return Valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Pump H <sub>2</sub> O Sample	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
- Non-Return Valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Pump NaOH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
- Non-Return Valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Pump H <sub>3</sub> BO <sub>3</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	.....
- Non-Return Valve	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	.....
Pump Suction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

### 6. The Following Program Run :

	Pass	Fail	N/A	Remark
Addition H <sub>2</sub> O 0-99 sec.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Addition NaOH 0-99 sec.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Addition H <sub>3</sub> BO <sub>3</sub> 0-99 sec.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	.....
Reaction Time 0-99 min.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Distillation Time 0-99 min	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Steam Capacity 30%-100%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Suction Time 0-99 sec.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
The Instrument is in perfect technical shape	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

Remark :

.....  
 .....

### Part : ข้อมูลสนับสนุนด้านเทคนิค (General Technical Support)

#### การบำรุงรักษาทั่วไป (Basic maintenance)

#### Cleaning

Glass parts and suction pump should be cleaned before long periods of non-usage (i.e. holidays). This way blockages caused by crystalline deposits are avoided.

The following program should be run:

Addition H <sub>3</sub> BO <sub>3</sub>	0	s
Addition H <sub>2</sub> O:	13	s
Addition NaOH:	0	s
Reaction time:	0	s
Distillation time:	7	min.
Steam capacity:	100	%
Suction time:	20	s

Place an empty digestion tube and an Erlenmeyer flask into position, and start the program.

In case of extreme deposits in the glassware you can clean the system by putting about 10 ml of sulphuric acid into the digestion tube.

## Error Code

The micro-processor continually surveys all the functions of the distillation system. As soon as an error arises it is shown on the display and accompanied by an acoustic signal.

Error message	Measures
No tap water	Check cooling water inlet for blockages. Ensure the tap is turned on
No sample tube	Insert tube
Check chemicals	Check set of tanks
Low water Press Enter	Check the water inlet distilled H <sub>2</sub> O
↓ Filling Steam generator	This message disappears as soon as steam generator is filled

After the above mentioned errors are corrected, the following message is displayed.

Error message	Measures
Stop Prog. No. x Continue=Enter	Enter = continue of Interrupted program Reset = Standby-mode

### Other error messages

Error message	Measures
Wait for steam	Message disappears as soon as stand-by is reached
Add sol. > 1min Continue=Enter	Check programming Enter=continue of Interrupted program Reset=Standby-mode
Program undefined	Check programming
Excess steam pressure	Switch the system off and call service
Sensor error	Switch the system off and call service



# 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



Supplement to Calibration Certificate No. Q22102976

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : N/A  
MODEL / TYPE : V9000  
SERIAL NO. : 2364  
CLID. NO. : 252102170  
JOB CONTROL NO. : 221008102976

CUSTOMER : **M GREEN GROUP COMPANY LIMITED**  
**188/47 PRACHA UTHIT RD.,**  
**BANG MOT, THUNG KHRU, BANGKOK 10140**

DATE OF RECEIVED : 08 October 2022

DATE OF ISSUED : 19 October 2022

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

Calibrated By : **Suwit Phuanbusabong**  
Calibration Engineer



Approved By : **[Redacted Signature]**  
Authorized Signatory  
19 October 2022



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. Q22102976A1

F3-012-04/01-12

page 1 of 3



@clccalibration



# CALIBRATION LABORATORY CO., LTD.

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



## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : N/A  
MODEL / TYPE : V9000  
SERIAL NO. : 2364  
DATE OF CALIBRATION : 10 October 2022

#### 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 :

1. Digital Multimeter, Hewlett Packard Model 34401A S/N. 3146A75935.
2. High Resolution Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Accelerometer with Measuring Amplifier, Bruel & Kjaer Model 8305, 2525 S/N. 397018, 2434988.

#### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0112-21, Due Date 26 October 2022.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0001/22, Due Date 22 February 2023.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0009-22, Due Date 22 June 2023.

#### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2.00$  which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2021)"

Certificate No. Q22102976

F3-011-04/01-12

page 2 of 3



@clccalibration



CLC  
Accredited  
ISO/IEC 17025

# CALIBRATION LABORATORY Co.,LTD.

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NSC-TISI-TIS 17025  
CALIBRATION 0659  
CLC

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 )	± ( % of rdg. )
10	160 Hz	peak	10.00	10.03	-0.03	1.0
20	160 Hz		20.00	20.02	-0.02	1.0
40	160 Hz		40.00	39.22	+0.78	1.0
60	160 Hz		60.00	57.60	+2.40	1.0
80	160 Hz		80.00	77.21	+2.79	1.0
100	160 Hz		100.00	96.25	+3.75	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. Q22102976

F3-011-04/01-12

page 3 of 3



@clccalibration

# 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

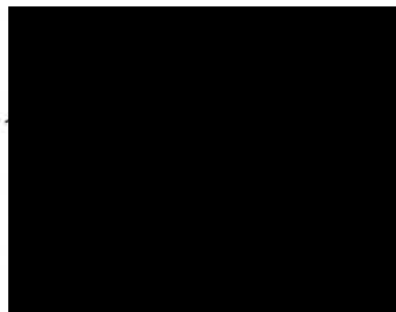
Name and Model	Serial Number	Manufacturer
Clarus 580	580S17020103	Perkin Elmer
TotalChrom	Version. 6.3.2.0646	Perkin Elmer

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



PQR-1

## Carrier Pressure 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: **4071-DMA**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 1

Setpoint Pressure PSI.	Observed Pressure PSI.	Deviation ml/min. % Error
5.00	4.90	2.00
10.00	10.00	0.00
20.00	20.10	0.50
30.00	30.20	0.67
40.00	40.30	0.75

Acceptance criteria  
of absolute deviation  
Evaluate Result

≤ 5%  
**PASS**

Qualifier's signat

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamlukka,Pathum thani, Thailand 12150  
Tel. (6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotect@gmail.com

VCR-CARRFLOW



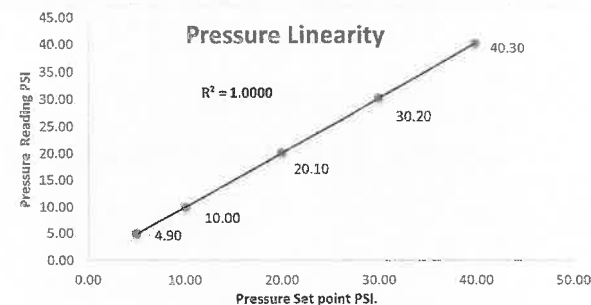
PQR-2

## Carrier Pressure 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: **4071-DMA**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 1

Flow Rate Setpoint (ml/min)	Flow Rate (ml/min) Reading
5.00	4.90
10.00	10.00
20.00	20.10
30.00	30.20
40.00	40.30
R-Square	1.0000

Acceptance criteria of  $R^2$  > 0.9990Evaluate Result **PASS**

Qualifier's signat

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

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Tel. (6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotect@gmail.com

VCR-CARRFLOW



PQR-3

## Detector 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: **4075-GFM**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 2

Setpoint Flow Rate ml/min.	Observed Flow Rate ml/min.	Deviation ml/min. % Error
20.00	19.80	1.00
30.00	29.40	2.00
40.00	39.50	1.25
50.00	49.30	1.40
60.00	59.20	1.33

Acceptance criteria  
of absolute deviation  
Evaluate Result  $\leq 5\%$   
**PASS**

Qualifier's signature

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamukka, Pathum thani, Thailand 12150  
Tel. (6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotect@gmail.com  
VCR-CARRFLOW



PQR-4

## 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: **4075-GFM**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 3

Setpoint Flow Rate ml/min.	Observed Flow Rate ml/min.	Deviation ml/min. % Error
100.00	98.80	1.20
200.00	197.60	1.20
300.00	295.30	1.57
400.00	394.70	1.33

Acceptance criteria  
of absolute deviation  
Evaluate Result  $\leq 5\%$   
**PASS**

Qualifier's signature

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamukka, Pathum thani, Thailand 12150  
Tel. (6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotect@gmail.com  
VCR-CARRFLOW



PQR-5

## GC Column Oven Temperature Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** 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: **1513-DTM**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 4

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)
40.0	39.8	39.8	39.7	39.8	39.7	39.8	0.24
100.0	100.5	100.3	100.3	100.3	100.4	100.4	0.36
150.0	150.2	150.3	150.3	150.4	150.5	150.3	0.34
200.0	200.2	200.2	200.4	200.4	200.5	200.3	0.34
280.0	280.0	280.2	280.3	280.3	280.3	280.2	0.22

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

Evaluate Result **PASS**

Qualifier's signature

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

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Tel. (6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotect@gmail.com  
VCR-GCOVENACC



PQR-6

## GC Column Oven Temperature Stability Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** Qualifier: **Mescotech Co., Ltd.**  
Department: **LAB Analytical** Procedure: **VKIT.GC.TEMPSTEB**  
Manufacturer: **PERKIN ELMER** Model: **Clarus 580**  
Serial No: **580S17020103** Detector Type: **FID**  
Standard Batch: **N/A** Traceable To: **4078-DTM**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 5

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	100.5	100.3	100.3	100.3	100.4	100.36	0.09

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

Evaluate Result **PASS**

Qualifier's signature

Date:

31/3/2023

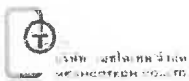
Authorised by:

Date:

31/3/2023

PQR

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Tel. (6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotect@gmail.com  
VCR-GCOVENSTAB



PQR-7

## GC Injector Temperature Performance Result

Customer: **PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD.** 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: **4078-DTM**  
Expiry Date: **March 31,2024** System ID: **GC 1**

The result reference to raw data on page: 6

Setpoint Temperature (°C)	Collected Temperature (°C)	Deviation of Accuracy Absolute/°C. (Set Temp-Average Temp)
150.0	146.5	3.5
200.0	196.5	3.5
280.0	276.7	3.3

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

Qualifier's signature:

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamukha, Pathum thani, Thailand 12150  
Tel.(6698)970-7090, Fax.(662)540-2541 Email: sales.meshcotech@gmail.com  
VCR-INTEMPACC

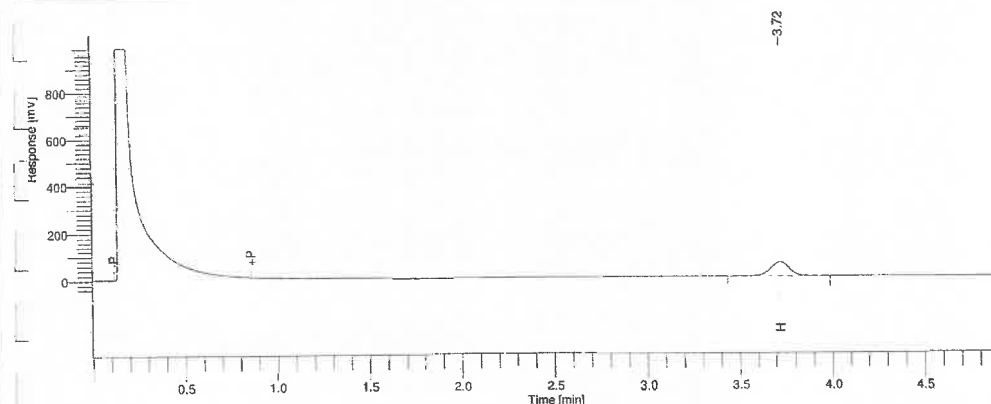
Page 1 of 8  
Raw Data Page 8

Software Version : 6.3.2.0646  
Operator : manager  
Sample Number : 006  
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 : 01-Apr-24 2:43:50 PM

Date : 01-Apr-24 2:59:22 PM  
Sample Name : Carry Over Blank 1  
Study : Calibration  
Rack/Vial : 0/1  
Channel : A  
A/D mV Range : 1000  
End Time : 5.00 min

Area Reject : 0.000000  
Dilution Factor : 1.00  
Cycle : 6

Raw Data File : D:\PMOQ2023\Carry Over Blank 1\_006.raw  
Result File : D:\PMOQ2023\Carry Over Blank 1\_006.rst [Editing in Progress]  
Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Carry Over Blank 1\_006.raw  
Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Carry Over Blank 1\_006.rst [Editing in Progress]  
Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Carry Over Blank 1\_006.rst [Editing in Progress]  
Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Hexadecane	3.721	378105.11	56147.29	100.00	100.00	0.3781
			378105.11	56147.29	100.00	100.00	0.3781

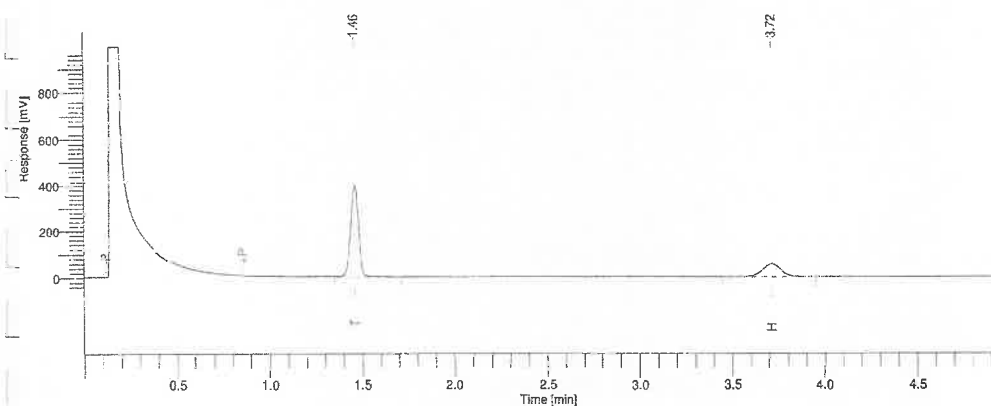
Missing Component Report  
Component Expected Retention (Calibration File)  
Tetradecane 1.450

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 009  
 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 : 01-Apr-24 3:38:06 PM

Date : 01-Apr-24 3:50:32 PM  
 Sample Name : Precision 8  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 14

Raw Data File : D:\PMOQ2023\Precision 8\_014.raw  
 Result File : D:\PMOQ2023\Precision 8\_014.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 8\_014.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 8\_014.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 8\_014.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.461	1131130.47	397781.56	75.57	75.57	1.1311
2	Hexadecane	3.715	365705.34	54365.48	24.43	24.43	0.3657
			1496835.81	452147.04	100.00	100.00	1.4968

Missing Component Report  
 Component Expected Retention (Calibration File)

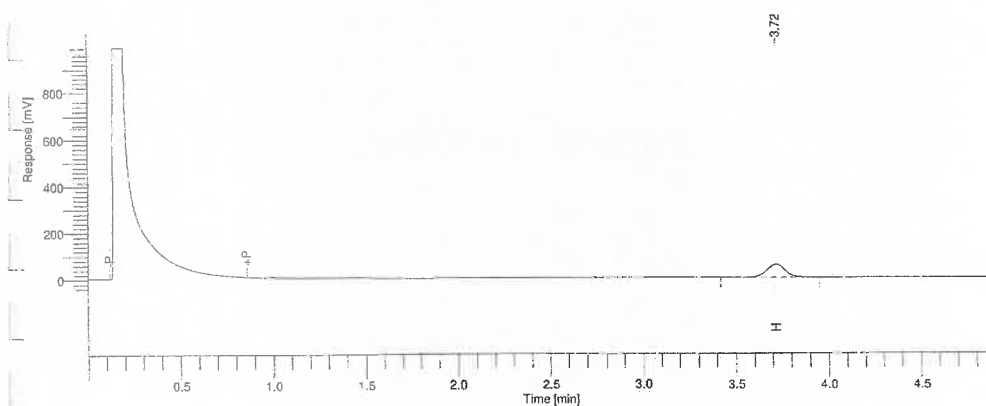
All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 010  
 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 : 01-Apr-24 3:44:57 PM

Date : 01-Apr-24 3:51:48 PM  
 Sample Name : Carry Over Blank 2  
 Study : Calibration  
 Rack/Vial : 0/1  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 15

Raw Data File : D:\PMOQ2023\Carry Over Blank 2\_015.raw  
 Result File : D:\PMOQ2023\Carry Over Blank 2\_015.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Carry Over Blank 2\_015.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Carry Over Blank 2\_015.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Carry Over Blank 2\_015.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Hexadecane	3.718	373276.70	55744.69	100.00	100.00	0.3733
			373276.70	55744.69	100.00	100.00	0.3733

Missing Component Report  
 Component Expected Retention (Calibration File)

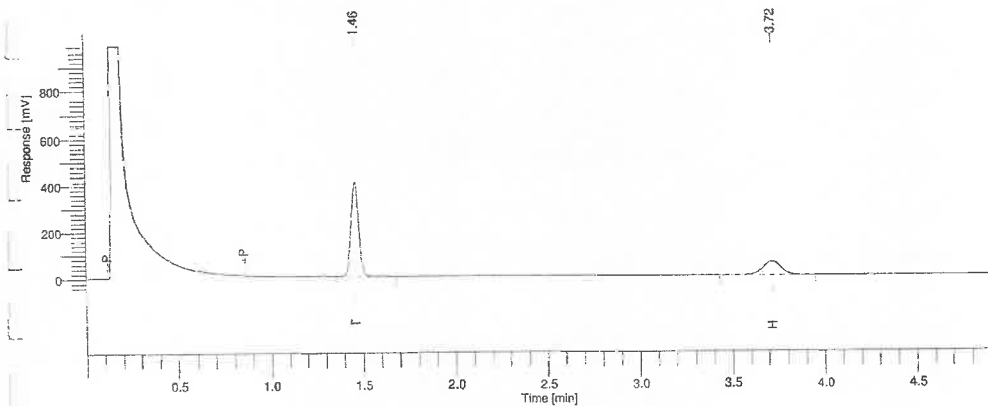
Tetradecane 1.450

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 007  
 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 : 01-Apr-24 2:50:38 PM

Date : 01-Apr-24 3:04:37 PM  
 Sample Name : Precision 1  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 7

Raw Data File : D:\PMOQ2023\Precision 1\_007.raw  
 Result File : D:\PMOQ2023\Precision 1\_007.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 1\_007.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 1\_007.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 1\_007.rst [Editing in Progress]  
 Report Format File: D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.461	1146805.50	405483.26	75.49	75.49	1.1468
2	Hexadecane	3.719	372264.12	55556.46	24.51	24.51	0.3723
		1519069.62	461039.73	100.00	100.00	1.5191	

Missing Component Report  
 Component Expected Retention (Calibration File)

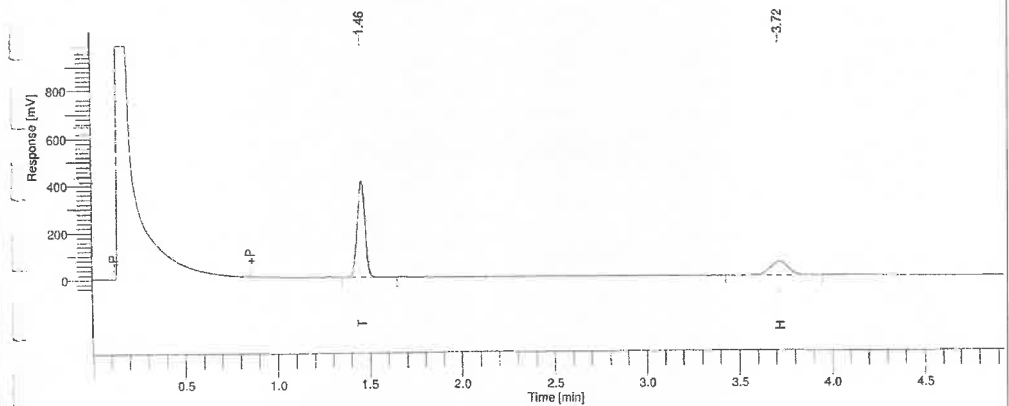
--All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 008  
 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 : 01-Apr-24 2:57:22 PM

Date : 01-Apr-24 3:06:20 PM  
 Sample Name : Precision 2  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 8

Raw Data File : D:\PMOQ2023\Precision 2\_008.raw  
 Result File : D:\PMOQ2023\Precision 2\_008.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 2\_008.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 2\_008.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 2\_008.rst [Editing in Progress]  
 Report Format File: D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.462	1142966.78	404053.91	75.57	75.57	1.1430
2	Hexadecane	3.719	369492.88	55077.66	24.43	24.43	0.3695
		1512459.66	459131.57	100.00	100.00	1.5125	

Missing Component Report  
 Component Expected Retention (Calibration File)

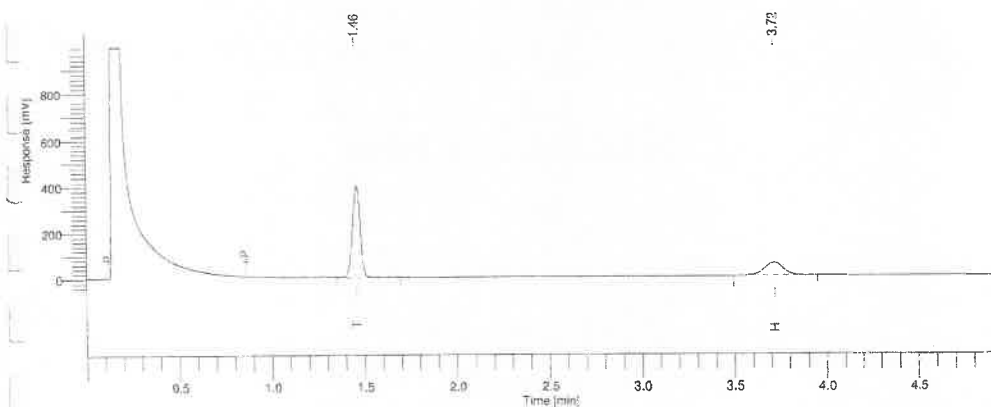
--All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 008  
 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 : 01-Apr-24 3:04:10 PM

Date : 01-Apr-24 3:12:08 PM  
 Sample Name : Precision 3  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 9

Raw Data File : D:\PMOQ2023\Precision 3\_009.raw  
 Result File : D:\PMOQ2023\Precision 3\_009.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 3\_009.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 3\_009.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 3\_009.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.460	1131811.87	397094.47	75.51	75.51	1.1318
2	Hexadecane	3.720	367090.85	54445.14	24.49	24.49	0.3671
		1498902.72	451539.61	100.00	100.00	1.4989	

Missing Component Report  
 Component Expected Retention (Calibration File)

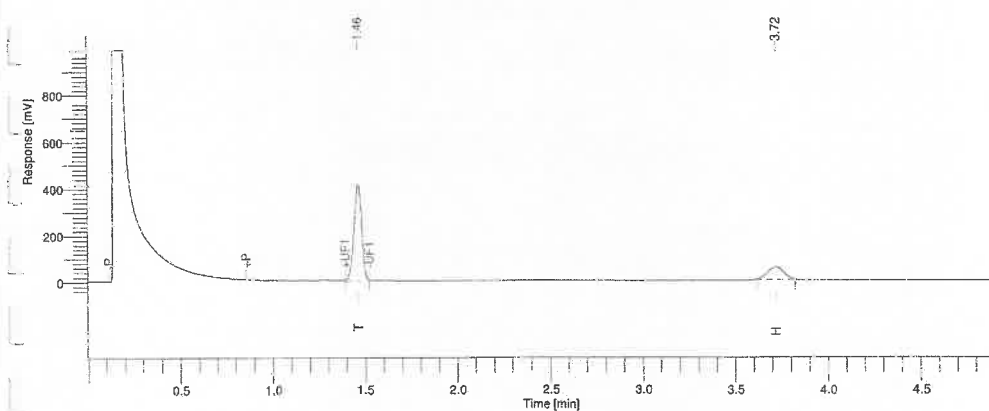
All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 008  
 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 : 01-Apr-24 3:10:58 PM

Date : 01-Apr-24 3:22:04 PM  
 Sample Name : Precision 4  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 10

Raw Data File : D:\PMOQ2023\Precision 4\_010.raw  
 Result File : D:\PMOQ2023\Precision 4\_010.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 4\_010.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 4\_010.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 4\_010.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.463	1159745.44	413355.95	78.19	78.19	1.1597
2	Hexadecane	3.720	323562.84	53364.38	21.81	21.81	0.3236
		1483308.28	466720.33	100.00	100.00	1.4833	

Missing Component Report  
 Component Expected Retention (Calibration File)

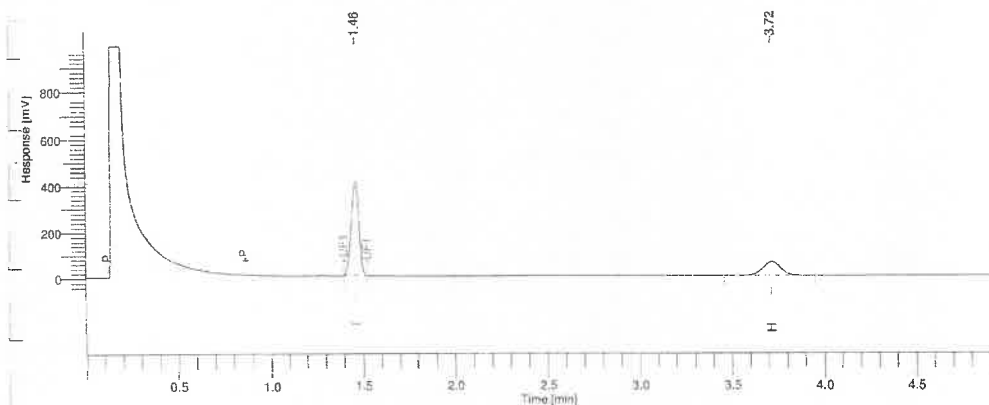
All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 008  
 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 : 01-Apr-24 3:17:45 PM

Date : 01-Apr-24 3:27:24 PM  
 Sample Name : Precision 5  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 11

Raw Data File : D:\PMOQ2023\Precision 5\_011.raw  
 Result File : D:\PMOQ2023\Precision 5\_011.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 5\_011.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 5\_011.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 5\_011.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.461	1158710.81	412581.94	74.83	74.83	1.1587
2	Hexadecane	3.718	389670.70	58566.34	25.17	25.17	0.3897
		1548381.51	471148.27	100.00	100.00	1.5484	

Missing Component Report  
 Component Expected Retention (Calibration File)

All components were found



## 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: 32

Peak Count#	Peak count Detected
Peak Detected Specify	
≥ 32 Peak Number	36 Peak Number

Acceptance criteria of absolute deviation ≥ 32 Peak

Evaluate Result **PASS**

Qualifier's signature:

Date: 31/3/2023

Authorised by:

Date: 31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamlukka, Pathum thani, Thailand 12150  
 Tel. (6628)970-7090, Fax. (662)540-2541 Email: sales.meshcotect@gmail.com

VCR-DATASYS



PQR-16

## 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: 33

Peak Number#	Peak high /1000	%deviation	Evaluate Result
Peak Detection Specify	Collected ( millivolt )		
1 500 millivolt	499.9929	0.00	PASS
2 1000 millivolt	999.998	0.00	PASS
		Acception criteria of % deviation	≤1%
		Evaluate Result	PASS

Qualifier's signature:

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamlukka, Pathum thani, Thailand 12150  
Tel. (6698)970-7090, Fax. (662)540-2541 Email: sales.meshcotect@gmail.com

VCR-DATASYS



PQR-17

## 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™**  
Standard Batch: **N/A** Traceable To: **Validator™**  
Expiry Date: **March 31,2023** System ID: **GC 1**

The result reference to raw data on page: 34

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

Qualifier's signature:

Date:

31/3/2023

Authorised by:

Date:

31/3/2023

PQR

82 Moo.18, Buengkamproi, Lamlukka, Pathum thani, Thailand 12150  
Tel. (6698)970-7090, Fax. (662)540-2541 Email: sales.meshcotect@gmail.com

VCR-DATASYS

Qualification Raw Data  
Attached

Carrier Gas Inlet Pressure Accuracy Raw data Record

Raw Data Page 1

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

Department: Quality Control

Instrument Model: Clarus 580 GC

Serial Name: 580S17020103

Gas Type: He

Carrier Gas Inlet Pressure

Inlet Pressure Setpoint (PSI)	Pressure Reading
5.00	4.90
10.00	10.00
20.00	20.10
30.00	30.20
40.00	40.30

Report Reference Number:

Engineer/Technical :

# Detector Gas Flow Accuracy Raw data Record

Raw Data Page 2

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Department: **Quality Control**  
Instrument Model: **Clarus 580 GC** Serial Name: **580S17020103**  
Gas Type: **H2**

## Gas Flow Setpoint

Flow rate ml/min	Flow rate reading
20.00	19.60
30.00	29.40
40.00	39.50
50.00	49.70
60.00	59.90

Report Reference Number

Engineer/Technical

# Detector Gas Flow Accuracy Raw data Record

Raw Data Page 3

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Department: **Quality Control**  
Instrument Model: **Clarus 580 GC** Serial Name: **580S17020103**  
Gas Type: **Air**

## Gas Flow Setpoint

Flow rate ml/min	Flow rate reading
100.00	98.80
200.00	197.60
300.00	295.70
400.00	394.70

Report Reference Num

Engineer/Technical

# Column Oven Temperature Raw data Reading

Raw Data Page 4

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

Department: Quality Control  
Serial Name: 580S17020103

Oven Temperature °C	Temperature Reading °C				
Temperature Set °C	Temp at 40 °C	Temp at 100 °C	Temp at 150 °C	Temp at 200 °C	Temp at 280 °C
Reading 1	29.8	100.5	150.2	200.2	280.0
Reading 2	29.46	100.3	150.3	200.2	280.2
Reading 3	29.7	100.3	150.3	200.4	280.3
Reading 4	29.8	100.3	150.4	200.4	280.3
Reading 5	29.7	100.4	150.5	200.5	280.3

T1: 39.96 T2: E01 T1-T2: E04 31-03 14:14:00	T1: 100.56 T2: E01 T1-T2: E04 31-03 13:07:34	T1: 150.26 T2: E01 T1-T2: E04 31-03 13:18:08	T1: 200.26 T2: E01 T1-T2: E04 31-03 13:34:47	T1: 280.06 T2: E01 T1-T2: E04 31-03 13:49:48
T1: 39.86 T2: E01 T1-T2: E04 31-03 14:15:59	T1: 100.36 T2: E01 T1-T2: E04 31-03 13:09:00	T1: 150.36 T2: E01 T1-T2: E04 31-03 13:20:35	T1: 200.26 T2: E01 T1-T2: E04 31-03 13:36:53	T1: 280.26 T2: E01 T1-T2: E04 31-03 13:51:45
T1: 39.76 T2: E01 T1-T2: E04 31-03 14:17:52	T1: 100.36 T2: E01 T1-T2: E04 31-03 13:10:07	T1: 150.36 T2: E01 T1-T2: E04 31-03 13:24:50	T1: 200.46 T2: E01 T1-T2: E04 31-03 13:37:56	T1: 280.36 T2: E01 T1-T2: E04 31-03 13:53:22
T1: 39.86 T2: E01 T1-T2: E04 31-03 14:18:10	T1: 100.36 T2: E01 T1-T2: E04 31-03 13:11:26	T1: 150.46 T2: E01 T1-T2: E04 31-03 13:25:55	T1: 200.46 T2: E01 T1-T2: E04 31-03 13:40:59	T1: 280.36 T2: E01 T1-T2: E04 31-03 13:54:41
T1: 39.76 T2: E01 T1-T2: E04 31-03 14:18:52	T1: 100.46 T2: E01 T1-T2: E04 31-03 13:13:08	T1: 150.56 T2: E01 T1-T2: E04 31-03 13:30:37	T1: 200.56 T2: E01 T1-T2: E04 31-03 13:42:31	T1: 280.36 T2: E01 T1-T2: E04 31-03 13:55:57

Report Reference Number

Engineer/Technician: P

# Column Oven Temperature Stability Raw data Reading

Raw Data Page 5

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

Department: Quality Control  
Serial Name: 580S17020103

## Oven Temperature Stability at 100 °C

Temperature °C put on Position #	Temp stability Reading at Position
Position 1	100.5
Position 2	100.3
Position 3	100.3
Position 4	100.3
Position 5	100.4

Report Reference Number

Engineer/Technician

## Injector port Temperature Raw data Reading

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Department: Quality Control  
 Instrument Model: Clarus 580 GC Serial Name: 580S17020103  
 Injector Type: Split/Splitless

## Injection Port Temperature °C

Temperature °C	Injector Temp 150 °C	Injector Temp 200 °C	Injector Temp 280 °C
Temperature Reading	146.5	196.5	216.7

T1: 146.60  
 T2: E01  
 T1-T2: E04  
 S1-S3 14:22:35  
  
 T1: 196.50  
 T2: E01  
 T1-T2: E04  
 S1-S3 14:25:44  
  
 T1: 276.70  
 T2: E01  
 T1-T2: E04  
 S1-S3 14:28:54

Report Reference Number

Engineer/Technical :

## Base Detector Temperature Raw data Reading

Customer Name: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Department: Quality Control  
 Instrument Model: Clarus 580 GC Serial Name: 580S17020103  
 Detector Type: FID

## Base Detector Temperature

Temperature Setpoint °C	Base Detector Temp 200 °C	Base Detector Temp 300 °C
Temperature Reading	197.1	297.0

T1: 197.10  
 T2: E01  
 T1-T2: E04  
 S1-S3 14:32:51  
  
 T1: 297.00  
 T2: E01  
 T1-T2: E04  
 S1-S3 14:36:51

Report Reference Number

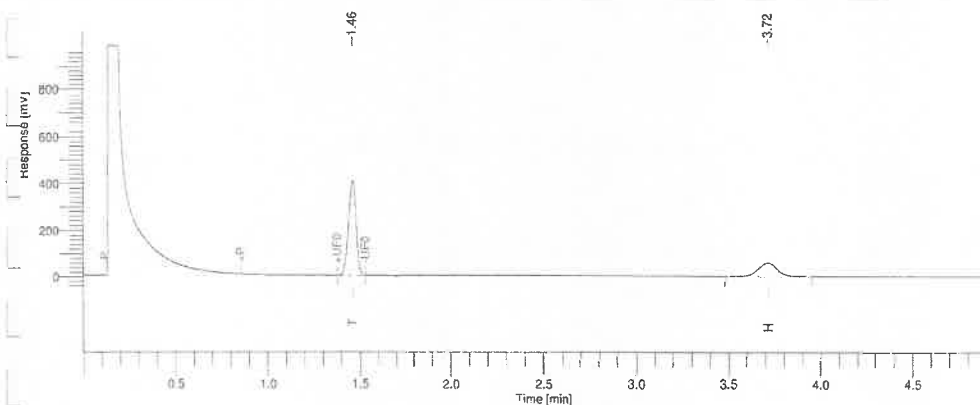
Engineer/Technical :

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 008  
 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 : 01-Apr-24 3:24:29 PM

Date : 01-Apr-24 3:32:36 PM  
 Sample Name : Precision 6  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 12

Raw Data File : D:\PMOQ2023\Precision 6\_012.raw  
 Result File : D:\PMOQ2023\Precision 6\_012.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 6\_012.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 6\_012.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\Precision 6\_012.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.461	1150475.11	409190.63	75.48	75.48	1.1505
2	Hexadecane	3.718	373769.66	55477.69	24.52	24.52	0.3738
		1524244.77	464668.32	100.00	100.00	1.5242	

Missing Component Report  
 Component Expected Retention (Calibration File)

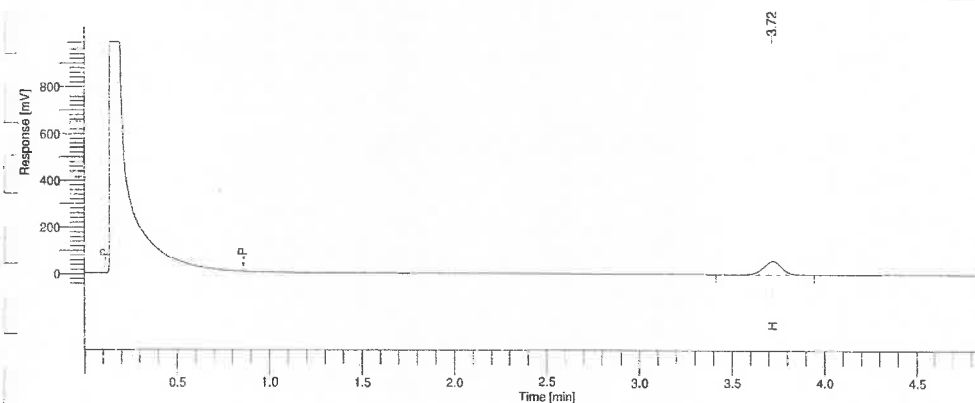
All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 001  
 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 : 01-Apr-24 2:09:54 PM

Date : 01-Apr-24 2:41:13 PM  
 Sample Name : FID Linearity 1  
 Study : Calibration  
 Rack/Vial : 0/1  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 1

Raw Data File : D:\PMOQ2023\FID Linearity 1\_001.raw  
 Result File : D:\PMOQ2023\FID Linearity 1\_001.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 1\_001.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 1\_001.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 1\_001.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\Data Analysis.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## \*\*\*\*\*Data analysis\*\*\*\*\*

PMC

Peak #	Component Name	Time [min]	Area [uV*sec]	Area [%]	Raw Amount
1	Hexadecane	3.721	385225.09	100.00	0.3852
			385225.09	100.00	0.3852

Missing Component Report  
 Component Expected Retention (Calibration File)

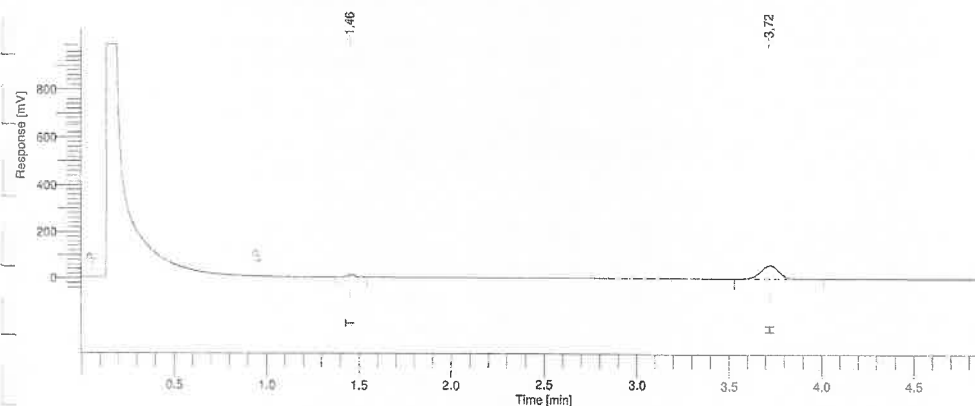
Tetradecane 1.450

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 002  
 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 : 01-Apr-24 2:16:40 PM

Date : 01-Apr-24 2:44:45 PM  
 Sample Name : FID Linearity 2  
 Study : Calibration  
 Rack/Vial : 0/2  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 2

Raw Data File : D:\PMOQ2023\FID Linearity 2\_002.raw  
 Result File : D:\PMOQ2023\FID Linearity 2\_002.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 2\_002.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 2\_002.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 2\_002.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.455	31325.75	11227.44	7.55	7.55	0.0313
2	Hexadecane	3.723	383781.45	57135.48	92.45	92.45	0.3838
		415107.21	68362.92	100.00	100.00	0.4151	

Missing Component Report  
 Component Expected Retention (Calibration File)

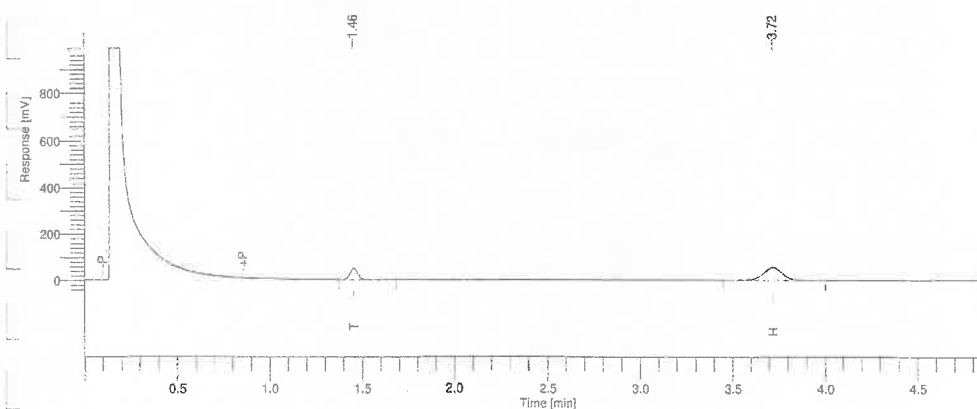
--All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 003  
 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 : 01-Apr-24 2:23:28 PM

Date : 01-Apr-24 2:46:39 PM  
 Sample Name : FID Linearity 3  
 Study : Calibration  
 Rack/Vial : 0/3  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 3

Raw Data File : D:\PMOQ2023\FID Linearity 3\_003.raw  
 Result File : D:\PMOQ2023\FID Linearity 3\_003.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 3\_003.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 3\_003.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 3\_003.rst [Editing in Progress]  
 Report Format File : D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.455	140126.66	49638.09	27.81	27.81	0.1401
2	Hexadecane	3.721	363761.09	54315.90	72.19	72.19	0.3638
		503887.74	103953.99	100.00	100.00	0.5039	

Missing Component Report  
 Component Expected Retention (Calibration File)

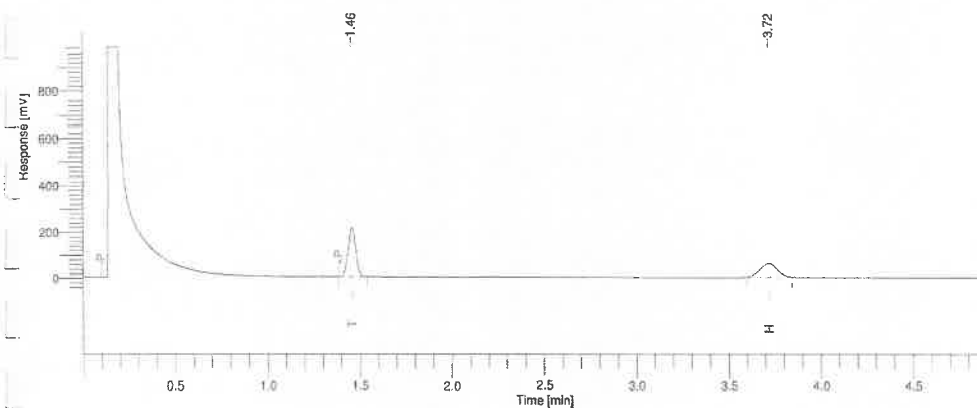
--All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 004  
 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 : 01-Apr-24 2:30:15 PM

Date : 01-Apr-24 2:58:02 PM  
 Sample Name : FID Linearity 4  
 Study : Calibration  
 Rack/Vial : 0/4  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 4

Raw Data File : D:\PMOQ2023\FID Linearity 4\_004.raw  
 Result File : D:\PMOQ2023\FID Linearity 4\_004.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 4\_004.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 4\_004.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 4\_004.rst [Editing in Progress]  
 Report Format File: D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.459	605206.45	214149.83	61.95	61.95	0.6052
2	Hexadecane	3.722	371770.35	57745.61	38.05	38.05	0.3718
			976976.80	271895.44	100.00	100.00	0.9770

Missing Component Report  
 Component Expected Retention (Calibration File)

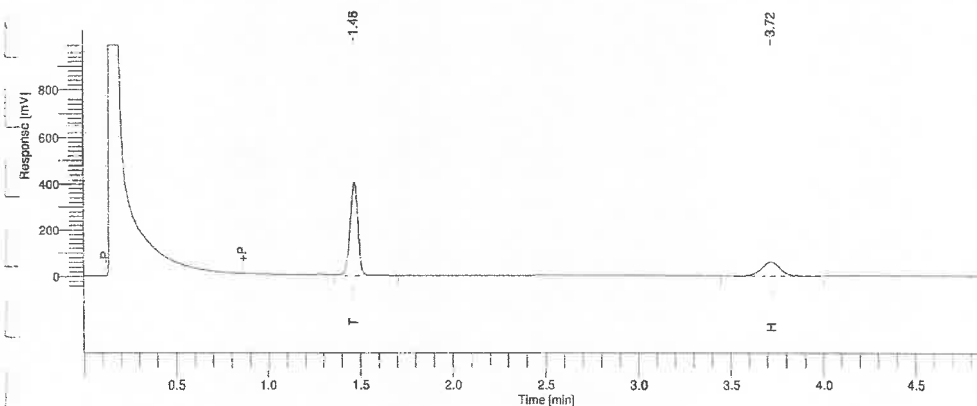
All components were found

Software Version : 6.3.2.0646  
 Operator : manager  
 Sample Number : 005  
 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 : 01-Apr-24 2:36:59 PM

Date : 01-Apr-24 2:52:16 PM  
 Sample Name : FID Linearity 5  
 Study : Calibration  
 Rack/Vial : 0/5  
 Channel : A  
 A/D mV Range : 1000  
 End Time : 5.00 min

Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 5

Raw Data File : D:\PMOQ2023\FID Linearity 5\_005.raw  
 Result File : D:\PMOQ2023\FID Linearity 5\_005.rst [Editing in Progress]  
 Inst Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 5\_005.raw  
 Proc Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 5\_005.rst [Editing in Progress]  
 Calib Method : d:\pmoq2023\calibration2023\_1 from D:\PMOQ2023\FID Linearity 5\_005.rst [Editing in Progress]  
 Report Format File: D:\DATA\REPORT FORMAT\ANALYSIS REPORT.rpt  
 Sequence File : D:\PMOQ2023\Calibration2023.seq



## ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Adjusted Amount
1	Tetradecane	1.463	1143527.90	401621.70	75.58	75.58	1.1435
2	Hexadecane	3.720	369538.04	55181.59	24.42	24.42	0.3695
			1513065.94	456803.29	100.00	100.00	1.5131

Missing Component Report  
 Component Expected Retention (Calibration File)

All components were found

Software Version : 6.3.2.0646 Date : 31-Mar-24 3:29:48 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  
Sample Amount : 1.0000  
Data Acquisition Time : 01-Jan-80 12:00:01 AM

Area Reject : 0.000000  
Dilution Factor : 1.00  
Cycle : 1

Raw Data File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-1dat-SS420x.raw  
Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-1dat-SS420x.rst [Editing in Progress]  
Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-1dat-SS420x.raw  
Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-1dat-SS420x.rst [Editing in Progress]  
Calib Method : E:\Calibration\Calibration QA HPL 1 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-1dat-SS420x.rst [Editing in Progress]  
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	25072.50	10006.09	0.02	0.02	BB 2.5057
2	0.197	49996.70	20002.24	0.04	0.04	BB 2.4996
3	0.271	75001.00	30003.39	0.06	0.06	BB 2.4998
4	0.377	100003.10	40002.73	0.08	0.08	BB 2.4999
5	0.441	125004.10	50002.86	0.10	0.10	BB 2.4999
6	0.542	150006.40	60004.06	0.12	0.12	BB 2.4999
7	0.622	175000.25	70001.15	0.14	0.14	BB 2.5000
8	0.705	199998.50	79999.49	0.16	0.16	BB 2.5000
9	0.790	225008.30	90003.14	0.18	0.18	BB 2.5000
10	0.869	250013.50	100004.00	0.20	0.20	BB 2.5000
11	0.944	275008.50	110001.13	0.22	0.22	BB 2.5001
12	1.052	300007.30	131169.88	0.24	0.24	BB 2.2872
13	1.125	325013.30	130003.49	0.26	0.26	BB 2.5000
14	1.202	350011.45	140002.31	0.28	0.28	BB 2.5000
15	1.290	375010.65	150000.44	0.30	0.30	BB 2.5001
16	1.382	400017.10	160003.59	0.32	0.32	BB 2.5001
17	1.450	425014.00	170002.19	0.34	0.34	BB 2.5001
18	1.535	450010.80	179999.19	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	1.802	525004.71	209997.53	0.42	0.42	BB 2.5001
22	1.880	550014.10	219999.59	0.44	0.44	BB 2.5001
23	1.964	575018.40	230000.61	0.46	0.46	BB 2.5001
24	2.048	600016.41	239999.66	0.48	0.48	BB 2.5001
25	2.137	625009.61	249998.06	0.50	0.50	BB 2.5001
26	2.209	650010.48	259997.01	0.51	0.51	BB 2.5001
27	2.295	675014.51	269996.84	0.53	0.53	BB 2.5001
28	2.370	700023.41	279999.05	0.55	0.55	BB 2.5001
29	2.464	725013.51	289997.61	0.57	0.57	BB 2.5001
30	2.540	750017.81	299997.84	0.59	0.59	BB 2.5001
31	2.632	775016.21	309996.61	0.61	0.61	BB 2.5001
32	2.701	800024.26	319998.04	0.63	0.63	BB 2.5001
33	2.797	825018.61	329997.98	0.65	0.65	BB 2.5001
34	2.876	850019.81	339998.39	0.67	0.67	BB 2.5001
35	2.956	875021.56	349996.13	0.69	0.69	BB 2.5001
36	3.050	900020.01	359996.06	0.71	0.71	BB 2.5001
37	3.132	925021.41	369997.06	0.73	0.73	BB 2.5001
38	3.217	950020.81	383410.76	0.75	0.75	BB 2.4778
39	3.300	975019.31	393413.66	0.77	0.77	BB 2.4784
40	3.382	1000014.71	403144.35	0.79	0.79	BB 2.4805
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	1075012.36	429990.20	0.85	0.85	BB 2.5001
44	3.712	1100021.01	439992.61	0.87	0.87	BB 2.5001
45	3.800	1125006.91	449988.57	0.89	0.89	BB 2.5001
46	3.870	1150000.41	459987.79	0.91	0.91	BB 2.5001

31-Mar-24 3:29:48 PM Result: D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-1dat-SS420x.rst

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL Area/Height [s]
47	3.958	1175014.36	469989.44	0.93	0.93	BB 2.5001
48	4.050	1200013.11	479988.06	0.95	0.95	BB 2.5001
49	4.132	1224994.21	489984.61	0.97	0.97	BB 2.5001
50	4.217	1249997.21	499986.84	0.99	0.99	BB 2.5001
51	4.292	1275007.46	509987.21	1.01	1.01	BB 2.5001
52	4.382	1300000.71	519983.12	1.03	1.03	BB 2.5001
53	4.468	1325001.86	529985.58	1.05	1.05	BB 2.5001
54	4.550	1349997.51	539985.84	1.07	1.07	BB 2.5001
55	4.631	1375005.61	549985.49	1.09	1.09	BB 2.5001
56	4.705	1400008.71	559983.49	1.11	1.11	BB 2.5001
57	4.798	1424996.31	569982.06	1.13	1.13	BB 2.5001
58	4.881	1449984.62	579980.49	1.15	1.15	BB 2.5001
59	4.959	1474990.87	589979.40	1.17	1.17	BB 2.5001
60	5.048	1499998.12	602789.08	1.19	1.19	BB 2.4885
61	5.123	1524994.22	609980.06	1.21	1.21	BB 2.5001
62	5.213	1549988.62	619981.84	1.23	1.23	BB 2.5001
63	5.300	1574989.82	629978.48	1.25	1.25	BB 2.5001
64	5.383	1600003.62	642851.22	1.27	1.27	BB 2.4889
65	5.463	1625001.72	649982.06	1.29	1.29	BB 2.5001
66	5.545	1649984.82	659980.17	1.31	1.31	BB 2.5001
67	5.632	1674991.22	669978.37	1.33	1.33	BB 2.5001
68	5.703	1700010.92	679983.12	1.35	1.35	BB 2.5001
69	5.786	1724999.57	689980.30	1.37	1.37	BB 2.5001
70	5.877	1749985.52	699978.84	1.39	1.39	BB 2.5001
71	5.963	1774990.02	709977.61	1.41	1.41	BB 2.5001
72	6.050	1800004.27	722495.59	1.43	1.43	BB 2.4914
73	6.122	1825005.22	729980.96	1.45	1.45	BB 2.5001
74	6.213	1849994.37	739981.50	1.47	1.47	BB 2.5001
75	6.295	1875004.72	749982.06	1.49	1.49	BB 2.5001
76	6.378	1900016.27	759982.05	1.50	1.50	BB 2.5001
77	6.452	1925005.27	769978.29	1.52	1.52	BB 2.5001
78	6.537	1949999.42	779981.84	1.54	1.54	BB 2.5001
79	6.634	1975002.92	789983.46	1.56	1.56	BB 2.5001
80	6.715	2000017.42	799982.59	1.58	1.58	BB 2.5001
81	6.798	2025012.32	809982.12	1.60	1.60	BB 2.5001
82	6.875	2049997.92	819981.02	1.62	1.62	BB 2.5001
83	6.965	2075007.77	829982.05	1.64	1.64	BB 2.5001
84	7.045	2100022.32	839983.24	1.66	1.66	BB 2.5001
85	7.125	2125017.92	849980.23	1.68	1.68	BB 2.5001
86	7.213	2150008.62	859983.02	1.70	1.70	BB 2.5001
87	7.296	2175008.72	869982.12	1.72	1.72	BB 2.5001
88	7.385	2200025.62	879905.53	1.74	1.74	BB 2.3457
89	7.452	2225025.12	889981.55	1.76	1.76	BB 2.5001
90	7.536	2250005.12	899980.12	1.78	1.78	BB 2.5001
91	7.623	2275004.87	909980.69	1.80	1.80	BB 2.5001
92	7.715	2300020.37	919981.18	1.82	1.82	BB 2.5001
93	7.796	2325026.12	929982.06	1.84	1.84	BB 2.5001
94	7.875	2350007.12	939980.12	1.86	1.86	BB 2.5001
95	7.963	2375003.17	949979.32	1.88	1.88	BB 2.5001
96	8.040	2400022.22	959980.02	1.90	1.90	BB 2.5001
97	8.130	2425021.92	969977.20	1.92	1.92	BB 2.5001
98	8.213	2450014.52	979979.49	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 5.06e+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-24 3:31:11 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  
Sample Amount : 1.0000  
Data Acquisition Time : 01-Jan-80 12:00:01 AM  
Area Reject : 0.000000  
Dilution Factor : 1.00  
Cycle : 1

Raw Data File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-2dat-SS420x.raw  
Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-2dat-SS420x.rst [Editing in Progress]  
Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-2dat-SS420x.raw  
Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-2dat-SS420x.rst [Editing in Progress]  
Calib Method : E:\Calibration\Calibration QA HPL I 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-2dat-SS420x.rst [Editing in Progress]  
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	25072.50	10006.09	0.02	0.02	BB	2.5057
2	0.197	49996.70	20002.24	0.04	0.04	BB	2.4996
3	0.271	75001.00	30003.39	0.06	0.06	BB	2.4998
4	0.377	100003.10	40002.73	0.08	0.08	BB	2.4999
5	0.441	125004.10	50002.86	0.10	0.10	BB	2.4999
6	0.542	150006.40	60004.06	0.12	0.12	BB	2.4999
7	0.622	175000.25	70001.15	0.14	0.14	BB	2.5000
8	0.705	199998.50	79999.49	0.16	0.16	BB	2.5000
9	0.790	225008.30	90003.14	0.18	0.18	BB	2.5000
10	0.869	250013.50	100004.00	0.20	0.20	BB	2.5000
11	0.944	275008.50	110001.13	0.22	0.22	BB	2.5001
12	1.052	300007.30	131169.88	0.24	0.24	BB	2.2872
13	1.125	325013.30	130003.49	0.26	0.26	BB	2.5000
14	1.202	350011.45	140002.31	0.28	0.28	BB	2.5000
15	1.290	375010.65	150000.44	0.30	0.30	BB	2.5001
16	1.382	400017.10	160003.59	0.32	0.32	BB	2.5001
17	1.450	425014.00	170002.19	0.34	0.34	BB	2.5001
18	1.535	450010.80	179999.19	0.36	0.36	BB	2.5001
19	1.628	475019.00	190002.08	0.38	0.38	BB	2.5001
20	1.714	500016.95	200001.35	0.40	0.40	BB	2.5001
21	1.802	525004.71	209997.53	0.42	0.42	BB	2.5001
22	1.880	550014.10	219999.59	0.44	0.44	BB	2.5001
23	1.964	575018.40	230000.61	0.46	0.46	BB	2.5001
24	2.048	600016.41	239999.66	0.48	0.48	BB	2.5001
25	2.137	625009.61	249998.06	0.50	0.50	BB	2.5001
26	2.209	650010.48	259997.01	0.51	0.51	BB	2.5001
27	2.295	675014.51	269996.84	0.53	0.53	BB	2.5001
28	2.370	700023.41	279999.06	0.55	0.55	BB	2.5001
29	2.464	725013.51	289997.61	0.57	0.57	BB	2.5001
30	2.540	750017.81	299997.84	0.59	0.59	BB	2.5001
31	2.632	775016.21	309996.61	0.61	0.61	BB	2.5001
32	2.701	800024.26	319998.04	0.63	0.63	BB	2.5001
33	2.797	825018.61	329997.98	0.65	0.65	BB	2.5001
34	2.876	850019.81	339998.39	0.67	0.67	BB	2.5001
35	2.956	875021.56	349996.13	0.69	0.69	BB	2.5001
36	3.050	900020.01	359996.06	0.71	0.71	BB	2.5001
37	3.132	925021.41	369997.06	0.73	0.73	BB	2.5001
38	3.217	950020.81	383410.76	0.75	0.75	BB	2.4778
39	3.300	975019.31	393413.66	0.77	0.77	BB	2.4784
40	3.382	1000014.71	403144.35	0.79	0.79	BB	2.4805
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	1075012.36	429990.20	0.85	0.85	BB	2.5001
44	3.712	1100021.01	439992.61	0.87	0.87	BB	2.5001
45	3.800	1125006.91	449988.57	0.89	0.89	BB	2.5001
46	3.870	1150000.41	459987.79	0.91	0.91	BB	2.5001

31-Mar-24 3:31:11 PM Result: D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-2dat-SS420x.rst

Peak #	Time [min]	Area [µV-s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
47	3.958	1175014.36	469989.44	0.93	0.93	BB	2.5001
48	4.050	1200013.11	479988.06	0.95	0.95	BB	2.5001
49	4.132	1224994.21	489984.61	0.97	0.97	BB	2.5001
50	4.217	1249997.21	499986.84	0.99	0.99	BB	2.5001
51	4.292	1275007.46	509987.21	1.01	1.01	BB	2.5001
52	4.382	1300000.71	519983.12	1.03	1.03	BB	2.5001
53	4.468	1325001.86	529985.58	1.05	1.05	BB	2.5001
54	4.550	1349997.51	539985.84	1.07	1.07	BB	2.5001
55	4.631	1375005.61	549985.49	1.09	1.09	BB	2.5001
56	4.705	1400008.71	559983.49	1.11	1.11	BB	2.5001
57	4.798	1424996.31	569982.06	1.13	1.13	BB	2.5001
58	4.881	1449984.62	579980.49	1.15	1.15	BB	2.5001
59	4.959	1474990.87	589979.40	1.17	1.17	BB	2.5001
60	5.048	1499998.12	602769.06	1.19	1.19	BB	2.4885
61	5.123	1524994.22	609980.06	1.21	1.21	BB	2.5001
62	5.213	1549988.62	619981.84	1.23	1.23	BB	2.5001
63	5.300	1574989.82	629978.48	1.25	1.25	BB	2.5001
64	5.383	1600003.82	642851.22	1.27	1.27	BB	2.4889
65	5.463	1625001.72	649982.06	1.29	1.29	BB	2.5001
66	5.545	1649984.82	659980.17	1.31	1.31	BB	2.5001
67	5.632	1674991.22	669978.37	1.33	1.33	BB	2.5001
68	5.703	1700010.92	679983.12	1.35	1.35	BB	2.5001
69	5.786	1724999.57	689980.30	1.37	1.37	BB	2.5001
70	5.877	1749985.52	699978.84	1.39	1.39	BB	2.5001
71	5.963	1774990.02	709977.61	1.41	1.41	BB	2.5001
72	6.050	1800004.27	722495.59	1.43	1.43	BB	2.4914
73	6.122	1825005.22	729980.96	1.45	1.45	BB	2.5001
74	6.213	1849994.37	739981.50	1.47	1.47	BB	2.5001
75	6.295	1875004.72	749982.06	1.49	1.49	BB	2.5001
76	6.378	1900016.27	759982.05	1.50	1.50	BB	2.5001
77	6.452	1925005.27	769978.29	1.52	1.52	BB	2.5001
78	6.537	1949999.42	779981.84	1.54	1.54	BB	2.5001
79	6.634	1975002.92	789983.46	1.56	1.56	BB	2.5001
80	6.715	2000017.42	799982.59	1.58	1.58	BB	2.5001
81	6.798	2025012.32	809982.12	1.60	1.60	BB	2.5001
82	6.875	2049997.92	819981.02	1.62	1.62	BB	2.5001
83	6.965	2075007.77	829982.05	1.64	1.64	BB	2.5001
84	7.045	2100022.32	839983.24	1.66	1.66	BB	2.5001
85	7.125	2125017.92	849980.23	1.68	1.68	BB	2.5001
86	7.213	2150008.62	859983.02	1.70	1.70	BB	2.5001
87	7.286	2175008.72	869982.12	1.72	1.72	BB	2.5001
88	7.385	2200025.62	937905.53	1.74	1.74	BB	2.3457
89	7.452	2225025.12	889981.55	1.76	1.76	BB	2.5001
90	7.536	2250005.12	899980.12	1.78	1.78	BB	2.5001
91	7.623	2275004.87	909980.69	1.80	1.80	BB	2.5001
92	7.715	2300020.37	919981.18	1.82	1.82	BB	2.5001
93	7.796	2325026.12	929982.06	1.84	1.84	BB	2.5001
94	7.875	2350007.12	939980.12	1.86	1.86	BB	2.5001
95	7.963	2375003.17	949979.32	1.88	1.88	BB	2.5001
96	8.040	2400022.22	959980.02	1.90	1.90	BB	2.5001
97	8.130	2425021.92	969977.20	1.92	1.92	BB	2.5001
98	8.213	2450014.52	979979.49	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 5.06e+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  
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 : 01-Jan-80 12:00:01 AM

Date : 31-Mar-24 3:32:15 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:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-3dat-SS420x.raw  
Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-3dat-SS420x.rst [Editing in Progress]  
Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-3dat-SS420x.raw  
Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-3dat-SS420x.rst [Editing in Progress]  
Calib Method : E:\Calibration\Calibration QA HPL I 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-3dat-SS420x.rst [Editing in Progress]  
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	24997.70	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	75001.63	30003.28	0.06	0.06	BB	2.4998
4	0.313	100005.10	40004.00	0.08	0.08	BB	2.4999
5	0.393	125006.40	50003.44	0.10	0.10	BB	2.5000
6	0.493	150013.20	60006.00	0.12	0.12	BB	2.5000
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	425026.10	170006.00	0.34	0.34	BB	2.5001
18	1.498	450024.20	180005.53	0.36	0.36	BB	2.5001
19	1.570	475024.40	190005.84	0.38	0.38	BB	2.5001
20	1.668	500026.10	200005.61	0.40	0.40	BB	2.5001
21	1.747	525021.00	210002.00	0.42	0.42	BB	2.5001
22	1.818	550028.20	220004.00	0.44	0.44	BB	2.5001
23	1.915	575025.00	230005.53	0.46	0.46	BB	2.5000
24	2.000	600024.65	240003.52	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	675021.31	270002.49	0.53	0.53	BB	2.5001
28	2.334	700033.41	282093.00	0.55	0.55	BB	2.4816
29	2.415	725033.31	290004.51	0.57	0.57	BB	2.5001
30	2.492	750037.56	300004.61	0.59	0.59	BB	2.5001
31	2.573	775030.31	310003.35	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	850043.21	340004.68	0.67	0.67	BB	2.5001
35	2.915	875034.51	350004.06	0.69	0.69	BB	2.5001
36	3.003	900034.81	360004.06	0.71	0.71	BB	2.5001
37	3.077	925041.11	370003.45	0.73	0.73	BB	2.5001
38	3.159	950044.41	380003.38	0.75	0.75	BB	2.5001
39	3.240	975038.31	390002.83	0.77	0.77	BB	2.5001
40	3.326	1000029.26	400000.07	0.79	0.79	BB	2.5001
41	3.413	1025044.51	410002.18	0.81	0.81	BB	2.5001
42	3.498	1050040.31	420000.49	0.83	0.83	BB	2.5001
43	3.582	1075030.06	431962.69	0.85	0.85	BB	2.4887
44	3.649	1100028.51	439998.98	0.87	0.87	BB	2.5001
45	3.746	1125031.26	449998.18	0.89	0.89	BB	2.5001
46	3.823	1150035.31	459997.84	0.91	0.91	BB	2.5001

31-Mar-24 3:32:15 PM Result: D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-3dat-SS420x.rst

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
47	3.907	1175033.31	469999.61	0.93	0.93	BB	2.5001
48	3.998	1200020.31	481887.91	0.95	0.95	BB	2.4902
49	4.080	1225024.41	489994.04	0.97	0.97	BB	2.5001
50	4.156	1250030.51	499995.49	0.99	0.99	BB	2.5001
51	4.249	1275030.81	509997.61	1.01	1.01	BB	2.5001
52	4.334	1300018.41	521958.18	1.03	1.03	BB	2.4907
53	4.415	1325031.61	529996.06	1.05	1.05	BB	2.5001
54	4.493	1350034.41	539995.49	1.07	1.07	BB	2.5001
55	4.585	1375027.41	550495.94	1.09	1.09	BB	2.3286
56	4.661	1400021.41	559995.49	1.11	1.11	BB	2.5001
57	4.742	1425024.61	569993.60	1.13	1.13	BB	2.5001
58	4.833	1450027.81	579991.84	1.15	1.15	BB	2.5001
59	4.910	1475021.76	589992.42	1.17	1.17	BB	2.5001
60	4.993	1500016.76	599993.07	1.19	1.19	BB	2.5001
61	5.081	1525022.56	609992.05	1.21	1.21	BB	2.5001
62	5.167	1550029.71	621665.25	1.23	1.23	BB	2.4934
63	5.238	1575017.07	629988.82	1.25	1.25	BB	2.5001
64	5.319	1600017.42	639991.69	1.27	1.27	BB	2.5001
65	5.406	1625023.22	649992.08	1.29	1.29	BB	2.5001
66	5.500	1650034.71	659993.55	1.31	1.31	BB	2.5001
67	5.580	1675022.42	669991.12	1.33	1.33	BB	2.5001
68	5.665	1700024.92	679995.53	1.35	1.35	BB	2.5001
69	5.745	1725030.12	689994.41	1.37	1.37	BB	2.5001
70	5.827	1750035.97	699992.70	1.39	1.39	BB	2.5001
71	5.918	1775028.87	756493.18	1.41	1.41	BB	2.3464
72	5.996	1800018.92	719992.63	1.43	1.43	BB	2.5001
73	6.072	1825036.32	729995.45	1.45	1.45	BB	2.5001
74	6.162	1850044.02	739994.84	1.47	1.47	BB	2.5001
75	6.237	1875039.47	749993.64	1.49	1.49	BB	2.5001
76	6.330	1900028.32	759994.93	1.50	1.50	BB	2.5001
77	6.412	1925030.22	769993.18	1.52	1.52	BB	2.5001
78	6.497	1950052.67	779996.16	1.54	1.54	BB	2.5001
79	6.573	1975046.02	789994.76	1.56	1.56	BB	2.5001
80	6.666	2000034.12	799996.06	1.58	1.58	BB	2.5001
81	6.747	2025041.12	809996.98	1.60	1.60	BB	2.5001
82	6.833	2050055.82	820981.00	1.62	1.62	BB	2.4971
83	6.915	2075052.07	829995.60	1.64	1.64	BB	2.5001
84	6.996	2100037.42	839996.12	1.66	1.66	BB	2.5001
85	7.072	2125034.27	849993.49	1.68	1.68	BB	2.5001
86	7.163	2150056.52	859996.06	1.70	1.70	BB	2.5001
87	7.241	2175056.12	869995.97	1.72	1.72	BB	2.5001
88	7.330	2200043.47	879996.05	1.74	1.74	BB	2.5001
89	7.411	2225043.32	889995.61	1.76	1.76	BB	2.5001
90	7.491	2250061.82	899995.70	1.78	1.78	BB	2.5001
91	7.585	2275064.87	939657.94	1.80	1.80	BB	2.3707
92	7.666	2300049.12	919997.02	1.82	1.82	BB	2.5001
93	7.748	2325046.32	930584.44	1.84	1.84	BB	2.4985
94	7.829	2350057.42	939994.61	1.86	1.86	BB	2.5001
95	7.913	2375060.12	949994.06	1.88	1.88	BB	2.5001
96	8.001	2400052.57	959995.58	1.90	1.90	BB	2.5001
97	8.071	2425042.42	969993.12	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  
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 : 01-Jan-80 12:00:01 AM

Date : 31-Mar-24 3:33:11 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:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-4dat-SS420x.raw  
Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-4dat-SS420x.rst [Editing in Progress]  
Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-4dat-SS420x.raw  
Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-4dat-SS420x.rst [Editing in Progress]  
Calib Method : E:\Calibration\Calibration QA HPL I 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-4dat-SS420x.rst [Editing in Progress]  
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	200005.80	80003.00	0.16	0.16	BB	2.5000
9	0.800	225010.40	90005.00	0.18	0.18	BB	2.5000
10	0.870	250016.20	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	300011.20	120002.47	0.24	0.24	BB	2.5000
13	1.133	325015.30	130005.47	0.26	0.26	BB	2.5000
14	1.202	350019.20	140004.49	0.28	0.28	BB	2.5001
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	425016.10	170004.12	0.34	0.34	BB	2.5000
18	1.548	450019.80	180004.61	0.36	0.36	BB	2.5000
19	1.637	475029.15	190006.52	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	1.882	550022.65	220003.42	0.44	0.44	BB	2.5001
23	1.972	575030.10	230005.00	0.46	0.46	BB	2.5001
24	2.047	600027.40	240003.60	0.48	0.48	BB	2.5001
25	2.128	625022.06	250002.44	0.50	0.50	BB	2.5001
26	2.220	650020.41	260002.06	0.51	0.51	BB	2.5001
27	2.304	675022.61	270000.77	0.53	0.53	BB	2.5001
28	2.383	700038.40	280008.00	0.55	0.55	BB	2.5001
29	2.469	725024.01	290002.02	0.57	0.57	BB	2.5001
30	2.550	750032.31	300004.45	0.59	0.59	BB	2.5001
31	2.630	775013.51	309997.45	0.61	0.61	BB	2.5001
32	2.718	800041.31	320005.06	0.63	0.63	BB	2.5001
33	2.802	825031.91	330002.96	0.65	0.65	BB	2.5001
34	2.880	850033.61	340003.49	0.67	0.67	BB	2.5001
35	2.970	875037.91	350003.49	0.69	0.69	BB	2.5001
36	3.050	900036.51	360001.76	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	975036.46	390001.64	0.77	0.77	BB	2.5001
40	3.381	1000031.71	399998.49	0.79	0.79	BB	2.5001
41	3.472	1025031.51	420329.37	0.81	0.81	BB	2.4386
42	3.548	1050031.46	420000.88	0.83	0.83	BB	2.5001
43	3.628	1075028.91	429997.12	0.85	0.85	BB	2.5001
44	3.723	1100035.96	439998.51	0.87	0.87	BB	2.5001
45	3.800	1125028.06	449997.20	0.89	0.89	BB	2.5001
46	3.883	1150024.06	459996.79	0.91	0.91	BB	2.5001

31-Mar-24 3:33:11 PM Result: D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-4dat-SS420x.rst

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
47	3.973	1175036.51	513926.16	0.93	0.93	BB	2.2864
48	4.052	1200031.61	479995.06	0.95	0.95	BB	2.5001
49	4.133	1225018.41	489993.06	0.97	0.97	BB	2.5001
50	4.218	1250021.01	499996.12	0.99	0.99	BB	2.5001
51	4.298	1275029.01	509995.45	1.01	1.01	BB	2.5001
52	4.373	1300023.01	519991.00	1.03	1.03	BB	2.5001
53	4.461	1325022.36	529992.88	1.05	1.05	BB	2.5001
54	4.548	1350017.86	539994.49	1.07	1.07	BB	2.5001
55	4.639	1375025.81	560832.83	1.09	1.09	BB	2.4518
56	4.714	1400028.11	559992.78	1.11	1.11	BB	2.5001
57	4.801	1425018.11	569991.49	1.13	1.13	BB	2.5001
58	4.873	1450008.66	579989.34	1.15	1.15	BB	2.5001
59	4.960	1475022.61	589990.49	1.17	1.17	BB	2.5001
60	5.058	1500033.66	599992.52	1.19	1.19	BB	2.5001
61	5.138	1525021.61	609991.06	1.21	1.21	BB	2.5001
62	5.220	1550015.02	619992.06	1.23	1.23	BB	2.5001
63	5.293	1575017.62	629988.49	1.25	1.25	BB	2.5001
64	5.387	1600030.41	639991.84	1.27	1.27	BB	2.5001
65	5.468	1625026.02	649992.27	1.29	1.29	BB	2.5001
66	5.555	1650016.02	670545.04	1.31	1.31	BB	2.4607
67	5.627	1675018.32	669989.40	1.33	1.33	BB	2.5001
68	5.712	1700039.22	679993.38	1.35	1.35	BB	2.5001
69	5.800	1725029.32	689992.96	1.37	1.37	BB	2.5001
70	5.890	1750016.32	764850.78	1.39	1.39	BB	2.2880
71	5.962	1775022.52	709989.84	1.41	1.41	BB	2.5001
72	6.053	1800035.72	729393.12	1.43	1.43	BB	2.4679
73	6.135	1825039.12	729994.04	1.45	1.45	BB	2.5001
74	6.213	1850021.57	739992.72	1.47	1.47	BB	2.5001
75	6.297	1875029.32	749992.61	1.49	1.49	BB	2.5001
76	6.377	1900045.72	759994.98	1.50	1.50	BB	2.5001
77	6.470	1925034.82	769991.63	1.52	1.52	BB	2.5001
78	6.543	1950024.72	779993.49	1.54	1.54	BB	2.5001
79	6.638	1975031.22	789993.83	1.56	1.56	BB	2.5001
80	6.723	2000045.72	872713.20	1.58	1.58	BB	2.2918
81	6.796	2025042.62	809994.06	1.60	1.60	BB	2.5001
82	6.886	2050035.57	819996.47	1.62	1.62	BB	2.5001
83	6.960	2075036.62	829994.49	1.64	1.64	BB	2.5001
84	7.053	2100048.32	839994.61	1.66	1.66	BB	2.5001
85	7.140	2125047.82	926257.98	1.68	1.68	BB	2.2942
86	7.211	2150040.77	859995.41	1.70	1.70	BB	2.5001
87	7.290	2175044.27	869994.58	1.72	1.72	BB	2.5001
88	7.376	2200057.32	879995.15	1.74	1.74	BB	2.5001
89	7.466	2225055.72	889995.62	1.76	1.76	BB	2.5001
90	7.538	2250039.47	899993.86	1.78	1.78	BB	2.5001
91	7.638	2275041.72	918510.89	1.80	1.80	BB	2.4769
92	7.718	2300058.92	919996.49	1.82	1.82	BB	2.5001
93	7.800	2325063.12	929997.06	1.84	1.84	BB	2.5001
94	7.880	2350043.57	939995.66	1.86	1.86	BB	2.5001
95	7.962	2375044.17	949995.78	1.88	1.88	BB	2.5001
96	8.041	2400063.22	959995.12	1.90	1.90	BB	2.5001
97	8.134	2425080.72	969992.98	1.92	1.92	BB	2.5001
98	8.219	2450053.92	979995.02	1.94	1.94	BB	2.5001
99	8.299	2475047.07	989995.56	1.96	1.96	BB	2.5001
100	8.369	2500072.67	999996.24	1.98	1.98	BB	2.5001

1.26e+08 5.08e+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 : 01-Jan-80 12:00:01 AM

Date : 31-Mar-24 3:34:04 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:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-5dat-SS420x.raw  
Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-5dat-SS420x.rst [Editing in Progress]  
Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-5dat-SS420x.raw  
Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-5dat-SS420x.rst [Editing in Progress]  
Calib Method : E:\Calibration\Calibration QA HPL 1 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-5dat-SS420x.rst [Editing in Progress]  
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	25176.99	10016.14	0.02	0.02	BB	2.5136
2	0.198	49996.20	20001.46	0.04	0.04	BB	2.4996
3	0.295	74999.65	30002.62	0.08	0.06	BB	2.4998
4	0.373	99996.30	40000.79	0.08	0.08	BB	2.4999
5	0.450	124998.85	50000.83	0.10	0.10	BB	2.4999
6	0.549	150001.20	60002.39	0.12	0.12	BB	2.4999
7	0.627	174998.20	69999.49	0.14	0.14	BB	2.5000
8	0.720	199997.05	81247.65	0.16	0.16	BB	2.4616
9	0.799	225004.55	90001.30	0.18	0.18	BB	2.5000
10	0.872	250005.25	100000.79	0.20	0.20	BB	2.5000
11	0.957	275000.60	109999.16	0.22	0.22	BB	2.5000
12	1.044	300000.60	119997.51	0.24	0.24	BB	2.5001
13	1.139	325004.70	142001.27	0.26	0.26	BB	2.2887
14	1.205	350004.15	139998.34	0.28	0.28	BB	2.5001
15	1.302	374999.10	151864.85	0.30	0.30	BB	2.4693
16	1.389	400007.60	174691.36	0.32	0.32	BB	2.2898
17	1.472	425003.20	185575.00	0.34	0.34	BB	2.2902
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	1.717	500001.81	199994.49	0.40	0.40	BB	2.5001
21	1.802	524997.01	212291.97	0.42	0.42	BB	2.4730
22	1.880	549999.31	219994.06	0.44	0.44	BB	2.5001
23	1.969	574998.51	229993.51	0.46	0.46	BB	2.5001
24	2.048	600002.86	239992.89	0.48	0.48	BB	2.5001
25	2.139	625001.36	272463.68	0.50	0.50	BB	2.2939
26	2.217	649992.81	259990.06	0.51	0.51	BB	2.5001
27	2.302	674990.41	272579.89	0.53	0.53	BB	2.4763
28	2.385	700004.61	279993.49	0.55	0.55	BB	2.5001
29	2.473	725001.16	289990.49	0.57	0.57	BB	2.5001
30	2.547	749997.26	299990.11	0.59	0.59	BB	2.5001
31	2.637	774998.66	312932.24	0.61	0.61	BB	2.4765
32	2.721	800003.61	319991.98	0.63	0.63	BB	2.5001
33	2.793	825003.71	329987.87	0.65	0.65	BB	2.5001
34	2.877	849998.56	339988.44	0.67	0.67	BB	2.5001
35	2.967	874994.06	349988.07	0.69	0.69	BB	2.5001
36	3.052	899996.91	362783.81	0.71	0.71	BB	2.4808
37	3.137	924999.41	369986.61	0.73	0.73	BB	2.5001
38	3.210	949996.36	379986.75	0.75	0.75	BB	2.5001
39	3.298	974983.51	389984.12	0.77	0.77	BB	2.5001
40	3.380	999985.31	399981.06	0.79	0.79	BB	2.5001
41	3.470	1024996.91	409984.06	0.81	0.81	BB	2.5001
42	3.548	1049987.31	419981.49	0.83	0.83	BB	2.5001
43	3.632	1074974.61	429979.33	0.85	0.85	BB	2.5001
44	3.719	1099981.71	439978.53	0.87	0.87	BB	2.5001
45	3.794	1124982.11	449977.02	0.89	0.89	BB	2.5001
46	3.885	1149977.11	459975.97	0.91	0.91	BB	2.5001

31-Mar-24 3:34:04 PM Result: D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 4-5dat-SS420x.rst

Peak #	Time [min]	Area [µV·s]	Height [µV]	Area [%]	Norm. Area [%]	BL	Area/Height [s]
47	3.966	1174972.86	469977.05	0.93	0.93	BB	2.5001
48	4.043	1199973.61	479974.06	0.95	0.95	BB	2.5001
49	4.132	1224971.71	489971.70	0.97	0.97	BB	2.5001
50	4.210	1249977.01	499974.61	0.99	0.99	BB	2.5001
51	4.304	1274962.42	512887.82	1.01	1.01	BB	2.4859
52	4.382	1299958.02	519968.84	1.03	1.03	BB	2.5001
53	4.457	1324972.02	529970.61	1.05	1.05	BB	2.5001
54	4.543	1349967.67	539970.54	1.07	1.07	BB	2.5001
55	4.638	1374956.92	553738.24	1.09	1.09	BB	2.3158
56	4.715	1399962.42	559969.61	1.11	1.11	BB	2.5001
57	4.790	1424968.37	569967.29	1.13	1.13	BB	2.5001
58	4.887	1449956.02	579965.06	1.15	1.15	BB	2.5001
59	4.955	1474945.52	589963.00	1.17	1.17	BB	2.5001
60	5.055	1499949.42	646399.72	1.19	1.19	BB	2.3205
61	5.135	1524955.82	609963.84	1.21	1.21	BB	2.5001
62	5.216	1549956.47	619964.05	1.23	1.23	BB	2.5001
63	5.301	1574936.52	629960.06	1.25	1.25	BB	2.5001
64	5.374	1599945.07	639962.27	1.27	1.27	BB	2.5001
65	5.465	1624960.32	649963.49	1.29	1.29	BB	2.5001
66	5.551	1649957.57	659962.52	1.31	1.31	BB	2.5001
67	5.629	1674942.42	669960.37	1.33	1.33	BB	2.5001
68	5.715	1699952.22	679963.63	1.35	1.35	BB	2.5001
69	5.800	1724958.17	689962.30	1.37	1.37	BB	2.5001
70	5.887	1749958.52	702204.24	1.39	1.39	BB	2.4921
71	5.970	1774938.32	712159.55	1.41	1.41	BB	2.4923
72	6.047	1799941.92	719959.51	1.43	1.43	BB	2.5001
73	6.126	1824957.12	729961.12	1.45	1.45	BB	2.5001
74	6.210	1849954.17	739960.47	1.47	1.47	BB	2.5001
75	6.305	1874944.97	802590.89	1.49	1.49	BB	2.3361
76	6.377	1899942.82	759960.49	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
79	6.623	1974944.52	789958.18	1.56	1.56	BB	2.5001
80	6.715	1999944.22	799959.91	1.58	1.58	BB	2.5001
81	6.789	2024956.22	809957.30	1.60	1.60	BB	2.5001
82	6.880	2049963.62	819959.62	1.62	1.62	BB	2.5001
83	6.963	2074944.02	829957.65	1.64	1.64	BB	2.5001
84	7.046	2099938.03	839957.06	1.66	1.66	BB	2.5001
85	7.123	2124947.23	849955.29	1.68	1.68	BB	2.5001
86	7.220	2149955.83	861483.67	1.70	1.70	BB	2.4956
87	7.295	2174952.43	869958.12	1.72	1.72	BB	2.5001
88	7.386	2199939.93	879956.57	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	7.718	2299935.73	919954.49	1.82	1.82	BB	2.5001
93	7.795	2324950.23	929953.51	1.84	1.84	BB	2.5001
94	7.881	2349957.23	939953.49	1.86	1.86	BB	2.5001
95	7.972	2374944.93	1.01e+06	1.88	1.88	BB	2.3595
96	8.054	2399932.93	959952.98	1.90	1.90	BB	2.5001
97	8.135	2424940.93	969949.84	1.92	1.92	BB	2.5001
98	8.209	2449956.73	979951.48	1.94	1.94	BB	2.5001
99	8.298	2474944.83	989949.84	1.96	1.96	BB	2.5001
100	8.379	2499940.18	999952.34	1.98	1.98	BB	2.5001

1.26e+08 5.08e+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-24 3:21:13 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  
 Sample Amount : 1.0000  
 Data Acquisition Time : 01-Jan-80 12:00:01 AM  
 Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 1

Raw Data File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 3dat-SS420x.raw  
 Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 3dat-SS420x.rst [Editing in Progress]  
 Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 3dat-SS420x.raw  
 Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 3dat-SS420x.rst [Editing in Progress]  
 Calib Method : E:\Calibration\Calibration QA HPL I 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 3dat-SS420x.rst [Editing in Progress]  
 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	0.816	30028.48	8572.86	0.15	0.15	BB 3.5028
2	1.063	16146.02	4955.97	0.08	0.08	BB 3.2579
3	1.251	239893.85	54127.89	1.21	1.21	BB 4.4320
4	1.481	6957.15	3189.61	0.04	0.04	BB 2.1812
5	1.642	317252.92	78206.12	1.60	1.60	BV 4.0566
6	1.783	1264626.26	338316.70	6.37	6.37	VB 3.7380
7	2.117	73179.02	21464.61	0.37	0.37	BB 3.4093
8	2.294	11729.50	5107.78	0.06	0.06	BB 2.2964
9	2.583	3205944.81	985243.14	16.15	16.15	BV 3.2540
10	2.732	736843.89	208870.02	3.71	3.71	VB 3.5278
11	3.079	34998.66	11516.75	0.18	0.18	BB 3.0389
12	3.385	1012797.19	341362.76	5.10	5.10	BB 2.9669
13	3.654	262028.39	79218.69	1.32	1.32	BV 3.3077
14	3.753	96286.47	27297.65	0.48	0.48	VV 3.5273
15	3.855	1262692.44	368387.51	6.36	6.36	VE 3.4276
16	3.953	100547.77	32900.12	0.51	0.51	EV 3.0562
17	4.113	1024569.01	275385.94	5.16	5.16	VE 3.7205
18	4.234	36364.97	11606.39	0.18	0.18	EB 3.1332
19	4.614	1637999.14	436244.00	8.25	8.25	BE 3.7548
20	4.797	61668.85	16416.08	0.31	0.31	EV 3.7566
21	4.933	1103776.89	323145.66	5.56	5.56	VV 3.4157
22	5.129	3484302.79	792493.98	17.55	17.55	VV 4.3966
23	5.279	96887.45	26319.41	0.49	0.49	VV 3.6812
24	5.373	75294.67	20847.88	0.38	0.38	VV 3.6116
25	5.519	2103875.09	508344.01	10.60	10.60	VV 4.1387
26	5.689	126779.57	33676.74	0.64	0.64	VB 3.7646
27	5.911	20302.15	6845.74	0.10	0.10	BB 2.9657
28	6.398	655346.16	181450.75	3.30	3.30	BV 3.6117
29	6.604	177376.86	50524.92	0.89	0.89	VB 3.5107
30	7.037	107577.92	29737.55	0.54	0.54	BB 3.6176
31	7.375	192377.99	54127.06	0.97	0.97	BV 3.5542
32	7.496	114192.46	27874.17	0.58	0.58	VV 4.0967
33	7.641	23849.60	6839.42	0.12	0.12	VB 3.4871
34	8.060	20086.11	5350.81	0.10	0.10	BB 3.7538
35	8.280	104478.34	27187.61	0.53	0.53	BV 3.8429
36	8.434	13844.79	4086.97	0.07	0.07	VB 3.3875
19852903.62		5.41e+06	100.00	100.00		

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

Software Version : 6.3.2.0646 Date : 31-Mar-24 3:16:24 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  
 Sample Amount : 1.0000  
 Data Acquisition Time : 01-Jan-80 12:00:01 AM  
 Area Reject : 0.000000  
 Dilution Factor : 1.00  
 Cycle : 1

Raw Data File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 2dat-SS420x.raw  
 Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 2dat-SS420x.rst [Editing in Progress]  
 Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 2dat-SS420x.raw  
 Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 2dat-SS420x.rst [Editing in Progress]  
 Calib Method : E:\Calibration\Calibration QA HPL I 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 2dat-SS420x.rst [Editing in Progress]  
 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	51000865.31	499992.91	33.33	33.33	MM 102.0032
2	5.120	1.02e+08	999997.88	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  
 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 : 01-Jan-80 12:00:01 AM

Date : 31-Mar-24 2:37:56 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:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 1dat-SS420x.raw  
 Result File : D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 1dat-SS420x.rst [Editing in Progress]  
 Inst Method : DEFAULT from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 1dat-SS420x.raw  
 Proc Method : E:\Calibra from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 1dat-SS420x.rst [Editing in Progress]  
 Calib Method : E:\Calibration\Calibration QA HPL 1 23 2016\Method\Software Cal from D:\DATA\DATA\PMOQ2023\Software Calibration\Software Calibration 1dat-SS420x.rst [Editing in Progress]  
 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	489086.85	31252.72	1.59	1.59	BB 15.6494
2	1.897	978247.20	62493.55	3.17	3.17	BB 15.6536
3	3.318	1957326.85	124988.33	6.35	6.35	BB 15.6601
4	4.738	3915645.14	250001.18	12.70	12.70	BB 15.6625
5	6.159	7832807.33	499999.35	25.40	25.40	BB 15.6656
6	7.580	15667284.11	999990.93	50.80	50.80	BB 15.6674

30840397.48 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

## Reference Certificate Index



## Certificate of Analysis 211-FID

### Product Description:

Product Name:	GC FID Standards 1-5	Composition:	n-Tetradecane and n-Hexadecane mixtures in Hexane
Batch Number:	211-FID	Part Code:	VSOL-GC100/5

### Certified Values:

Standard	n-Tetradecane Concentration (µg/mL)	n-Hexadecane Concentration (µg/mL)
GC FID Standard 1	0.0	252.2
GC FID Standard 2	20.3	252.2
GC FID Standard 3	101.4	252.2
GC FID Standard 4	404.6	252.2
GC FID Standard 5	807.1	252.2

### 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 1 µL to 1.5 mL.

### 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:

#### a) 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.

#### b) GC Instrumentation Calibration

The GC equipment is qualified routinely, using appropriate certified test and measuring equipment. The GC system performance is further verified 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.

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## Certificate of Analysis 211-FID

### 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:

Expiry date:	31 August 2025
Certifying Officer:	Neil Gowans BSc (Hons), Quality Manager
Issue Date:	15 August 2022

### Contact Details:

V:KIT Ltd  
Congleton, CW12 1LB  
UNITED KINGDOM  
info@v-kit.com  
www.v-kit.com

#### 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.

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## Certificate of Calibration Simulated Calibration of Thermometer

Issued by V:KIT Ltd

Certificate No: 4078-DTM

Issue Date: 13-Jan-2023

### V:KIT Ltd

16 John Bradshaw Court  
Alexandria Way  
Congleton,  
Cheshire, CW12 1LB, UK  
Tel: +44 (0) 1260 591385  
www.v-kit.com - info@v-kit.com

Customer: MESHOTEC CO., LTD.  
Address: 82 Moo18, Buengkamproi  
Lamlukka, Pathum thani 12150  
Thailand

Customer PO No.: PO2023-01-001

Date of Receipt: 07-Dec-2022

Calibration performed by: Daniel John

Calibration Date: 13-Jan-2023

Unit Under Test: 2-Ch Thermometer Type K

Serial Number: 1531-0234

Manufacturer: V:KIT Ltd

Model: VKIT-1531

Equipment Condition: Acceptable

Calibration Range: 0 - 400°C

Ambient Temperature: 20.6°C

Expiry Date: 12-Jan-2024

### 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") reported in this certificate.

### Test Equipment Used

Calibration Equipment:	Identification:	Certificate ID:	Calibration Date:	Expiry Date:
Signal Calibrator	Ametek 1371098	01661	25-Nov-2021	24-Nov-2023
Digital Thermometer	Ametek 1293031	01668	30-Nov-2021	29-Nov-2023
Temperature Probe	Ametek 585197-02	01668	30-Nov-2021	29-Nov-2023

### Calibration Results ("As Left")

T1	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	100.1	0.1	± 1.0	0.47
	250.0	250.0	0.0	± 1.4	0.47
	400.0	399.8	0.2	± 1.9	0.47
T2	Applied Temp. °C	Indicated Temp. °C	Deviation °C	Specification °C	Uncertainty °C
	0.0	0.0	0.0	± 0.7	0.47
	25.0	25.0	0.0	± 0.7	0.47
	50.0	50.0	0.0	± 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	399.7	0.3	± 1.9	0.47

Approved By: Tom Gowans

Approval Date: 13-Jan-2023



## Certificate of Calibration Gas Flowmeter

Issued by V:KIT Ltd

Certificate No: 4075-GFM

Issue Date: 20-Dec-2022

### V:KIT Ltd

16 John Bradshaw Court  
Alexandria Way  
Congleton  
Cheshire, CW12 1LB, UK  
Tel: +44 (0) 1260 591385  
www.v-kit.com - info@v-kit.com

Customer: MESHOTEC CO., LTD.

Address: 82 Moo18, Buengkamproi  
Lamlukka, Pathum thani 12150  
Thailand

Customer PO No.: PO2023-01-001

Date of Receipt: 07-Dec-2022

Calibration performed by: Tom Gowans

Calibration Date: 20-Dec-2022

Manufacturer: V:KIT Ltd

Model: VKIT-GFM3

Equipment Condition: Acceptable

Serial Number: 950577

Calibration Range: 0 - 500 mL/min

Test Media: Nitrogen

Reference Temperature: 0.0 °C

Expiry Date: 19-Dec-2023

### Calibration Method

The flowmeter was tested and the indicated flow readings compared against reference flow rates using mass flow standards calibrated in an ISO 17025 accredited laboratory.

### Test Equipment Used

Calibration Equipment:	Identification:	Certificate ID:	Calibration Date:	Expiry Date:
High Flow controller	Bronkhorst F-201CV s/n: M21209881A	BHTG28/5934430	05-May-2021	04-May-2023
Low Flow controller	Bronkhorst F-201CV s/n: M21209881B	BHTG74/5949355	18-May-2021	17-May-2023
Digital Thermometer	Ametek 1293031	01668	30-Nov-2021	29-Nov-2023
Temperature Probe	Ametek 585197-02	01668	30-Nov-2021	29-Nov-2023

### Calibration Results ("As Left")

Reference Flow (mL/min)	Indicated Flow (mL/min)	Flow Accuracy (%)
0.0	0.0	0.0
10.0	9.9	-1.0
50.0	50.5	1.0
100.0	100.4	0.4
200.0	200.6	0.3
400.0	400.9	0.2

Limit: Flow Accuracy ≤ 3.0 %

Uncertainty of Measurement: ± 0.4 mL/min or 2.5 %, whichever is greater

Approved By: Tom Gowans

Approval Date: 20-Dec-2022



## Certificate of Calibration Calibration of Digital Pressure Meter

Issued by V:KIT Ltd

Certificate No: 4071-DMA

Issue Date: 24-Jan-2023

### V:KIT Ltd

16 John Bradshaw Court  
Alexandria Way  
Congleton  
Cheshire, CW12 1LB, UK  
Tel: +44 (0) 1250 591385  
www.v-kit.com - info@v-kit.com

Customer: MESHCO TECH CO., LTD.  
Address: 82 Moo18, Buengkamproi  
Lamlukka, Pathum thani 12150  
Thailand

Customer PO No.: PO2023-01-001

Unit Under Test: Pressure Meter for GC Inlet  
Manufacturer: V:KIT Ltd  
Model: VKIT-DMA2  
Equipment Condition: New  
Serial Number: DMA-0543

Calibration performed by: Tom Gowans

Calibration Date: 24-Jan-2023

Expiry Date: 23-Jan-2024

### Calibration Method

The Unit Under Test was calibrated against measuring equipment whose values are traceable to recognised National Standards using QMS procedure 06.09.007.

### Test Equipment Used

Calibration Equipment:	Identification:	Certification/ Calibration Details:	Expiry:
Pressure Source	CN10635094	3959-EPC	02-Nov-2023

### Calibration Results ("As Left")

Actual Pressure (psi)	UUT Indicated Pressure (psi)	Absolute Deviation (psi)	Acceptance Criteria (psi)
0.0	0.0	0.0	0.0
10.0	10.0	0.0	0.1
15.0	14.9	0.1	0.2
25.0	24.9	0.1	0.3
50.0	49.9	0.1	0.5
80.0	80.2	0.2	0.8

Approved By: Tom Gowans

Approval Date: 24-Jan-2023

## Chromatography Data System Validator Certificate of Calibration

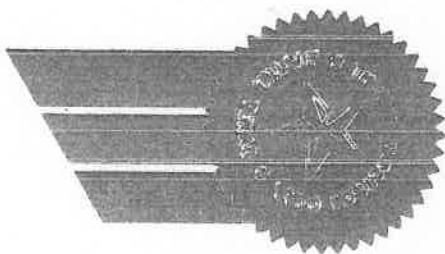
### Validator™ Chromatography Data System Validator

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

# 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

The Certification Body  
of TÜV SÜD Asia Pacific TÜV SÜD Group  
certifies that



**MESH COTECH CO., LTD.**

82 Moo 18, Buengkamproi, Lamlukka, Pathumthani 12150, Thailand

has established and applies  
a Quality Management System for

Trading, Calibration and Maintenance Service of  
Chromatography and Analytical Instruments  
(HPLC, LC-MS, GC, GC-MS, IC and Spectrophotometer).

An audit was performed, Report No. 721243408.

Proof has been furnished that the requirements according to

**ISO 9001:2015**

are fulfilled. The certificate is valid from 2023-05-11 until **2026-05-10**.

Certificate Registration No.: TUV100 11 4870

2023-05-11



by the Joint Accreditation System  
Asia and New Zealand, IAF  
www.jas-asia.org/register

TÜV SÜD Korea Ltd. • 29F, Two IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu • Seoul, 07326 • Korea

TUV®



## 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

Alcumus ISOQAR Limited, Cobra Court, 1 Blackmore Road, Stretford, Manchester M32 0QY.

T: 0161 865 3699 E: [isoqarenquiries@alcumus.com](mailto:isoqarenquiries@alcumus.com) W: [alcumus.com/isoqar](http://alcumus.com/isoqar)

This certificate is the property of Alcumus ISOQAR and must be returned on request.