

ภาคผนวก จ

สำเนาเอกสารรับรองเครื่องมือการตรวจวัด



77-715TR

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (NISTR)

Request No. 21-64/0312

MTC No. EEL.BP. 570264

CALIBRATION CERTIFICATE

Submitted by : Faxlab Co., Ltd.
Address : 540, 540/1 Soi Bangkhue 7, Bangkhue, Rangkhue, Bangkok 10160 Thailand.
Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre,
: Soi 1 C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :
Description : Sound Level Calibrator
Manufacturer : Brüel&Kjær
Model : 4230
Serial No. : 1351075

Ambient Environment
Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325 ± 1.500) kPa

Standards used : 1. Digital Function Synthesizer NF Electronic DE-193A S/N 122037.

2. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484
3. Programmable Attenuator Tanigawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N NY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0659001.
6. Audio Analyzer Kithley 2015-P S/N 4106495.
7. Condenser Microphone Brüel&Kjær 4180 S/N 2869871.

Calibration Procedure: CIP-102-04 based on IEC 60942:2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 10 Feb. 2021

Date of Calibration : 18 Feb. 2021

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Head Office

Office/Laboratory

Office

EMBL MTC 002 Rev.2



77-715TR

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (NISTR)

Request No. 21-64/0312

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The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

Nominal Output of Unit Under Test = 94 dB re 20µPa at 1000 Hz

Acoustic Output in dB re 20µPa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class I
1/2 inch Brüel&Kjær 4180	93.78	-0.22	± 0.10	±0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class I
1/2 inch Brüel&Kjær 4180	998.3	-1.7	± 1.5	±1.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class I
1/2 inch Brüel&Kjær 4180	0.68	± 0.50	±3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by

(Mr. Tawikant Iamsaunon)

Approved by :



Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 18 Feb. 2021

Date of Issue : 19 Feb. 2021

Ref : 2011264021000592001

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End of Certificate



CHECK LIST

CUSTOMER NAME	M GREEN GROUP COMPANY LIMITED (บริษัท เมาท์ กรุ๊ป จำกัด)
EQUIPMENT NAME	CO Analyzer
MANUFACTURER	HORIBA
MODEL	APMA-370
SERIAL NO.	BAK11GRC

TEST VALUES		
NO.	CO Analyzer (APMA-370)	UNIT
1	Signal (NAIR)	mV
2	Signal (COMP)	mV
3	CELL	°C, Standard Value: Ambient temperature +1°C (±0.5°C)
4	PUMP	kPa
5	JAMBERT	kPa
6	SAMPLER	L/min (1 L/min to 1 L/min)
7	OVER FLOW	L/min (1.2 L/min more)
8	DC 24 V	V (24 V ± 0.5 V)
9	DC 5 V	V (5 V ± 0.5 V)
10	Sample Reading	PPM
11	Zero	PPM
12	Span	PPM

Remark: Reference: EX-SM-100-5B, "Ambient CO Monitor APMA-370 Operation Manual" Page: 44B
(Ambient temperature = 5°C to 40°C.)

ผลการตรวจสอบ

- พบค่าในระบอบเครื่องอย่างมีค่า Cal ไม่เกิน

รายละเอียดการดำเนินการ

ทำการไล่ค่าจากกระเป๋าสีดำขึ้น, เปลี่ยน Filter ใหม่แล้ว, ทำ Calibration Zero/Span, Multipoint, เป็น Demonstration

ผลการดำเนินการ

เรียบร้อยแล้ว มีใบส่งมอบเครื่องวัดค่าแล้ว



CALIBRATED BY: [Redacted] DATE: 15/10/64
CHECKED BY: [Redacted] DATE: 15/10/64

ข้อมูลทางเทคนิคด้านเทคนิคเพิ่มเติม: เจ้าหน้าที่ศูนย์บริการลูกค้า, โทร 02-868-1246, E-Mail: info@nactech-testing.com
เลขที่: 4-15.67/35-30 สมบูรณ์แบบ 7.71 แอร์โรมิเตอร์ เซนเซอร์อุณหภูมิ 10000 Pa หรือ 868-0812-13 โทร 02-868-1246

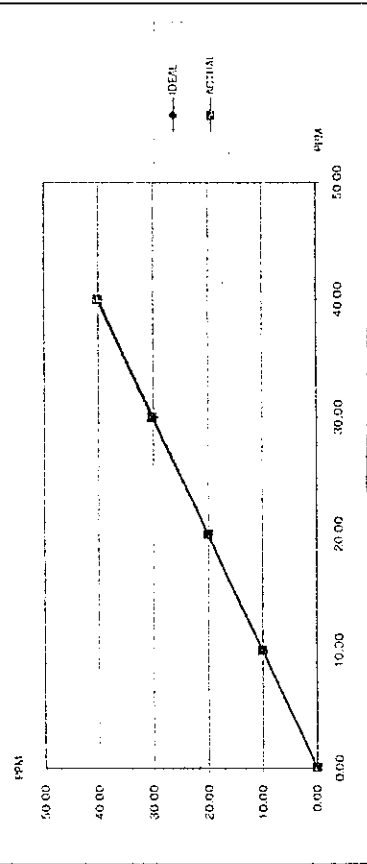


TEST REPORT

CUSTOMER NAME	M GREEN GROUP COMPANY LIMITED (บริษัท เมาท์ กรุ๊ป จำกัด)
EQUIPMENT NAME	CO Analyzer
MANUFACTURER	HORIBA
MODEL	APMA-370
SERIAL NO.	BAK11GRC
STANDARD GAS CONCENTRATION (PPM)	4533 PPM
CYLINDER NO.	CC734373
CYLINDER PRESSURE (PSI)	1,000 PSI
CERTIFIED DATE	12/05/2020
EXPIRED DATE	12/05/2028
CERTIFIED BY	AIRGAS

TEST RESULTS

POINT NO	CALIBRATION RESULTS		
	IDEAL	ACTUAL	%ERROR
ZERO	0.00	0.0100	0.01
1	10.00	10.0100	0.0
2	20.00	20.0800	0.1
3	30.00	30.2300	0.2
4	40.00	40.2100	0.2
AVERAGE (%)			0.45



CALIBRATED BY: [Redacted] DATE: 15/10/64
CHECKED BY: [Redacted] DATE: 15/10/64

ข้อมูลทางเทคนิคด้านเทคนิคเพิ่มเติม: เจ้าหน้าที่ศูนย์บริการลูกค้า, โทร 02-868-1246, E-Mail: info@nactech-testing.com
เลขที่: 4-15.67/35-30 สมบูรณ์แบบ 7.71 แอร์โรมิเตอร์ เซนเซอร์อุณหภูมิ 10000 Pa หรือ 868-0812-13 โทร 02-868-1246



CHECK LIST

CUSTOMER NAME	M GREEN GROUP COMPANY LIMITED (บริษัท เหม กรีน กรุ๊ป จำกัด)		
EQUIPMENT NAME	SO ₂ Analyzer		
MANUFACTURER	HORIBA	MODEL : APSA-370	SERIAL NO. : G0KURMX

TEST VALUES			
NO.	Ambient SO ₂ Monitor	UNIT	BEFORE
1	SIGNAL	mV (Voltage of the measured SO ₂ Value)	11.60
2	LAMP	mV (200mV to 1200 mV)	876.20
3	CELL	°C (Ambient Ambient temperature ± (5°C to 15°C))	33.70
4	PUMP	kPa (65 kPa or less)	44.30
5	AMBIENT	kPa	101.20
6	SAMPLE	L/min (0.6 L/min to 1.0 L/min)	0.60
7	DC 24V	V (24 V ± 0.5 V)	23.60
8	DC 5V	V (5 V ± 0.5 V)	5.00
9	SAMPLE SO ₂ Reading	PPB	5.61
10	Zero	PPB	-1.93
11	Span	PPB	253.17

หมายเหตุ : Indicators EX-FM-010-556, Ambient SO₂ Monitor APSA-370 Operation Manual Page # 78
(Ambient temperature = 5°C to 40°C)

ผลการตรวจพบ

พบ : ในระหว่างการติดตั้งเครื่อง แดมปีเคาท์ (Color Glass Filter) สามารถ ขยับและเลื่อนภาพให้เข้ากันได้กับ Cal เครื่องได้

รายละเอียดการติดตั้ง

ใช้ทาบได้ทั้งหมด (Color Glass Filter) 1 EA , ที่ Calibration Zero/Span , Multipoint , ใช้ Diagnostics

ผลการติดตั้ง

ใช้ทาบได้ทั้งหมด สามารถดำเนินการตรวจสอบได้



CALIBRATED BY : [Redacted] DATE : 18/10/64

CHECKED BY : [Redacted] DATE : 18/10/64

ผลการตรวจพบ : ตรวจพบ : ในระหว่างการติดตั้งเครื่อง แดมปีเคาท์ (Color Glass Filter) สามารถ ขยับและเลื่อนภาพให้เข้ากันได้กับ Cal เครื่องได้

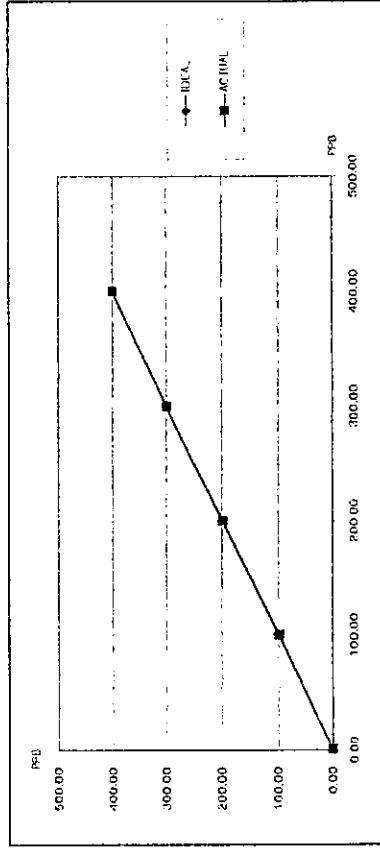


TEST REPORT

CUSTOMER NAME	M GREEN GROUP COMPANY LIMITED (บริษัท เหม กรีน กรุ๊ป จำกัด)		
EQUIPMENT NAME	SO ₂ Analyzer		
MANUFACTURER	HORIBA	MODEL : APSA-370	SERIAL NO. : G0KURMX
STANDARD GAS CONCENTRATION (PPM)	53.20 PPM		CYLINDER NO. : CC734373
CYLINDER PRESSURE (PSI) : 1,000 PSI			CERTIFIED DATE : 12/05/2020
CERTIFIED BY : AIRGAS			EXPIRED DATE : 12/05/2024

TEST RESULTS

POINT NO	TEST RESULTS		
	IDEAL	ACTUAL	%ERROR
ZERO	0.00	0.230	0.23
1	100.00	98.490	-1.51
2	200.00	198.490	-0.75
3	300.00	298.490	-0.17
4	400.00	400.120	0.03
AVERAGE (%)			0.60



CALIBRATED BY : [Redacted] DATE : 18/10/64

CHECKED BY : [Redacted] DATE : 18/10/64

ผลการตรวจพบ : ตรวจพบ : ในระหว่างการติดตั้งเครื่อง แดมปีเคาท์ (Color Glass Filter) สามารถ ขยับและเลื่อนภาพให้เข้ากันได้กับ Cal เครื่องได้



CHECK LIST

CUSTOMER NAME	M. GREEN GROUP COMPANY LIMITED (บริษัท กรีน กรุ๊ป จำกัด)
EQUIPMENT NAME	NO _x Analyzer
MANUFACTURER	HORIBA
MODEL	APNA-370
SERIAL NO.	RSJHKG73

TEST VALUES				
NO.	NO _x Analyzer (APNA-370)	UNIT	BEFORE	AFTER
1	Signal (NO)	mV	12.600	7.700
2	Signal (NO ₂)	mV	10.300	12.300
3	Temp (°C, Standard Value, Ambient to 10 ± 0.2°C, 15°C)	Temp. °C	42.400	43.600
4	Pressure (kPa, Standard Value (Ambient 101.3 ± 1.0 kPa ± 0.1))	Pressure kPa	111.400	111.900
5	AMBIENT	ppb	101.200	100.800
6	Span (1.1 L/min ± 0.3 L/min)	L/min (1.1 L/min ± 0.3 L/min)	23.700	23.780
7	DC 24 V	V (24 V ± 0.5 V)	5.000	5.000
8	DC 5 V	V (5 V ± 0.5 V)	5.000	5.000
9	Spanning NO Reading	PPB	10.640	8.180
10	Spanning NO ₂ Reading	PPB	9.980	7.120
11	Spanning NO ₂ Reading	PPB	20.240	9.980
12	Zero (NO)	PPB	2.060	0.170
13	Span (NO)	PPB	382.270	400.240
14	Zero (NO ₂)	PPB	2.940	0.130
15	Span (NO ₂)	PPB	236.130	400.450

NO_x analyzer (APNA-370) (NO_x Analyzer) (APNA-370) (Ambient NO_x Monitor) (APNA-370) (Ambient NO_x Monitor) (APNA-370) (Page 448)

(Ambient Temperature: 5°C to 40°C)

ผลการตรวจสอบ

พบค่าผิดปกติเล็กน้อย ที่ค่า Gas Gain

รายละเอียดการดำเนินการ

- ตรวจเช็คค่าผิดปกติเล็กน้อย ที่ค่า Gas Gain, ทำ Calibration Zero Span, Multipoint, Gas Dynamics

ผลการดำเนินการ

เป็นไปตามข้อกำหนดการใช้งาน

CALIBRATED BY:	DATE: 15/10/64
CHECKED BY:	DATE: 15/10/64

ผลการตรวจสอบตามข้อกำหนดการใช้งาน: เป็นไปตามข้อกำหนดการใช้งาน (NO_x Analyzer) (APNA-370) (Ambient NO_x Monitor) (APNA-370) (Page 448)

วันที่: 15/10/64 เวลา: 09:00 น. สถานที่: ห้องปฏิบัติการ (NO_x Analyzer) (APNA-370) (Ambient NO_x Monitor) (APNA-370) (Page 448)

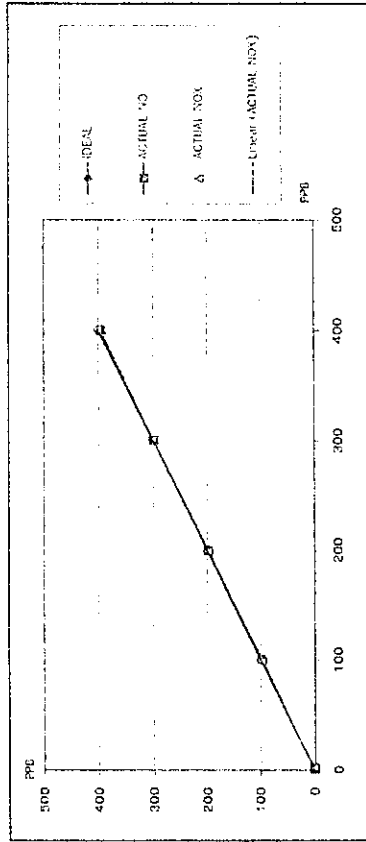


TEST REPORT

CUSTOMER NAME	M. GREEN GROUP COMPANY LIMITED (บริษัท กรีน กรุ๊ป จำกัด)
EQUIPMENT NAME	NO _x Analyzer
MANUFACTURER	HORIBA
MODEL	APNA-370
SERIAL NO.	RSJHKG73
STANDARD GAS CONCENTRATION (PPM)	50.15 PPM
CYLINDER NO.	CCY34373
CYLINDER PRESSURE (PSI)	1,700 PSI
CERTIFIED DATE	12/05/2020
EXPIRED DATE	12/05/2028

TEST RESULTS

POINT NO.	IDEAL	ACTUAL NO.	%ERROR NO.	ACTUAL NO.	%ERROR NO.	ACTUAL NO.	%ERROR NO.
ZERO	0.00	0.12	0.12	0.13	0.13	-	-
1	100.00	98.80	-1.17	99.20	-0.80	-0.80	-0.80
2	200.00	199.02	-0.98	199.40	-0.60	-0.60	-0.60
3	300.00	298.96	-0.04	300.10	0.10	0.03	0.03
4	400.00	400.24	0.24	400.45	0.45	0.11	0.11
AVERAGE (%)				-0.40			-0.24



CALIBRATED BY:

CHECKED BY:

ผลการตรวจสอบตามข้อกำหนดการใช้งาน: เป็นไปตามข้อกำหนดการใช้งาน (NO_x Analyzer) (APNA-370) (Ambient NO_x Monitor) (APNA-370) (Page 448)



Certificate of Calibration

Page : 1 of 2

Certificate No. : 64-200274-1

Submitted by :

M Green Group Co., Ltd

188-46 Wisetwinnakorn 25, Pracha-Ud Rd., Bangkro, Bangkok 10140 Thailand

Equipment :

Electronic Balance

Manufacturer : SHIMADZU Model : AP225WD

Serial No. : D316300690

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

Environment :

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

Ambient Temperature : (26.1 to 26.3) °C

Relative Humidity : (64.0 to 64.4) %

Air Pressure : (1000.0) mbar

Date of Received :

20 September 2021

Date of Calibration :

20 September 2021

Date of Issue :

23 September 2021

Calibrated by :

Akaradiah Thipphalai

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 :

National Institute of Metrology (London) (NIMT)

12614/2024

17 Nov 2021

002264101

Approved by :

(Signature: Pong Jaeng)

Laboratory Manager

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 Calibratech Co., Ltd.



Certificate of Calibration

Page : 2 of 2

Certificate No. : 64-200274-1

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	-0.00006	0.000014
0.01	0.00009	0.000016
0.1	0.00001	0.000018
1	0.00000	0.000027
10	0.00000	0.000053
20	0.00002	0.000071
50	0.00000	0.00011
100	0.00013	0.00020
150	0.00002	0.00038
200	0.00001	0.00058

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

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



Eccentric error

Load test

50 g

A B C D E

0.00005 0.00001 0.00005 -0.00004 0.00000 g

Repeatability

Load test

20g

g

Stable

0.000052

g

-0.000



CAL

Calibratech Co.,Ltd.

7/90-7 Moo 2, Sukhumvit Road, Banggoed, Pakkred, Nonthaburi 11120
Tel (02) 964-6211 Fax (02) 964-5155 e-mail: calibratech.co@yahoo.com, calibratech.co@calibratech.co



ACCREDITED
CALIBRATION ISO 9000

Certificate of Calibration

Certificate No. : 64-210435-1

Page : 1 of 2

Submitted by :

M Green Group Co.,Ltd

188 46 Wiatesukhachon 25, Pracha Urd Rd., Bangkok Bangkok 10140 Thailand

Equipment :

Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 1 kg

ID No. : 63-210391-1

Assumed density of weight : 7950 kg / m³

Assumed Air density : 1.2 kg / m³

Ambient Temperature : (20 ± 2) ° C

Relative Humidity : (50 ± 10) %

Air Pressure : 1006.7 mbar

Date of Received : 20 September 2021

Date of Calibration : 28 September 2021

Date of Issue : 28 September 2021

Calibrated by : Wanchai Swaphong

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

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

Standard Weights

ID No

Cert. No.

Due Date

Traceability

E 210435-1

AN0060-19

27 Mar 2022

National Institute of Metrology (Thailand) (NIMT)

Approved by

(Signature: Pongthong)
Laboratory Manager

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 Calibratech Co.,Ltd.



CAL-F003-03

CAL

Calibratech Co.,Ltd.

7/90-7 Moo 2, Sukhumvit Road, Banggoed, Pakkred, Nonthaburi 11120
Tel (02) 964-6211 Fax (02) 964-5155 e-mail: calibratech.co@yahoo.com, calibratech.co@calibratech.co

Certificate of Calibration

Certificate No. : 64-210435-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

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

This result of calibration was found accurate as shown in 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-F003-03

CAL

Calibratech Co., Ltd.

106-7 Moo 2, Subprachin 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120
Tel: 02-564-4211 Fax: 02-564-5155 e-mail: calibratech.co.th@yahoo.com, calibratech.co.th@gmail.com



MSC-TS-1515-17025
CALIBRATION 0030

Certificate of Calibration

Page : 1 of 2

Certificate No. : 64-210435-2

Submitted by : M Green Group Co., Ltd.

18846 Wisetukhukhon 25, Pracha Uthit Rd., Thungkru Bangkok 10140 Thailand

Equipment : Weight
Manufacturer : N/A Material : Stainless Steel

Weight size : 100 g

ID No. : 63-210391-2

Assumed density of weight : 7950 kg / m³
Assumed Air density : 1.2 kg / m³

Environment :
Ambient Temperature : (20 ± 2) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1006.6 mbar

Date of Received : 20 September 2021

Date of Calibration : 28 September 2021

Date of Issue : 28 September 2021

Calibrated by : Wutichai Swaiphong

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
63-11-1-2425	MM-0006-19	27 Mar 2022	National Institute of Metrology (Thailand), (GUM) (1)

Approved
(Signature Promthong)
Laboratory Manager

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 Calibratech Co., Ltd.



CAL-F0031-03

CAL

Calibratech Co., Ltd.

106-7 Moo 2, Subprachin 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120
Tel: 02-564-4211 Fax: 02-564-5155 e-mail: calibratech.co.th@yahoo.com, calibratech.co.th@gmail.com

Certificate of Calibration

Certificate No. : 64-210435-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

No.	Nominal Value	Id Mark	Conventional mass Value	Measuring Uncertainty
1	100 g	none	-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%.

-e00-

Approved

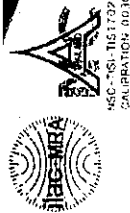


CAL-F0031-03

CAL

Calibratech Co., Ltd.

106/7 Moo 2, Subhachaban 3 Rd., Bangpaed, Pakkret, Nonthaburi 11120
Tel: 02-964-0211 Fax: 02-964-5155 e-mail: calibratech.co@yahoo.com, calibratech.co.th@gmail.com



ISO 9001:2015
ISO 17025:2017
CAL-PK031-03

Certificate of Calibration

Certificate No. : 64-210435-3

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

388-46 Wisetachakarn 25, Pracha Utd Rd., Thungru Bangkok, 10140 Thailand

Equipment :

Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 200 g

ID No. : 64-210391-3

Assumed density of weight : 7950 kg/m³

Assumed Air density : 1.2 kg/m³

Environment :

Ambient Temperature : (20 ± 2) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1006.5 mbar

Date of Received :

20 September 2021

Date of Calibration :

28 September 2021

Date of Issue :

28 September 2021

Calibrated by :

Wuttichai Swarppong

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

64-210435-3

MM-000019

27 Mar 2022

National Institute of Metrology (Thailand) (NIMT)

Approved by

U. Srachan Preehthong, J
Laboratory Manager

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 Calibratech Co., Ltd.



CAL-PK031-03

CAL

Calibratech Co., Ltd.

106/7 Moo 2, Subhachaban 3 Rd., Bangpaed, Pakkret, Nonthaburi 11120
Tel: 02-964-0211 Fax: 02-964-5155 e-mail: calibratech.co@yahoo.com, calibratech.co.th@gmail.com

Certificate of Calibration

Certificate No. : 64-210435-3

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

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

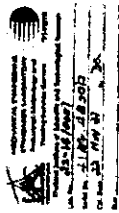
This result of calibration was found accurate as shown on date and place of calibration only

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%.

~900~



CAL-PK031-03



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

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

Request No.23-65/0081

MTC.No.23-65/0081

Number of page(s) 2

CALIBRATION CERTIFICATE

Nomenclature : MASS FLOWMETER

Manufacturer : TSI

Serial No.: 41461443012

Model : 4146

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

Subdivision : 0.001 l/min

Submitted by : M GREEN GROUP CO.,LTD

188/46, Pracha-Uthit Rd.,

Thungkru, Bangkok 10140, Thailand.

Received date : 4 November 2021 Condition of measured item : Normal

Calibration date : 22 November 2021

Standard :

Standard	Certificate No.	Date due	Traceability
RTD Thermometer	PSL-T 336/63	6-Apr-22	TISTR
Meloid (Pressure) Transducer (UpStream)	MP-0013-21	25-Jun-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 : [Redacted]

Approved by : [Redacted]

(Mr.Terasak Panna)

Director

Mechanical Engineering Standards Laboratory

Ref. 20132664110404535001

Issued Date 22 November 2021

Head Office
TISTR
188/46, Pracha-Uthit Rd.,
Thungkru, Bangkok 10140, Thailand.
Tel: 02-554-1000
Fax: 02-554-1001
E-mail: tistr@tistr.go.th

Official Laboratory
TISTR
188/46, Pracha-Uthit Rd.,
Thungkru, Bangkok 10140, Thailand.
Tel: 02-554-1000
Fax: 02-554-1001
E-mail: tistr@tistr.go.th

Branch Office
TISTR
188/46, Pracha-Uthit Rd.,
Thungkru, Bangkok 10140, Thailand.
Tel: 02-554-1000
Fax: 02-554-1001
E-mail: tistr@tistr.go.th

Page 1 of 1



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

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

Request No.23-65/0081

2/2

MTC.No.23-65/0081

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 (%)
0.055	0.055820	22.475	1006.41	-1.47	1.47
0.107	0.10604	22.384	1006.43	+1.22	1.30
0.204	0.20161	22.308	1006.41	+1.02	1.09
0.307	0.30422	22.260	1006.39	+0.91	1.00
0.409	0.40962	22.218	1006.38	-0.15	1.00
0.505	0.50702	22.167	1006.36	-0.40	0.99
1.021	1.0292	22.174	1006.45	-0.77	0.87
2.014	1.9973	22.417	1006.86	+0.85	0.90
3.003	2.9625	22.416	1007.50	+1.36	0.99

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

The end of calibration certificate.

Page 1 of 1

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	VIBRATION METER
MANUFACTURER	:	N/A
MODEL / TYPE	:	V9000
SERIAL NO.	:	2364
CLID. NO.	:	552102170
JOB CONTROL NO.	:	211022102584

CUSTOMER : PSET ENV'T TECHNOLOGY CO., LTD.

28/63 MOO 1, RAI KHING SUBDISTRICT,
SAMPRAN DISTRICT, NAKHON PATHOM PROVINCE 73210

DATE OF RECEIVED : 22 October 2021

DATE OF ISSUED : 28 October 2021

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

Calibrated By:

Chawit Chongtham

Calibration Engineer

Approved By: _____

Monžkol' Yotsounforn

Authorized Signatory

28 October 2021

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

Certificate No. 021112584

22-1046-160-34

Page 1 of 5



REPORT OF CALIBRATION

FOR

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

ENVIRONMENT CONDITIONS :

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

PROCEDURE USED :

The 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 Measure Amplifier which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

- 3 Digital Multimeter, Agilent Technologies Model 34401A 5% 1.53604448%.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. 07-0070/21, Due Date 23 July 2022.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0007/21, Due Date 04 January 2022.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied

where the correction factor $k = 3.00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

How have we evaluated ourselves to the "Evaluation of the Librarians of Measurement in Calibration (EA-402 M:2013)"

Certificate No. Q21102584

21-1670-110-29

Page 7 of 3





ilac-MRA

CALIBRATION LABORATORY CO., LTD.

... ..



WILLIAMSON

CONDITION OF CALIBRATION ITEM: GOOD

MEASUREMENT RESULTS: (X) without adjustment () adjustment

CALIBRATION DATA

VELOCITY RESULT

VELOCITY RESULT		Feet point		Mode	SID Reading (mm/s)	DUC Reading (mm/s)	Correction (mm/s)	Uncertainty $\pm 1\%$ of rdg. 1
(mm/s)	(frequency)	(mm/s)	(frequency)					
10	160 Hz			peak	10.00	10.02	-0.02	1.1
20	160 Hz				20.00	19.95	+0.05	3.0
40	160 Hz				40.00	39.12	+0.88	1.0
60	160 Hz				60.00	57.57	+2.13	1.0
80	160 Hz				80.00	77.17	+2.83	1.0
100	160 Hz				100.00	96.05	+3.95	1.0

Note: The Scope of Accredited TISI Certificate No 19C0870655 Issue 1 Page 57 of 111

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

End of Certificate

Certificate No. Q21102584

FD-301 (Rev. 11-27-60)



5. 10. 3



PerkinElmer



PRODUCT CERTIFICATION AND DECLARATION OF CONFORMITY

CLARUS 580 GAS CHROMATOGRAPH

SERIAL NO. 580S17020103

This is to certify that this PerkinElmer product was tested and verified to be in conformance with all applicable quality requirements, including specifications, drawings, calibration, preservation, packing, marking requirements and part identification.

Declaration of EMC & Safety Code Compliance

This PerkinElmer product conforms to the regulations stipulated in the CE Mark requirements for the EMC Directive (2004/108/EC, industrial environment) and the LVD Directive (2006/95/EC):

EN 55011:2007 Group 1, Class A, EMC – RF Characteristics of ISM Equipment
EN 61326-1:2006, EMC – Requirements for Electrical Equipment for Laboratory Use
EN 61000-4-2:1995 – A1:1999 – A2:2001, EMC – Electrostatic Discharge Requirements
EN 61000-4-3:2006, EMC – Radiated Electromagnetic Field Requirements
EN 61000-4-4:2004, EMC – Electrical Fast Transient/Burst Requirements
EN 61000-4-5:2006, EMC – Surge Immunity Requirements
EN 61000-4-6:2007, EMC – Conducted Disturbances (Induced by RF fields) Requirements
EN 61000-4-8:1993 – A1:2001, EMC – Power Frequency Magnetic Field Immunity Requirements
EN 61000-4-11:2004, EMC – Voltage Dips, Short Interruptions, Voltage Variations Requirements
EN 61010-1:2001, Safety Requirements for Electrical Equipment for Laboratory Use

NOTE: The operation of certain types of equipment (e.g., signal generators) may be subject to given restrictions. Please refer to the appropriate information in the respective user documentation.

Declaration of System Validation

The product was found to meet its functional and performance specification prior to shipment. To support this declaration, the following Engineering, Assembly and Test documents are held by PerkinElmer and are available for reference upon request in justified cases and to an appropriate extent:

The Product Description
The Functional Specification
The User Interface Definition

The System Design Documentation
The Source Code Documentation
The Evaluation Documentation

NOTE: PerkinElmer will maintain possession of all documents and controls their reproduction, including parts of them.

The existence of these documents and the procedures used in their production are formal requirements of the PerkinElmer Quality Management System. The integrity of the PerkinElmer Quality Management System is routinely audited, has been certified to ISO 9001 since 1992 and the certification continues in good standing.

998556C de

PerkinElmer, Shelton, CT 06484 USA
[in the EU: PerkinElmer Limited, Chalfont Road, Storr Green, Bucks, HP9 2FX, England]

John C. Bouse
Staff Engineer – Compliance
R&D Shared Services

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.

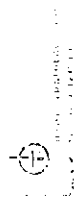
Qualifier's signature / Date

(Mr. Prasittisent Maliphan)

Accepter's signature / Date

(.....)

Performance Qualification Report



VCR-1

Carrier Gas Flow Rate Accuracy Result

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Qualifier: Mascotech 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: 2707-GFM
Expiry Date: April 07, 2022 System ID GC 1

The result reference to raw data on page: 1

Setpoint Flow Rate ml/min.	Observed Flow Rate ml/min.	Deviation ml/min. % Error
1.00	1.04	4.00
2.00	2.05	2.50
3.00	3.12	4.00
4.00	4.13	3.25
5.00	5.19	3.80

Acceptance criteria
of absolute deviation
Evaluate Result

≤ 5%

PASS

Qualifier's signature		Date: 9 / 4 / 2021
Authorised by:		Date: 9 / 4 / 2021

VCR 82 Moo.18, Suevongkarnprai, Lamliukka, Pathum Thani, Thailand 12150
Tel: (6698)970-7090, Fax: (662)540-2541 Email: sales.mascotech@gmail.com

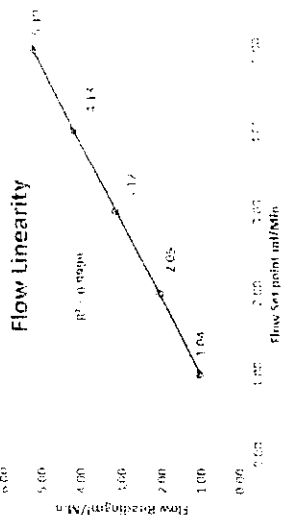
VTR-CARFLOW

Carrier Gas Flow Rate Linearity Result

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO., LTD. Qualifier: MescoTech Co., Ltd.
 Department: LAB Analytical Procedure: VKIT GC.FLOW
 Manufacturer: PERKIN ELMER Model: Clarus 580
 Serial No: 580S17020103 Detector Type: FID
 Standard Batch: N/A Traceable To: 2707-GFM
 Expiry Date: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 1

Flow Rate Setpoint (ml/min)	Flow Rate (ml/min) Reading
1.00	1.04
2.00	2.05
3.00	3.12
4.00	4.13
5.00	5.19
R-Square	
0.9999	



Acceptance criteria of $R^2 > 0.9990$

Evaluate Result **PASS**

Qualifier's signature:

Authorised by:

Date: 4/4/2022

Date: 4/4/2022

VCR 82 Moo.18, Buengkamproi, Lamluaka, Pathum Thani, Thailand 12150
 Tel. (660)970-7090, Fax. (662)540-2541 Email: sales.mesotech@gmail.com

VCR-CARRFLOW

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: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 2

Setpoint Temperature (°C)	Collected 1 Temperature (°C)	Collected 2 Temperature (°C)	Collected 3 Temperature (°C)	Collected 4 Temperature (°C)	Collected 5 Temperature (°C)	Average Temperature (°C)	Deviation of Accuracy Absolute/°C
50.0	50.2	50.4	50.4	50.5	50.5	50.4	0.40
100.0	100.6	100.5	100.4	100.5	100.4	100.5	0.45
150.0	150.7	150.6	150.7	150.5	150.5	150.6	0.60
200.0	199.7	199.6	199.4	199.5	199.5	199.5	0.46
250.0	250.7	250.1	250.0	250.0	250.0	250.2	19.84

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

Evaluate Result **PASS**

Qualifier's signature:

Authorised by:

Date: 4/4/2022

Date: 4/4/2022

VCR 82 Moo.18, Buengkamproi, Lamluaka, Pathum Thani, Thailand 12150
 Tel. (660)970-7090, Fax. (662)540-2541 Email: sales.mesotech@gmail.com

VCR-GCOVENACC

GC Column OverTemperature 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: 2706-DTM
 Expiry Date: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 3

Setpoint Temperature (°C)	Collected Point1 Temperature (°C)	Collected Point2 Temperature (°C)	Collected Point3 Temperature (°C)	Average Temperature (°C)	STDEV Temperature (°C)
100.0	100.6	100.5	100.4	100.48	0.02

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

Evaluate Result **PASS**

Qualifier's signature:		Date: 4/4/2022
Authorised by:		Date: 4/4/2022

VCR
 82 Moo.18, Buengklamproi, Lam Lukka, Pathum Thani, Thailand 12150
 Tel. (66)0270-7090, Fax (66)0270-2541 Email: sales.mescolab@gmail.com
 VCP-GC-TEMPSTAB

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: 2706-DTM
 Expiry Date: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 4

Setpoint Temperature (°C)	Collected Temperature (°C)	Deviation of Accuracy Absolute/°C (Set Temp-Average Temp)
150.0	148.9	1.1
200.0	195.2	4.8
250.0	247.0	3.0

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

Qualifier's signature:		Date: 4/4/2022
Authorised by:		Date: 4/4/2022

VCR
 82 Moo.18, Buengklamproi, Lam Lukka, Pathum Thani, Thailand 12150
 Tel. (66)0270-7090, Fax (66)0270-2541 Email: sales.mescolab@gmail.com
 VCP-INTEMPACC

GC Base Detector 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: 2706-DTM
 Expiry Date: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 5

Setpoint Temperature (°C)	Collected Temperature (°C)	Deviation of Accuracy Absolute/°C (Set Temp-Average Temp)
250.0	245.8	-4.20
300.0	296.8	-3.20

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

Evaluate Result

PASS

Qualifier's signature:		Date: 4/4/2021
Authorised by:		Date: 4/4/2021

VCR 82 Moo.18, Buengklamproi, Lam Lukka, Pathum Thani, Thailand 12150
 Tel. (6608)970-7090, Fax (662)540-2541 Email: sales.mescotech@gmail.com

VCR-DFTTEMPACC

GC Injections Carry Over Result

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO., LTD. Qualifier: Mescotech Co., Ltd.
 Department: LAB Analytical Procedure: VKIT.GC.LINPRC
 Manufacturer: PERKIN ELMER Model: Clarus 580
 Serial No: 580S17020103 Detector Type: FID
 Standard Batch: 177-FID Traceable To: 177-FID
 Expiry Date: April 07, 2022 System ID: GC 1

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

Injections	Peak Retention Time	Area
Carry Over Blank1	1.613	0.000
Standard 0.08% Tetradecane	1.613	325201.05
Carry Over Blank2	1.613	0.000
%Carry Over		0.000

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

Evaluate Result

PASS

Qualifier's signature:		Date: 4/4/2021
Authorised by:		Date: 4/4/2021

VCR 82 Moo.18, Buengklamproi, Lam Lukka, Pathum Thani, Thailand 12150
 Tel. (6608)970-7090, Fax (662)540-2541 Email: sales.mescotech@gmail.com

VCR-GC-CARRYOVER

GC Injections Area Precision Result

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Qualifier: MescoTech Co., Ltd.
 Department: LAB Analytical Procedure: VKIT.GC.LINPRC
 Manufacturer: PERKIN ELMER Model: Clarus 580
 Serial No: 580S17020103 Detector Type: FID
 Standard Batch: 177-FID Traceable To: 177-FID
 Expiry Date: April 07, 2022 System ID: GC 1

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

Number of Injections	Retention Time	Area
Precision 1 0.08% Tetradecane	1.615	299621.14
Precision 2 0.08% Tetradecane	1.615	299416.86
Precision 3 0.08% Tetradecane	1.615	299740.12
Precision 4 0.08% Tetradecane	1.615	299757.64
Precision 5 0.08% Tetradecane	1.612	294478.45
Precision 6 0.08% Tetradecane	1.615	298501.29
Average 0.08% Tetradecane		298585.92
STDEV		2066.19
%RSD		0.69

Acceptance criteria of Precision (%RSD) ≤ 1%

Evaluate Result

PASS

Qualifier's signature:		Date: 7/4/2021
Authorised by:		Date: 7/4/2021

VCR 82 Moo.18, Bueangkomproi, Lam Lukka, Pathum Thani, Thailand 12150
 Tel: (66)89970-7090, Fax: (66)1540-2541 Email: sales-mesrotech@quadr.com
 VCR-CGPRE

GC Injections Retention Precision Result

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO.,LTD. Qualifier: MescoTech Co., Ltd.
 Department: LAB Analytical Procedure: VKIT.GC.LINPRC
 Manufacturer: PERKIN ELMER Model: Clarus 580
 Serial No: 580S17020103 Detector Type: FID
 Standard Batch: 177-FID Traceable To: 177-FID
 Expiry Date: April 07, 2022 System ID: GC 1

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

Number of Injections	Peak Retention time
Precision 1 0.08% Tetradecane	1.615
Precision 2 0.08% Tetradecane	1.615
Precision 3 0.08% Tetradecane	1.615
Precision 4 0.08% Tetradecane	1.615
Precision 5 0.08% Tetradecane	1.612
Precision 6 0.08% Tetradecane	1.615
Average	1.61
STDEV	0.00
%RSD	0.03

Acceptance criteria of Peak Retention (%RSD) ≤ 0.5%

Evaluate Result

PASS

Qualifier's signature:		Date: 7/4/2021
Authorised by:		Date: 7/4/2021

VCR 82 Moo.18, Bueangkomproi, Lam Lukka, Pathum Thani, Thailand 12150
 Tel: (66)89970-7090, Fax: (66)1540-2541 Email: sales-mesrotech@quadr.com
 VCR-CGPRE

FID Linearity Result

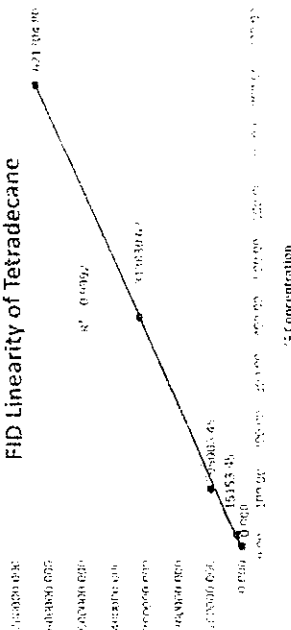
Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO., LTD.
 Department: LAB Analytical
 Manufacturer: PERKIN ELMER
 Serial No: 580S17020103
 Standard Batch: 177-FID
 Expiry Date: April 07, 2022

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

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

Tetradecane		Injection		concentration (µg/ml)		Area	
Linearity 1	0.000%	Tetradecane		0.00		0.000	
Linearity 2	0.002%	Tetradecane		20.00		15153.45	
Linearity 3	0.010%	Tetradecane		100.20		95008.45	
Linearity 4	0.040%	Tetradecane		398.60		313830.62	
Linearity 5	0.080%	Tetradecane		802.30		621304.80	
		R-Square					

FID Linearity of Tetradecane



Acceptance criteria of Linearity (R^2) >0.9990

Evaluate Result PASS

Qualifier's signature:

Date: 4/4/2021

Authorised by:

Date: 4/4/2021

82 Moo.18, BuengKampri, Lamliukka, Pathum Thani, Thailand 12150
 Tel. (662)540-7090, Fax. (662)540-2541 Email: sales.messcotech@gmail.com

VCR GC 10

Data System Linearity of Detection Check

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO., LTD.
 Department: LAB Analytical
 Manufacturer: PERKIN ELMER
 Software Version: 6.3.2.0646
 Standard Batch: N/A
 Expiry Date: April 07, 2022

Qualifier: Messcotech Co., Ltd.
 Procedure: Validator Method
 Model: TotalChrom
 Traceable To: Validator
 System ID: GC 1

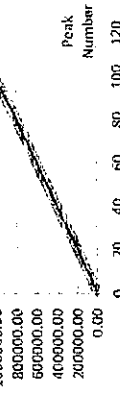
The result reference to raw data on page: 70-72

Peak Number#	Peak High (uV)	Peak Number#	Peak High (uV)	Peak Number#	Peak High (uV)	Peak Number#	Peak High (uV)
1	10002.00	26	260002.43	51	509996.49	76	759996.98
2	20003.00	27	270002.06	52	519993.03	77	769993.79
3	30004.00	28	281599.30	53	529994.64	78	780631.83
4	40004.00	29	290001.64	54	539997.42	79	789994.06
5	50004.53	30	300003.60	55	549996.61	80	799996.06
6	60006.00	31	310002.06	56	559996.06	81	809994.61
7	70005.00	32	320005.98	57	569994.06	82	819996.97
8	80003.00	33	330004.52	58	579991.43	83	829996.57
9	90004.06	34	340005.72	59	589993.16	84	839996.61
10	100006.38	35	350005.35	60	599994.14	85	849995.05
11	110004.48	36	360003.49	61	609991.62	86	859996.12
12	120004.00	37	370003.06	62	619995.56	87	869995.92
13	130005.06	38	380005.12	63	629990.37	88	879994.61
14	140006.36	39	390002.44	64	639993.06	89	889995.06
15	150004.44	40	400000.84	65	649994.62	90	899994.59
16	160005.06	41	410003.61	66	659993.58	91	909996.23
17	170004.67	42	420001.49	67	669990.49	92	919995.29
18	180004.49	43	429999.68	68	679996.01	93	929995.41
19	190006.49	44	440000.06	69	689994.78	94	939994.25
20	200005.14	45	449998.44	70	699993.99	95	949993.25
21	210002.03	46	459996.88	71	709992.6	96	959996.12
22	220004.44	47	469999.06	72	719992.75	97	969992.63
23	230003.37	48	479996.98	73	729996.12	98	979995.09
24	240003.12	49	489994.06	74	739995.6	99	989993.96
25	250002.84	50	499996.99	75	749995.66	100	999993.66
		R-Square		1.0000			

Linearity Correlation Calculated

Acceptance criteria of R^2

>0.9960



Evaluate Result

PASS

Qualifier's signature:

Date: 4/4/2021

Authorised by:

Date: 4/4/2021

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VCR

VCR DATASYS

Data System Number of Detection Check

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO., LTD. Qualifier: Messtech Co., Ltd.
 Department: LAB Analytical Procedures: 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: April 07, 2022 System ID: GC 1

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

Peak Count#	Peak Detected Specify	Peak count Detected
≥ 32 Peak Number	43 Peak Number	≥ 32 Peak

Acceptance criteria
 of absolute deviation
 Evaluate Result **PASS**

Qualifier's signature	Date: 7/4/2021
Authorised by:	Date: 7/4/2021

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 Tel: (6699)70-7090, Fax: (662)510-2541 Email: sales.messtech@gmail.com

VCR-DATASYS

Data System Precision of Detection Check

Customer: PINTHONG GROUP MANAGEMENT AND CONSULTANTS CO., LTD. Qualifier: Messtech Co., Ltd.
 Department: LAB Analytical Procedures: 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: April 07, 2022 System ID: GC 1

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

Collected 3 Peak Data 4-1	Collected 3 Peak Data 4-2	Collected 3 Peak Data 4-3	Collected 3 Peak Data 4-4	Collected 3 Peak Data 4-5
Peak Number #	Peak High (uVolt)	Peak Number #	Peak High (uVolt)	Peak Number #
1	10002.000	1	10003.000	1
50	499996.990	50	499996.120	50
100	999993.660	100	999996.270	100

%RSD at peak Number 1 = 0.2
 %RSD at peak Number 50 = 0.06
 %RSD at peak Number 100 = 0.06
 Acceptance criteria of Precision deviation
 Evaluate Result **PASS** %RSD ≤ 0.5

Qualifier's signature	Date: 7/4/2021
Authorised by:	Date: 7/4/2021

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 Tel: (6699)70-7090, Fax: (662)510-2541 Email: sales.messtech@gmail.com

VCR-DATASYS

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: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 37

Peak Number#	Peak high /1000 Peak Detection Specify	Collected (millivolt)	%deviation	Evaluate Result
1	500 millivolt	499.992	0.01	PASS
2	1000 millivolt	999.999	0.00	PASS

Acceptance criteria 0.1%

of % deviation

Evaluate Result

PASS

Qualifier's signature	
Authorised by:	

Date: 4/4/2022
Date: 4/4/2022

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 Tel: (662)970-7090, Fax: (662)970-7541 Email: sales.meshtech@gmail.com

VCR DATA/SYS

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: April 07, 2022 System ID: GC 1

The result reference to raw data on page: 38

Peak Number#	Retention Time Apex	Previous peak Current peak Absolute time /min.	Evaluate Result
1	0.476	N/A	
2	1.897	1.897	PASS
3	3.318	1.897	PASS
4	4.738	1.897	PASS
5	6.159	1.897	PASS
6	7.580	1.897	PASS

Acceptance criteria
of absolute deviation

1.41-1.43 Minute

Evaluate Result

PASS

Qualifier's signature	
Authorised by:	

Date: 4/4/2022
Date: 4/4/2022

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VCR DATA/SYS