

4.3 เอกสารสอบเทียบเครื่องมือ
(บริษัท เอ็ม กรีน กรุ๊ป จำกัด ทะเบียนเลขที่ ว-299)



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

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

Request No.23-67/0217

MTC.No.23-67/0217

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-Utd Rd.,

Thungkru, Bangkok 10140, Thailand.

Received date : 15 January 2024

Condition of measured item : Normal

Calibration date : 29 January 2024

Standard :

Standard	Certificate No.	Date due	Traceability
RTD Thermometer	PSL-T 643/65	1-Jun-24	TISTR
Molbox/Pressure Transducer/UpStream	MP-0076-23	2-Apr-25	NIMT
Primary Flow Calibrator S/N 117982	MW-0034-23	11-Jun-25	NIMT
Primary Flow Calibrator S/N 119521	MW-0033-23	6-Jun-25	NIMT

Calibrated by :

Approved by :

Director

Mechanical Engineering Standards Laboratory

Ref. 2013267011500200001

Issued Date 5 February 2024

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

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.4

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpaigtistr.or.th Website:www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
196 Phahonyothin Road, Chatuchak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th



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

Request No.23-67/0217

2/2

MTC.No.23-67/0217

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	0.054207	24.850	1009.71	-0.38	1.5
0.100	0.098967	24.899	1009.71	+1.04	1.2
0.200	0.19792	24.858	1009.73	+1.05	1.0
0.300	0.29857	24.898	1009.80	+0.59	1.0
0.402	0.40414	24.917	1009.90	-0.61	1.0
0.503	0.50840	24.888	1009.99	-1.00	1.0
1.002	1.0214	24.947	1010.28	-1.86	0.86
2.006	2.0206	24.905	1010.93	-0.72	0.86
3.003	3.0272	24.989	1011.72	-0.80	0.86

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.

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

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FM.BL.MTC.002 Rev.4

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpaigtistr.or.th Website:www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
196 Phahonyothin Road, Chatuchak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

CAL

Calibratech Co.,Ltd.

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

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



NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 66-200300-1

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 : (25.6 to 26.7) °C

Relative Humidity : (54.4 to 56.6) %

Air Pressure : 1010.0 mbar

Date of Received : 20 September 2023

Date of Calibration : 20 September 2023

Date of Issue : 22 September 2023

Calibrated by : Akaradath Thippichai

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02222345	10 Nov 2023	National Institute of Metrology (Thailand), (NIMT)

Approved by :

Laboratory Manager

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpoed, 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. : 66-200300-1

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	0.00000	0.000012
0.01	0.00000	0.000013
0.1	0.00000	0.000015
1	0.00000	0.000026
10	0.00000	0.000053
20	-0.00003	0.000071
50	0.00004	0.00011
100	-0.00009	0.00020
150	0.0000	0.00038
200	-0.0001	0.00038

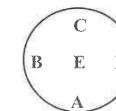
This result of calibration was found accurate as shown on date and place of calibration only.

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
-0.00003	0.00000	0.00000	-0.00005	0.00000

g



Repeatability Load test : 200 g

Stdev. : 0.000048 g

- o0o -

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-F0031-03



JIRANATEE ASSOCIATES CO.,LTD.

TEST REPORT

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED

EQUIPMENT NAME : SO₂ 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

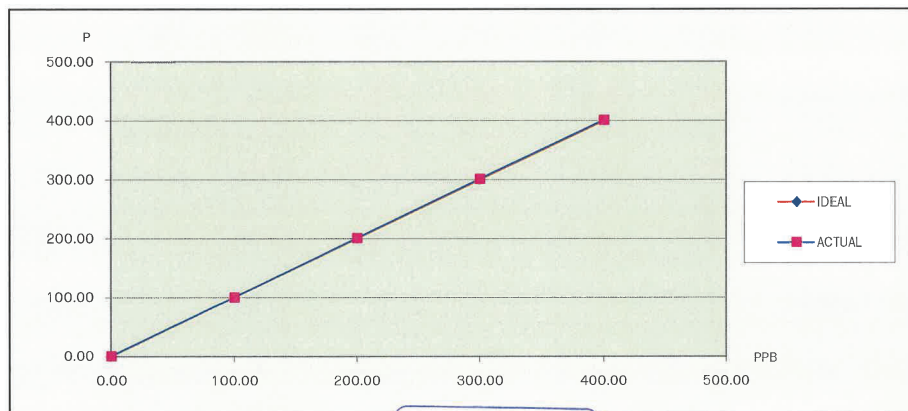
CERTIFIED DATE : 12/05/2020

CERTIFIED BY : AIRGAS

EXPIRED DATE : 12/05/2028

TEST RESULTS

POINT NO	TEST RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.22	0.22	-
1	100.00	99.88	-0.1	-0.12
2	200.00	200.25	0.3	0.13
3	300.00	300.72	0.7	0.24
4	400.00	400.54	0.5	0.14
AVERAGE (%)				0.10



CALIBRATED BY :

DATE : 18/10/66

CHECKED BY :

DATE : 18/10/66

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



JIRANATEE ASSOCIATES CO.,LTD.

CHECK LIST

CUSTOMER NAME : M GREEN GROUP COMPANY LIMITED

EQUIPMENT NAME : SO₂ Analyzer

MANUFACTURER : HORIBA

MODEL : APSA-370

SERIAL NO. : G8KGHRMX

TEST VALUES

NO.	Ambient SO ₂ Monitor	UNIT	BEFORE	AFTER
1	SIGNAL	mV (Voltage of the measured SO ₂ Value)	6.50	6.40
2	LAMP	mV (200mV to 1200 mV)	609.00	602.80
3	CELL	°C (Ambient tembient temperature +(5°C to 15°C))	30.70	36.00
4	PUMP	kPa (65 kPa or less)	42.50	43.70
5	AMBIENT	kPa	102.50	101.50
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	1.38	2.06
10	Zero	PPB	-1.12	0.22
11	Span	PPB	472.42	400.54

Remark : Reference EX-EN-019-56 , Ambient SO₂ Monitor APSA-370 Operation Manual Page #78

(Ambient temperature = 5°C to 40°C)

อาการที่ตรวจพบ

- มีน้ำเข้าเครื่อง ทำให้ Cal ไม่ขึ้น , หน้าจอตกไม่ได้

รายละเอียดการดำเนินการ

- ทำการไล่น้ำออกจากเครื่อง , เปลี่ยน Touch Panel ใหม่ , ทำ Calibration Zero/Span , Multipoint

ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY :

DATE : 18/10/66

CHECKED BY :

DATE : 18/10/66

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

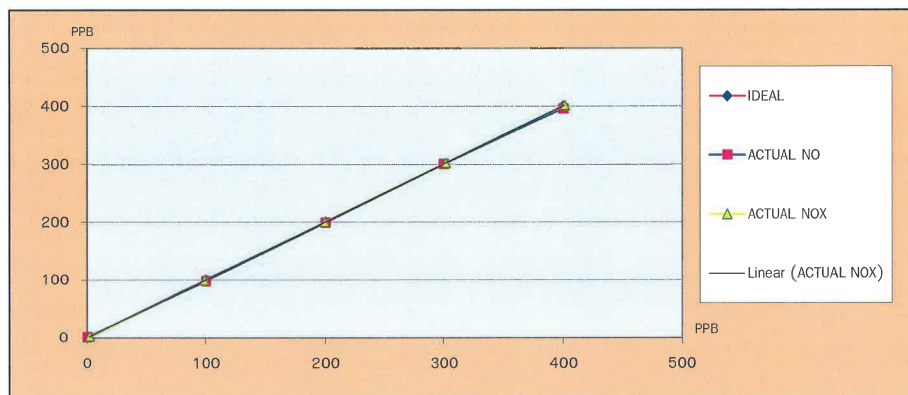
เลขที่ 63/14-15 , 67/35-36 ซอยเพชรเกษม 7, 7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร : 02-868-0812-13 โทรสาร : 02-868-1889

TEST REPORT

CUSTOMER NAME	: M GREEN GROUP COMPANY LIMITED						
EQUIPMENT NAME	: NO _x 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 _x	ERROR NO _x	%ERROR NO _x
ZERO	0.00	0.88	0.88	-	1.20	1.20	-
1	100.00	102.49	2.49	2.49	101.79	1.79	1.79
2	200.00	201.84	1.84	0.92	201.89	1.89	0.94
3	300.00	301.20	1.20	0.40	302.15	2.15	0.72
4	400.00	400.51	0.51	0.13	401.16	1.16	0.29
AVERAGE (%)				0.98			0.94



CALIBRATED BY :

DATE : 19/10/66

CHECKED BY :

DATE : 19/10/66

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

CHECK LIST

CUSTOMER NAME	: M GREEN GROUP COMPANY LIMITED		
EQUIPMENT NAME	: NO _x Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APNA-370
SERIAL NO.	: RSBHK673		

TEST VALUES

NO.	NO _x Analyzer (APNA-370)	UNIT	BEFORE	AFTER
1	Signal (NO)	mV	14.600	2.800
2	Signal (NO _x)	mV	35.400	16.600
3	Detector	Temp °C , Standard Value : Ambient temp+(5°Cto15°C) Pressure kPa , Standard Value : (Ambient/1013x100-20)±4kPa	42.500 79.000	42.900 70.500
4	AMBIENT	kPa	102.500	101.500
5	SAMPLE	L/min (1.1 L/min ± 0.3 L/min)	-	-
6	DC 24 V	V (24 V ± 0.5 V)	23.700	23.700
7	DC 5 V	V (5 V ± 0.5 V)	5.000	5.000
8	Sampling NO Reading	PPB	12.940	2.540
9	Sampling NO ₂ Reading	PPB	20.050	21.400
10	Sampling NO _x Reading	PPB	32.990	24.000
11	Zero (NO)	PPB	-0.600	0.880
12	Span(NO)	PPB	364.620	400.510
13	Zero (NO _x)	PPB	-0.410	1.220
14	Span (NO _x)	PPB	357.370	401.160

Remark : Reference EX-EN-022-56 , "Ambient NO_x Monitor APNA-370 Operation Manual " Page #48

(Ambient temperature = 5°C to 40°C)

อาการที่ตรวจพบ

- มีน้ำเข้าเครื่อง ทำให้ Cal ไม่ขึ้น , หน้าจอติดไม่ได้

รายละเอียดการดำเนินการ

- ทำการไล่น้ำออกจากเครื่อง , เปลี่ยน Touch Panel ใหม่ , ทำ Calibration Zero/Span , Multipoint

ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY :

DATE : 19/10/66

CHECKED BY :

DATE : 19/10/66

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

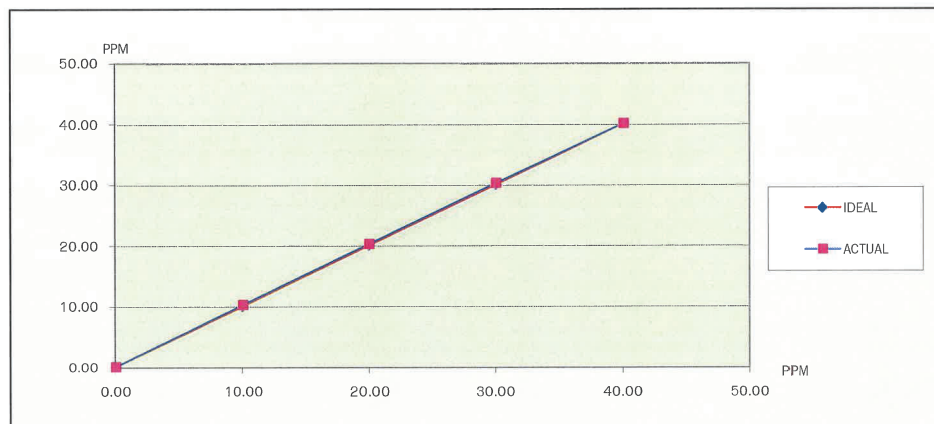
เลขที่ 63/14-15,67/35-36 ซอยเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

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	0.00	0.00	-
1	10.00	10.20	0.2	2.00
2	20.00	20.21	0.2	1.05
3	30.00	30.21	0.2	0.70
4	40.00	40.00	0.0	0.00
AVERAGE (%)				0.94



CALIBRATED BY :

DATE : 20/10/66

CHECKED BY :

DATE : 20/10/66

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	9.70	4.40
2	Signal (COMP)	mV	0.30	-4.50
3	CELL	°C , Standard Value : Ambient temperature +(5°Cto15°C)	28.40	32.00
4	PUMP	kPa	40.10	39.20
5	AMBIENT	kPa	102.50	101.50
6	SAMPLE	L/min (1 L/min to L/min)	-	-
7	OVER FLOW	L/min (1.2 L/min or more)	0.00	0.00
8	DC 24 V	V (24 V ± 0.5 V)	23.90	23.90
9	DC 5 V	V (5 V ± 0.5 V)	4.90	4.90
10	Sample Reading	PPM	0.83	0.86
11	Zero	PPM	-1.56	0.00
12	Span	PPM	41.55	40.00

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

อาการที่ตรวจพบ

- มีน้ำเข้าเครื่อง ทำให้ Cal ไม่ขึ้น , หน้าจอติดไม่ได้ , Special Oring เสื่อมสภาพ ทำให้ Cal ไม่ขึ้น

รายละเอียดการดำเนินการ

- ทำการได้น้ำออกจากเครื่อง , เปลี่ยน Touch Panel ใหม่ , เปลี่ยน Special Oring ใหม่

ทำ Check List Analyzer , ทำ Calibration Zero/Span , Multipoint

ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY :

DATE : 20/10/66

CHECKED BY :

DATE : 20/10/66

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



ID LINE : IEC17025



Certificate of Calibration

Certificate Number : SPR24010172-9 Page : 1 of 3

Customer : M Green Group Co.,Ltd
188/46, Pracha-Uttd 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 : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Received Date : 12 Jan 2024

Relative Humidity : $50\% \pm 15\%$ Calibration Date : 16 Jan 2024

Location of Calibration : In-Lab Recommend Due Date : 16 Jan 2025

Calibration Procedure : SP-CPE-04-01 Date of Issue : 17 Jan 2024

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.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by :
Calibration Officer

Approved by :
Authorized Signatory



ID LINE : IEC17025



Calibration Report

Certificate Number : SPR24010172-9 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



ID LINE : IEC17025



Result of Calibration

Certificate No. : SPR24010172-9

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	93.7	93.7	-0.3	-0.3	0.15
114	113.6	113.6	-0.4	-0.4	0.15

Select C		Unit : dB			
Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.7	93.7	-0.3	-0.3	0.15
114	113.5	113.5	-0.5	-0.5	0.15

Select Z		Unit : dB			
Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.7	93.7	-0.3	-0.3	0.15
114	113.6	113.6	-0.4	-0.4	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 -



Certificate of Calibration

Certificate Number : SPR24010172-11

Page : 1 of 3

Customer : M Green Group Co.,Ltd

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

Equipment Name : Sound Calibrator

Manufacturer : Scarlet Tech

Model : ST-120

Serial Number : N/A

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$

Received Date : 12 Jan 2024

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

Calibration Date : 16 Jan 2024

Location of Calibration : In-Lab

Recommend Due Date : 16 Jan 2025

Calibration Procedure : In-House Method

Date of Issue : 17 Jan 2024

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.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by :



Calibration Officer

Approved by :



Authorized Signatory



Calibration Report

Certificate Number : SPR24010172-11

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Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Measuring Receiver	8902A	2950A02471	EF-0048-23	14 Nov 2024
AUDIO Analyzer	8903B	3011A09975	EL05303/23	14 Feb 2024

Traceability

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

NIMT - The National Institute of Metrology, Thailand.

PCAL - Professional Calibration & Services Co.,Ltd



Result of Calibration

Certificate No. : SPR24010172-11

Page : 3 of 3

Function : Sound Level

UUC Setting (\pm dB)	Standard Reading (dB)	Error (dB)	Uncertainty (\pm dB)
94	94.1	-0.1	1.5
114	114.1	-0.1	1.5

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 $k = 2$, providing a level of confidence approximately 95%.

- End of Certificate -



CALIBRATION LABORATORY Co.,LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VIBRATION METER
MANUFACTURER : N/A
MODEL / TYPE : V9000
SERIAL NO. : 2364
CLID. NO. : 252102170
JOB CONTROL NO. : 240109000883
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

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

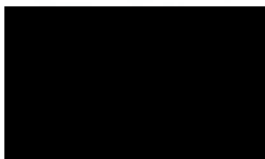
DATE OF RECEIVED : 09 January 2024

DATE OF ISSUED : 11 January 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Suwit Phuanbusabong
Calibration Engineer



Approved By :

Authorized Signatory
11 January 2024

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. Q24000883

F3-011-05/12-23

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REPORT OF CALIBRATION

FOR

NOMENCLATURE : VIBRATION METER
MANUFACTURER : N/A
MODEL / TYPE : V9000
SERIAL NO. : 2364
DATE OF CALIBRATION : 10 January 2024

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, 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. US36044686.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Accelerometer with Conditioning Amplifier, Bruel & Kjaer Model 8305, 2626 S/N. 705491, 1741406.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand)
Certificate No. EE-0100-23, Due Date 01 December 2024.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd.
Certificate No. 07-0043/23 , Due Date 12 April 2024.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand)
Certificate No. AV-0053-23, Due Date 12 October 2024.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied
by the coverage factor $k = 2,00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q24000883

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



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

CALIBRATION DATA

VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
(mm/s)	(frequency)		(mm/s)	(mm/s)	(mm/s)	\pm (% of rdg.)
10	160 Hz	peak	10.00	10.03	-0.03	1.0
20	160 Hz		20.00	19.72	+0.28	1.0
40	160 Hz		40.00	38.70	+1.30	1.0
60	160 Hz		60.00	57.50	+2.50	1.0
80	160 Hz		80.00	77.12	+2.88	1.0
100	160 Hz		100.00	96.15	+3.85	1.0

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 62 of 138

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

End of Certificate

Certificate No. Q24000883

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