
เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์

CERTIFICATE OF CALIBRATION

Certificate No.: CO-1808005/23

Page 1 of total 4 pages

Customer
WATER ANALYSIS CENTER CO., LTD.
1/94 Moo 5, T. Kanham,
A.U-thai, Ayuthaya 13210

Equipment
pH Meter
Manufacturer
METTLER TOLEDO
Model
SevenCompact S220
Serial No.
B327527211
ID No.
WWL 0068
Description
Range : 0 - 14 pH, Resolution : 0.01 pH

Environmental Conditions
Ambient Temperature: (20 ± 2) °C
Relative Humidity: (50 ± 10) %
Atmospheric Pressure: -

Calibration Location
Jayhawks Laboratory (CL&GL)
Received Date
18 August 2023
Calibration Date
18 August 2023
Date of Issue
21 August 2023

Condition of Artifacts
Used conditions but can be calibrated

Checked by

Approved by

Act as Technical Manager

Representative of Managing Director

() (Krisyosl K.) () (Sakda Y.)
() (Patiphan K.) (✓) (Onnapa P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

Certificate No.: CO-1808005/23

Page 2 of total 4 pages

Reference Method:

- The calibration method used was CP-178 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	030822	Feb. 9, 2024	NIMT
	7.01	300522	Feb. 9, 2024	
	10.01	230822	Feb. 7, 2024	

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Documenting Process Calibrator	754	2630521	10-2412001/22	Dec. 23, 2023	THC
Digital Thermometer with Sensor	1523 / 5622	1709138 / 4605984-005	10-0806001/23	Jun. 8, 2024	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

1. Function Simulated pH Meter

Standard Applied (mV)	Nominal Value (pH)	UUC Reading		Uncertainty (± mV)
		pH	mV	
177.48	4.00	4.01	177.4	0.060
0.00	7.00	7.00	0.0	0.060
-177.48	10.00	10.01	-177.4	0.060

UUC : Unit Under Calibration

Note : Adjust Curve to simulate pH (4,7,10)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: MC 2307702

Page 2 of 3

The Reference Standard Instrument :

Description	Certificate No.	Serial No.	Due date	Traceable thru
Data Acquisition/Switch Unit	MC 2303173	MY41010916	9 Mar 2024	MCAL
With Thermocouple Type " T " ID. No.171 to 1719				

Traceability :

The measurement standard traceable to the international system of units (SI) through certificate as mentioned above

1. Calibration Procedure:

This Instrument was calibration according to TLAS G-20 by comparison with calibrated thermocouple type T under no load condition. The Thermocouples were placed on nine points and located one thermocouple in each of the eight corners of the chamber and was away from the each wall of 5 cm to 10 cm. And placed the ninth thermocouple within 2.5 cm of the geometric center of the chamber.

Temperature Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

Temperature Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.

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

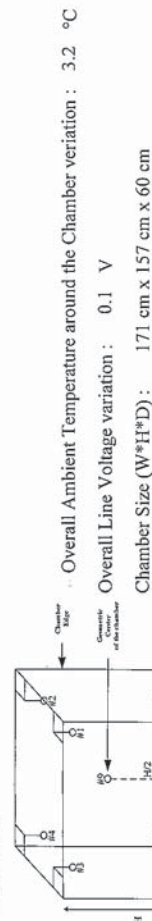


Figure 1 : Sensor Installation Location

Checked by : Thanagorn

[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]

Certificate of Calibration

TEMPERATURE CONTROLLER ENCLOSURES



Certificate No.: MC 2307702

Page 1 of 3



Customer	: Water Analysis Center Co., Ltd.	Received Date	: 11 July 2023
Reference Job No.	: 23-1577		
Description	: Refrigerator		
Manufacturer	: SANDEN INTERCOOL	Model	: SEC-1500SBD
Serial No.	: SEC1500201A-0708-00304	ID. No.	: WWL0038
Marking	: Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2307702) has been attached to the case.		
Method	: In-House calibration procedure MWI-T-033 this method is reference to TLAS G-20 "Temperature Controlled Enclosures".		
Location of Calibration	: Water Analysis Center Co., Ltd. ; Laboratory.		
Environmental Conditions	: Ambient Temperature : (25.3 to 25.9) °C		
	Relative Humidity : (65.2 to 67.9) %		
Date of Calibration	: 11 July 2023	Date of Issue	: 12 July 2023

Checked by : Thanagorn Approved by : Aittipong
Thanagorn Limchaicharoen Aittipong Kanjanawasit
(Calibration Supervisor) (Technical Manager)

The uncertainties are for a confidence probability of approximately 95%

This certificate is issued in accordance with the conditions of accreditation granted by the National Standardization Council of Thailand-Office of the National Standardization Council that has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of Master Calibration Co.,Ltd.

[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]

2. Result of calibration :

Temperature Measurement Accuracy Test

Indicating Temperature	Measured Temperature (°C) at Spread Locations									Uncertainty
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. #9	
2.5	4.4	4.2	4.2	4.2	4.0	3.9	4.1	4.0	3.8	0.86

Chamber Characterization Result

Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
2.0	2.5	1.50	1.01	3.3

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

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by: Thangam

[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]



CERTIFICATE OF CALIBRATION

Certificate No.: C0-1907007/23

Customer
WATER ANALYSIS CENTER CO., LTD.
1/94 Moo 5, T.Kanham,
A.U-thai, Ayutthaya 13210

Equipment	Conductivity Meter
Manufacturer	EUTECH
Serial No.	2657889
Description	-
	Model
	CON 2700
	ID No.
	WWL 0136

Environmental Conditions	Ambient Temperature: (20 ± 2) °C
Relative Humidity:	(50 ± 10) %
Atmospheric Pressure:	-

Calibration Location	Jayhawks Laboratory (CL&GL)
Received Date	19 July 2023
Calibration Date	19 July 2023
Date of Issue	20 July 2023

Condition of Artifacts

Checked by

Approved by _____

Act as Technical Manager

Representative of Managing Director

(Dr. Ekachai Puttitwong)

() (Krisyosl K.)

()	(Krisyosol K.)	()	(Sakda Y.)
()	(Patiphan K.)	(✓)	(Onmapa P.)
()	(Pongsak H.)	()	(Niriphong K.)
()	(Kanung C.)	()	(Nonthachai K.)
()	(Pramong P.)	()	(Noppol P.)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

691-31

REV. 02 02/24/21



THEANANTHART CALIBRATION CO., LTD.
110/11 Moo 5, Phra Pradaeng Suburb, Samut Prakan 10930
Tel. 02-904-2162, 02-904-2163, 02-904-2164, 02-904-2165, 02-904-2166



Certificate No.: C0-1907007/23

Page 2 of total 2 pages

Reference Method:

- The calibration method used was CP-177 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard :

Material	Batch Value	Lot Number	Due Date	Traceability
Conductivity Standard Solution	147.8 $\mu\text{S/cm}$	S220611005	Dec. 6, 2023	SCP Science
	1.425 mS/cm	S220812006	May 31, 2024	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- SCP Science.

Measurement Results: (Probe Serial No. : 93X219065)

Conductivity Standard Solution	Measured Value	Correction	Uncertainty (\pm)
147.8 $\mu\text{S/cm}$	147.5 $\mu\text{S/cm}$	0.3 $\mu\text{S/cm}$	2.5 $\mu\text{S/cm}$
1.425 mS/cm	1.427 mS/cm	-0.002 mS/cm	0.0051 mS/cm

Note : Adjustment points: 147.8 $\mu\text{S/cm}$ 1.425mS/cm

The above 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 -

Calibrated by Onnapa
REV.02.02/24/21



AUTOMATION SERVICE CO., LTD.
CALIBRATION LABORATORY

SV 201005/2024

Cert. No. WAC-065
Page 1 of 2

CERTIFICATE OF CALIBRATION

Instrument : DO Meter
Model : DO-31P
Serial No. : 780065
Manufacturer : TOA-DKK
Measuring Range : 0.00 ~ 20.00 mg/l

Machine : -
Location : -

Customer : Water Analysis Center Co.,Ltd.
1/94 Moo.5 T.Kanham, A.U.-Thai
Ayutthaya 13210 Thailand

Date Of Received : 11 / 01 / 2024
Date Of Calibration : 11 / 01 / 2024

Ambient Condition : Temperature 26 $^{\circ}\text{C}$
Humidity 58 % RH

Calibrated By :

P. Yooyen
(Ms. Phance Yooyen)
Technician

Approved By :

N. Phung
(Mr. Nipon Phungsomsak)
Technical Manager

Date Of Issue : 15 / 01 / 2024

This Certificate may not be reproduced other than in full, except with the prior written approval of the head of the industrial instruments calibration center.



AUTOMATION SERVICE CO.,LTD.
CALIBRATION LABORATORY

Instrument : DO Meter
Model : DO-31P
Serial No. : 780065

Cert. No. WAC-065
Page 2 of 2

Calibrate Procedure

- ☐ This instrument was calibrated by comparison with standard solution (PH/ORP)
☐ This instrument was calibrated by comparison with scattering plate value (Turbidity)
☐ This instrument was calibrated by comparison with conductivity (Conductivity)
☒ This instrument was calibrated by comparison with Sodium sulfite anhydrous (DO)

Condition of this result of calibration

1). Reference Standard Solution

Standard	Lot No	Batch	Cert. No.	Due Date
----------	--------	-------	-----------	----------

Sodium Sulfite Power	408K1405	-	-	-
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2). Traceability This certification is traceable to

- ☒ Kanto Chemical Co.,INC.
☐ DKK Corporation

Result Of Calibration

Standard Solution (mg/l) at 25.7°C	Before Adjust		After Adjust	
	Indicator	Error	Indicator	Error
Zero	0.00	+ 0.10	0.00	-
Span	8.02	- 1.57	8.02	-

DO Electrode No. OE270AA(S) S/N 111F0029

Calibrated By P. Yooyen
(Ms. Phanee Yooyen)
Technician



Intech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhaphan 5 Rd., O ngoen,
Salmal, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Certificate of Calibration

Certificate No. : MT24-3208
Page : 1 of 2

Customer	:	Water Analysis Center Co.,Ltd.
Address	:	1/94 M.5, Rojana Industrial Park, T.Kanham, A.U-Thai, Ayuthaya 13210
Description	:	Hot Air Oven
Manufacturer	:	Memmert
Model	:	UF 260
Serial No.	:	B620.0814
Identification No.	:	WWL 0212
Calibration Place	:	Customer Laboratory
Order No.	:	1152/24
Received date	:	Mar 22, 2024
Calibration date	:	Mar 22, 2024
Environment Condition	:	
Temperature	:	(25 \pm 10) °C
Humidity	:	(50 \pm 30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
LXI Data Acquisition Switch Unit with Sensor	34972A	MY49020096	MT23-7163	Nov 30, 2024

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor 2, providing a level of confidence of not less than 95%



Calibrated by : Mr.Yuttakorn Jamneansri

Approved by : (Mr.Panuwat Phuklan)

Issue date : Apr 10, 2024

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Intech Metrological Center Co.,Ltd

Rev.03 / Feb 2024

Automation Service Co.,Ltd. 929 829/1 Soi Pattanakarn30, Pattanakarn Rd., Suanluang, Suanluang, Bangkok 10250
Tel. : 02-319-9994 ext. 721,725 | E-mail : iso@automation.co.th, service@automation.co.th | www.automation.co.th

FM-MT-013

Certificate No. : MT24-3208

Page : 2 of 2

Result : Without adjustment

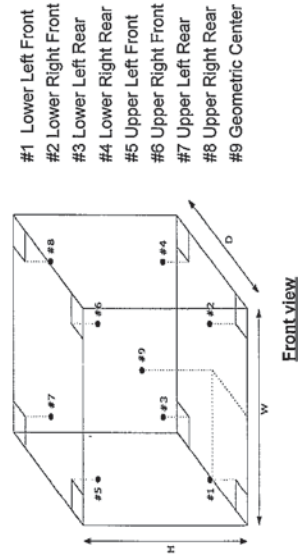
Resolution : 0.1 °C

Function : Temperature measurement

Calibration point : 104, 180 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
104	103.494	103.933	103.871	103.988	103.990	104.081	103.843	104.217	104.022	0.45
180	179.985	179.953	180.047	179.985	179.908	180.088	180.065	180.273	180.105	0.54

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
104.0	104.0	0.34	0.66	1.3
180.0	180.0	0.41	0.86	1.2



UUC* = Unit under calibration
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.
Overall Variation = Difference of temperature value between the maximum and minimum any time.
Stability = One half of the maximum difference of measured temperatures at any one probe.



Certificate of Calibration

Equipment: Balance
Model: BL 210S
Serial No. (or ID.): 15808131 (WWL 0022)
Manufacturer: Sartorius
Condition: In condition

Certificate No.: C01241754

Issued Date: 05 June 2024

Job No.: WO-00030302

Page: 1 of 2

Customer: Water Analysis Center Co., Ltd.
1/94 Moo 5, Rojana Industrial Park, Rojana Road,
Tambol Kanham, Amphur U-Thai, Ayutthaya 13210 Thailand

Environment Condition: Temperature 26 °C ± 0.2 °C
Humidity 50 %RH ± 2.6 %RH

Calibration Place: Water Analysis Center Co., Ltd. (ห้างเครื่องชั่ง)
1/94 Moo 5, Rojana Industrial Park, Rojana Road,
Tambol Kanham, Amphur U-Thai, Ayutthaya 13210 Thailand

Calibration By: Mr. Polawad Ruamrup

Calibration Date: 05 June 2024

The Method used: In-house method, CAL-WI-47, based on UKAS Lab 14

Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Co., Ltd. Certificate No. C02240400

Signature

(Mr. Polawad Ruamrup)

Person in charge

Signature

(Mr. Rungrod Jenkitrakulchai)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 หมู่ที่ 5 ถนนสาย 10260
ซอยสุขุมวิท 10260 กรุงเทพฯ 10260
Phone: +66 2039 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-asia/thailand

Delivering Growth - in Asia and Beyond.



Certificate No.: C01241754

Page: 2 of 2

Calibration Results:

Without Adjustment

Eccentric Error: Weight to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.

Nominal Test Value	Reference Points (g)				
	A	B	C	D	E
-	0.0000	0.0001	0.0000	0.0000	-0.0002

Repeatability: Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
20	0.00004
200	0.00006

Error of indication from nominal or conventional mass value., Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of indication (g)	Uncertainty (g)	k
1	1.00001	1.0000	0.0000	0.00011	2.04
2	2.00002	2.0000	0.0000	0.00011	2.04
5	5.00002	5.0000	0.0000	0.00011	2.04
10	10.00001	10.0000	0.0000	0.00011	2.04
20	20.00001	20.0000	0.0000	0.00012	2.03
50	50.00003	50.0000	0.0000	0.00013	2.02
70	70.00004	70.0000	0.0000	0.00016	2.01
100	99.99996	100.0001	0.0001	0.00017	2.01
120	119.99997	120.0002	0.0002	0.00021	2.00
150	149.99999	150.0002	0.0002	0.00024	2.00
200	199.99996	200.0004	0.0004	0.00030	2.00

The End of Certificate

สำนักมาตรฐาน เทคโนโลยี จำกัด
DKSH Technology Limited
2533 หมู่ 9 ตำบลบางนา อำเภอบางนา กรุงเทพมหานคร 10260
Phone: +66 2639 7000 Email: info.dksh@dksh.com Website: www.dksh.com/solutions-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C01-14: 12 Sep 2022



Master Calibration Co., Ltd.

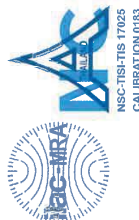
547 Soi Ratchadaminvati, Kwang Sansernok, Khor Huaykwang, Bangkok 10310

Tel : (02) 274 2978-9, (02) 2742987-8 Fax : (02) 274 2518, (02) 274 2989

Website : www.mastercalibration.com E-mail : calibrate@mastercalibration.com

Certificate of Calibration

LIQUID BATH



Page 1 of 3

Certificate No.: MC 2314268

Customer : Water Analysis Center Co., Ltd.
1/94 Moo 5, T.Kantham, A.U.-Thai, Ayutthaya 13210.

Reference Job No. : 23-2833 Received Date : 15 December 2023
Description : Water Bath
Manufacturer : ESSTELL Model : EWB-122D
Serial No. : 20180508122 ID. No. : WWL 0214
Marking : Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2314268) has been attached to the case.
Method : In-House calibration procedure MWI-T-029 this method is reference to ASTM E715 "Liquid Bath".

Location of Calibration : Water Analysis Center Co., Ltd. ; Laboratory.
Environmental Condition : Ambient Temperature : (29.4 to 29.8) °C
Relative Humidity : (49.0 to 52.0) %

Date of Calibration : 15 December 2023 Date of Issue : 19 December 2023

Checked by : Chalermkit

Chalermkit Rakphada
(Calibration Engineer)

Approved by : Aittipong

Aittipong Karjanasit
(Technical Manager)

The uncertainties are for a confidence probability of approximately 95%

This certificate is issued in accordance with the conditions of accreditation granted by the National Standardization Council of Thailand-Office of the National Standardization Council that has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of Master Calibration Co., Ltd.

[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]

Certificate No.: MC 2314268

Page 2 of 3

Reference Standard Instrument :

Description	Certificate No.	Serial No.	Due date	Traceable thru
Data Acquisition/Switch Unit With Thermocouple Type " T " ID. No.27/1 to 27/5	MC 2301270	MY44020009	9 Mar 2024	MCAL

Traceability :

The measurement standard traceable to the international system of units (SI) through certificate as mentioned above

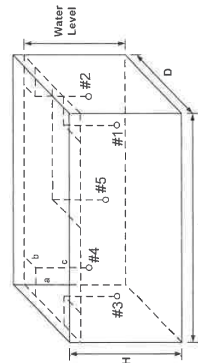
1. Calibration Procedure:

This Instrument was calibration according to ASTM E715 - 2007 by comparison with calibrated sensor under no load condition. The sensor were placed on five points and located one sensor in each of the eight corners of the chamber and was away from the each wall of 5 cm to 10 cm. And placed the five sensor within 2.5 cm of the geometric center of the chamber.

Temperature Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

Temperature Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.

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



- Overall Ambient Temperature around the Chamber variation : 1.3 °C
- Overall Line Voltage variation : 0.0 V
- Chamber Size (W*H*D) : 50 cm x 12 cm x 30 cm
- Water Level : 7 cm

Checked by : Chalemkij

[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]

Certificate No.: MC 2314268

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2. Result of calibration :

Temperature Measurement Accuracy Test

Indicating Temperature (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty (±°C)
	#1	#2	#3	#4	Ref. #5	
45.0	44.5	44.4	44.5	44.5	44.6	0.45

Chamber Characterization Result

Desired Temperature (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.5	45.0	45.0	0.62	0.88	1.5

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.0$, providing a level of confidence of approximately 95 %.

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by : Chalemkij

[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]

Certificate of Calibration

TEMPERATURE CONTROLLER ENCLOSURES



Certificate No.: MC 2314270

Customer : Water Analysis Center Co., Ltd.
1/94 Moo 5, T.Kantham, A.U-Thai, Ayutthaya 13210.

Reference Job No. : 23-2833
Description : Incubator
Manufacturer : Memmert
Serial No. : D619/0170
Model : IN260
ID. No. : WWL 0192
Marking : Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2314270) has been attached to the case.
Method : In-House calibration procedure MWI-T-033 this method is reference to TLAS G-20 "Temperature Controlled Enclosures".
Location of Calibration : Water Analysis Center Co., Ltd. ; Laboratory.
Environmental Conditions : Ambient Temperature : (25.2 to 25.6) °C
Relative Humidity : (65.4 to 66.2) %
Date of Calibration : 15 December 2023
Date of Issue : 19 December 2023

Checked by : **Chalermkit**
Chalermkit Rakphada
(Calibration Engineer)

Approved by : **Aittipong**
Aittipong Kahjanasat
(Technical Manager)

The uncertainties are for a confidence probability of approximately 95%

This certificate is issued in accordance with the conditions of accreditation granted by the National Standardization Council of Thailand-Office of the National Standardization Council that has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of Master Calibration Co.,Ltd.

Certificate No.: MC 2314270

Page 2 of 3

Reference Standard Instrument :

Description	Certificate No.	Serial No.	Due date	Traceable thru
Data Acquisition/Switch Unit	MC 2214032	MY41029992	26 Dec 2023	MCAL
With Thermocouple Type " T " ID. No.31/1 to 31/9				

Traceability :

The measurement standard traceable to the international system of units (SI) through certificate as mentioned above

1. Calibration Procedure:

This Instrument was calibration according to TLAS G-20 by comparison with calibrated thermocouple type T under no load condition. The Thermocouples were placed on nine points and located one thermocouple in each of the eight corners of the chamber and was away from the each wall of 5 cm to 10 cm. And placed the ninth thermocouple within 2.5 cm of the geometric center of the chamber.

Temperature Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

Temperature Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.

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

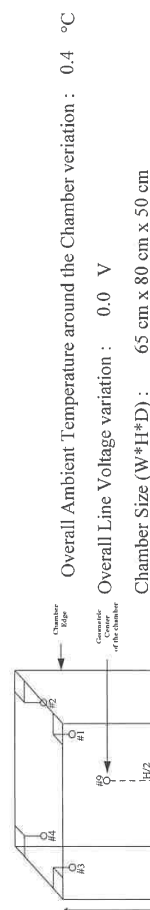


Figure 1 : Sensor Installation Location

Checked by : **Chalermkit**



Certificate No.: MC 2314270

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

Indicating Temperature (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. #9	
35.0	35.2	35.2	35.2	35.2	35.1	35.1	35.0	35.1	35.1	0.44

Chamber Characterization Result

Desired Temperature (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	0.13	0.21	0.4

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

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by : Chalermit

รายการเครื่องมือที่ใช้ในการตรวจวัด/วิเคราะห์

No	Model	Serial Number	Part	Remark
1	Test WS/WD Report	2302DR0081	1	WindSpeed/บ้านโดมม่วง หมู่ 8
2	Test WS/WD Report	2302DR0083	2	WindSpeed/บ้านลาดโพธิ์ตร หมู่ 3
3	Test WS/WD Report	2302DR0090	3	WindSpeed/บ้านลาดตะเคียน หมู่ 1
4	Test WS/WD Report	2311DR0044	4	WindSpeed/โรงเรียนหนองมนหมู่ หมู่ 3
5	TE-5170 (TSP)	2726	5	TSP/บ้านโดมม่วง หมู่ 8
6	TE-5170 (TSP)	2727	6	TSP/บ้านลาดโพธิ์ตร หมู่ 13
7	TE-5170 (TSP)	2730	7	TSP/บ้านลาดตะเคียน หมู่ 1
8	TE-5170 (TSP)	2738	8	TSP/โรงเรียนหนองมนหมู่ หมู่ 3
9	TE-6070 (PM-10)	2731	9	PM-10/บ้านโดมม่วง หมู่ 8
10	TE-6070 (PM-10)	2735	10	PM-10/บ้านลาดโพธิ์ตร หมู่ 13
11	TE-6070 (PM-10)	2733	11	PM-10/บ้านลาดตะเคียน หมู่ 1
12	TE-6070 (PM-10)	2739	12	PM-10/โรงเรียนหนองมนหมู่ หมู่ 3
13	APNA-370	9BRKGTUK	13	NO ₂ /บ้านโดมม่วง หมู่ 8
14	APNA-370	W2VNUX08	14	NO ₂ /บ้านลาดโพธิ์ตร หมู่ 13
15	APNA-370	705KA9JJ	15	NO ₂ /บ้านลาดตะเคียน หมู่ 1
16	43C	42C-70988-367	16	NO ₂ /โรงเรียนหนองมนหมู่ หมู่ 3
17	APSA-370	YDL839W0	17	SO ₂ /บ้านโดมม่วง หมู่ 8
18	APSA-370	8R18JB8F	18	SO ₂ /บ้านลาดโพธิ์ตร หมู่ 13
19	APSA-370	Y8SW7T00	19	SO ₂ /บ้านลาดตะเคียน หมู่ 1
20	43C	43C-58282-317	20	SO ₂ /โรงเรียนหนองมนหมู่ หมู่ 3
21	แบบบันทึกการสอบเทียบเครื่อง Sound Level Meter	00396803	21	Noise/บ้านลาดโพธิ์ตร หมู่ 13
22	แบบบันทึกการสอบเทียบเครื่อง Sound Level Meter	200051	22	Noise/บ้านลาดตะเคียน หมู่ 1
23	แบบบันทึกการสอบเทียบเครื่อง Sound Level Meter	200052	23	Noise/บ้านคลองร่วม หมู่ 9
24	แบบบันทึกการสอบเทียบเครื่อง Sound Level Meter	200053	24	Noise/บ้านทุ่งงาม หมู่ 2



SCARLET | TECH

Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, tested and inspected following the standard calibration procedure (st-wl-21) and is within manufacture's specification at the time when the calibration is done

Client: Envir Service Co., Ltd.
Serial: 2302DR0081
Calibration Date: 2024/3/29
Calibration Expiry Date: 2025/3/28

The Result of Calibration

Velocity				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
10	10	0.0	0.9-1.1	Pass
19	19	0.0	1.8-2.2	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	19.9	0.3	19.0-21.0	Pass

Wind Direction				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
18°	17°	1	42-48	Pass
195°	195°	0	132-138	Pass
228°	228°	0	222-238	Pass
318°	318°	0	312-318	Pass
359°	0°	1	357-3	Pass

Inspection Room Temp	Actual Value	Deviation	Tolerance	Result
22.2°C	22.5	0.3	21.5-23.5	Pass

Atmospheric Pressure Inspection	Actual Value	Deviation	Tolerance	Result
1007	1004	3	1001-1019	Pass

Environment Conditions:

Air temperature: 22 °C
Relative humidity: 55 %
Static pressure: 102.2 kPa



Performed by:

Certified by Head of Engineering Department

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4F-3, No. 347, 2nd Sec., Heping E Rd., Daan Dist. Taipei City 106, Taiwan



SCARLET | TECH

Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, test and inspected following the standard calibration procedure (st-wl-21) and is within manufacturer's specification at the time when the calibration is done

Client: Envir Service Co., Ltd.

Serial: 2302DR0083

Calibration Date: 2024/3/29

Calibration Expiry Date: 2025/3/28

The Result of Calibration

		Velocity		
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
1.0	1.1	0.1	0.9-1.1	Pass
1.9	2.0	0.1	1.8-2.2	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	20.0	0.4	19.0-21.0	Pass

		Wind Direction		
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
48°	47°	1	42-48	Pass
135°	135°	0	132-138	Pass
226°	226°	0	222-228	Pass
316°	315°	1	312-318	Pass
359°	0°	1	357-3	Pass

Inspection Room Temp	Actual Value	Deviation	Tolerance	Result
22.2°C	22.5	0.3	21.5-23.5	Pass

Atmospheric Pressure Inspection	Actual Value	Deviation	Tolerance	Result
1007	1005	2	1001-1019	Pass

Environment Conditions:

Air temperature: 22 °C
Relative humidity: 55 %
Static pressure: 102.2 kPa



Performed by:

Certified by Head of Engineering Department

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SCARLET | TECH

Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, test and inspected following the standard calibration procedure (st-wl-21) and is within manufacturer's specification at the time when the calibration is done

Client: Envir Service Co., Ltd.

Serial: 2302DR0090

Calibration Date: 2024/3/29

Calibration Expiry Date: 2025/3/29

The Result of Calibration

		Velocity		
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
1.0	1.0	0.0	0.9-1.1	Pass
1.9	1.9	0.0	1.8-2.2	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	19.9	0.3	19.0-21.0	Pass

		Wind Direction		
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
48°	47°	1	42-48	Pass
135°	135°	0	132-138	Pass
226°	226°	0	222-228	Pass
316°	316°	0	312-318	Pass
359°	0°	1	357-3	Pass

Inspection Room Temp	Actual Value	Deviation	Tolerance	Result
22.2°C	22.5	0.3	21.5-23.5	Pass

Atmospheric Pressure Inspection	Actual Value	Deviation	Tolerance	Result
1007	1004	3	1001-1019	Pass

Environment Conditions:

Air temperature: 22 °C
Relative humidity: 55 %
Static pressure: 102.2 kPa



Performed by:

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Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, test and inspected following the standard calibration procedure (st-wl-21) and is within manufacture's specification at the time when the calibration is don

Client: Envir Service Co., Ltd.

Serial: 2311DR0044

Calibration Date: 2024/3/29

Calibration Expiry Date: 2025/3/28

The Result of Calibration

Velocity			
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance
1.0	1.0	0.0	0.9-1.1
1.9	1.9	0.0	1.8-2.2
4.9	5.0	0.1	4.7-5.3
7.0	7.1	0.1	6.0-8.0
10.0	10.0	0.0	9.5-10.5
19.6	19.9	0.3	19.0-21.0
Result			
Pass			

Wind Direction			
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance
48°	47°	1	42-48
135°	135°	0	132-138
224°	224°	0	222-228
316°	316°	0	312-318
359°	0°	1	357-3
Result			
Pass			

Inspection Room Temp	Actual Value	Deviation	Tolerance	Result
22.2°C	22.5	0.3	21.5-23.5	Pass

Atmospheric Pressure Inspection	Actual Value	Deviation	Tolerance	Result
1007	1004	3	1001-1019	Pass

Environment Conditions

Air temperature: 22 °C
Relative humidity: 55 %
Static pressure: 102.2 kPa



Performed by:

Certified by Head of Engineering Department

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บริษัท ศูนย์วิเคราะห์น้ำ จำกัด

WATER ANALYSIS CENTER COMPANY LIMITED

194 หมู่ 5 ต.สามพัน อ.อุทัย จ.พระนครศรีอยุธยา 13210
194 Moo 5, T.Kaibam, A.U-Thai, Ayutthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Page 1 of 1

Project Site :

ณอุตสาหกรรมไบโเทค กัญชา

Location :

บ้านโคกมะม่วง หมู่ 8

Date of measurement :

23/5/2024

Worksheet No. :

C-230524-WWL0097

High Volume ID :

WWL0097

High Volume Model :

TE-5170 (TSP)

High Volume S/N :

2726

Ambient Condition

Temperature (°C) :

26

Barometric Pressure (mmHg) :

756

Calibration Office

Calibrator ID :

WWL0103

Calibrator Model :

TE-5028A

Calibrate Date :

27/03/2024

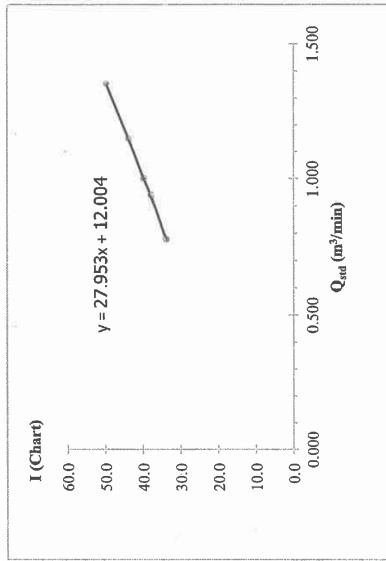
Quality Standard Slope :

1.59186

Quality Standard Intercept :

-0.01922

Test No.	delta H ₂ O (inch)	Q _{ad} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.60	1.354	50.0	49.80	Slope : 27.84
2	3.30	1.149	44.0	43.82	Intercept : 11.956
3	2.50	1.001	40.0	39.84	Correlation Coefficient : 0.9995
4	2.20	0.940	38.0	37.85	
5	1.50	0.778	34.0	33.86	



Calibrated by :

Approved by :

Mr. JITTA WEE WONGMAKHEEB

Mr. RUNGSASIKORN KOSUM



บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.สามนา อ.อุ้มอ่อง พระนครศรีอยุธยา 13210
194 Moo 5, T.Kham, A.U-Thai, Ayutthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

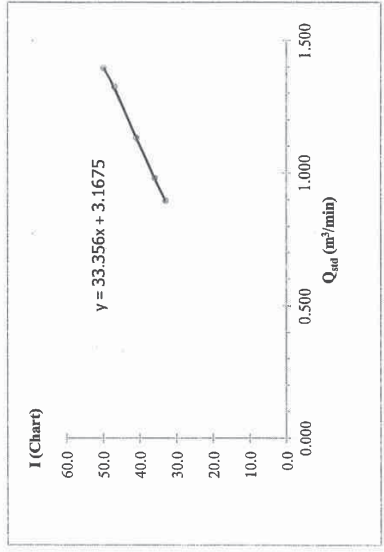


บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.สามนา อ.อุ้มอ่อง พระนครศรีอยุธยา 13210
194 Moo 5, T.Kham, A.U-Thai, Ayutthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Project Site : นิคมอุตสาหกรรมไฮเทค ถนนพหลโยธิน
Location : บ้านลาดโพธิ์ หมู่ 13
Date of measurement : 23/5/2024
Worksheet No. : C-230524-WWL0095 Calibration Office
High Volume ID : WWL0095 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2727 Calibrator S/N : 3271
Ambient Condition : 27/03/2024
Temperature (°C) : 26 Quality Standard Slope : 1.59186
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01922

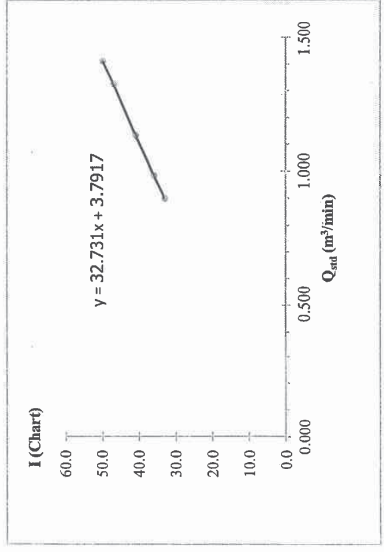
Test No.	delta H ₂ O (inch)	Q _{ad} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.397	50.0	49.80	Slope : 33.22 Intercept : 3.155 Correlation Coefficient : 0.9995
2	4.40	1.324	47.0	46.81	
3	3.20	1.131	41.0	40.83	
4	2.40	0.981	36.0	35.85	
5	2.00	0.897	33.0	32.87	



Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSAKORN KOSUM

Project Site : นิคมอุตสาหกรรมไฮเทค ถนนพหลโยธิน
Location : บ้านลาดโพธิ์ หมู่ 1
Date of measurement : 23/5/2024
Worksheet No. : C-230524-WWL0096 Calibration Office
High Volume ID : WWL0096 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2730 Calibrator S/N : 3271
Ambient Condition : 27/03/2024
Temperature (°C) : 26 Quality Standard Slope : 1.59186
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01922

Test No.	delta H ₂ O (inch)	Q _{ad} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.411	50.0	49.80	Slope : 32.60 Intercept : 3.776 Correlation Coefficient : 0.9998
2	4.40	1.324	47.0	46.81	
3	3.20	1.131	41.0	40.83	
4	2.40	0.981	36.0	35.85	
5	2.00	0.897	33.0	32.87	



Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSAKORN KOSUM

High Volume Air Sampler Calibration Worksheet

Project Site :

ณมดสาครนไยเทค กบินทร์

Location :

บ้านโคกมะม่วง หมู่ 8

Date of measurement :

23/5/2024

Worksheet No. :

C-230524-WWL0102

 Calibration Office

WWL0103

High Volume ID :

WWL0102

 Calibrator ID :

TE-5028A

High Volume Model :

TE-6070 (PM10)

 Calibrator Model :

3271

High Volume S/N :

2731

 Calibrator S/N :

27/03/2024

Ambient Condition

Calibrate Date :

27/03/2024

Temperature (°C) :

26

 Quality Standard Slope :

0.99709

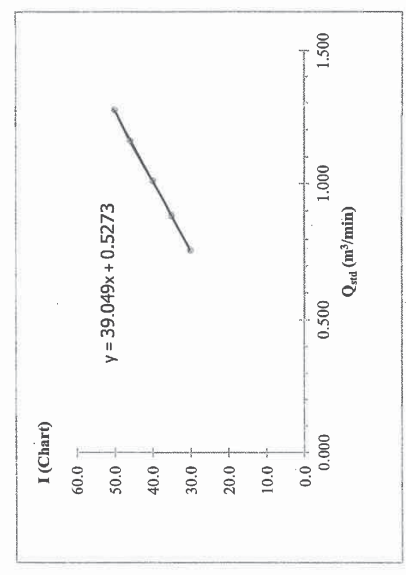
Barometric Pressure (mmHg) :

756

 Quality Standard Intercept :

-0.01199

Test No.	delta H ₂ O (inch)	Q _{ad} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.00	1.273	50.0	31.44	Slope : 24.56
2	3.30	1.158	46.0	28.93	Intercept : 0.332
3	2.50	1.009	40.0	25.15	Correlation Coefficient : 0.9996
4	1.90	0.881	35.0	22.01	
5	1.40	0.758	30.0	18.87	



Calibrated by :

Approved by :

Mr. JITTA WEE WONGMAKHEEB

Mr. RUNGSASIKORN KOSUM

High Volume Air Sampler Calibration Worksheet

Project Site :

ณมดสาครนไยเทค กบินทร์

Location :

โรงเรียนหนองมะตูม หมู่ 3

Date of measurement :

23/5/2024

Worksheet No. :

C-230524-WWL0223

 Calibration Office

WWL0103

High Volume ID :

WWL0223

 Calibrator ID :

TE-5028A

High Volume Model :

TE-5170 (TSP)

 Calibrator Model :

3271

High Volume S/N :

2738

 Calibrator S/N :

27/03/2024

Ambient Condition

Calibrate Date :

27/03/2024

Temperature (°C) :

26

 Quality Standard Slope :

1.59186

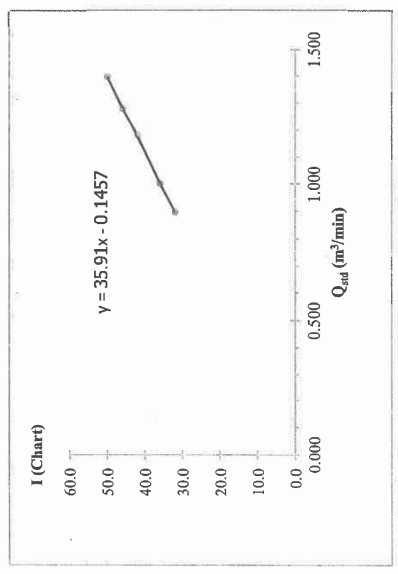
Barometric Pressure (mmHg) :

756

 Quality Standard Intercept :

-0.01922

Test No.	delta H ₂ O (inch)	Q _{ad} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.397	50.0	49.80	Slope : 35.77
2	4.10	1.279	46.0	45.81	Intercept : -0.145
3	3.50	1.183	42.0	41.83	Correlation Coefficient : 0.9991
4	2.50	1.001	36.0	35.85	
5	2.00	0.897	32.0	31.87	



Calibrated by :

Approved by :

Mr. JITTA WEE WONGMAKHEEB

Mr. RUNGSASIKORN KOSUM

High Volume Air Sampler Calibration Worksheet

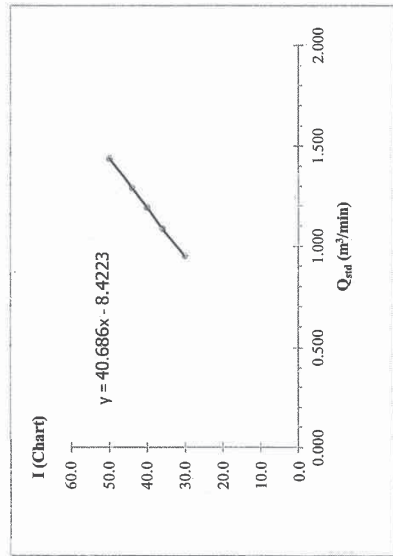
Project Site :
Location :
Date of measurement :
Worksheet No. :
High Volume ID :
High Volume Model :
High Volume S/N :
Ambient Condition :
Temperature (°C) :
Barometric Pressure (mmHg) :

ข้อมูลสถานที่ทดสอบ
บ้านลาดตะเคียน หมู่ 1
23/5/2024
C-230524-WWL0101
WWL0101
TE-6070 (PM10)
2733
26
756

Calibration Orifice
Calibrator ID :
Calibrator Model :
Calibrator S/N :
Calibrate Date :
Quality Standard Slope :
Quality Standard Intercept :

WWL0103
TE-5028A
3271
27/03/2024
0.99709
-0.01199

Test No.	delta H ₂ O (inch)	Q _{std} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.10	1.436	50.0	31.44	Slope : 25.58
2	4.10	1.289	44.0	27.67	Intercept : -5.296
3	3.50	1.192	40.0	25.15	Correlation Coefficient : 0.9998
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by :
Approved by :
Mr. JITTAWEE WONGMAKHEB
Mr. RUNGSASIKORN KOSUM

High Volume Air Sampler Calibration Worksheet

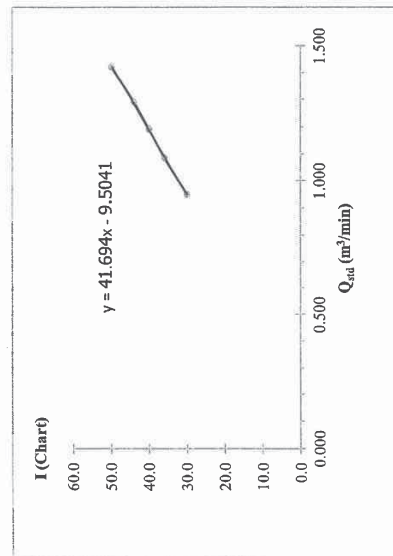
Project Site :
Location :
Date of measurement :
Worksheet No. :
High Volume ID :
High Volume Model :
High Volume S/N :
Ambient Condition :
Temperature (°C) :
Barometric Pressure (mmHg) :

ข้อมูลสถานที่ทดสอบ
บ้านลาดโพธิ์ หมู่ 13
23/5/2024
C-230524-WWL0100
WWL0100
TE-6070 (PM10)
2735
26
756

Calibration Orifice
Calibrator ID :
Calibrator Model :
Calibrator S/N :
Calibrate Date :
Quality Standard Slope :
Quality Standard Intercept :

WWL0103
TE-5028A
3271
27/03/2024
0.99709
-0.01199

Test No.	delta H ₂ O (inch)	Q _{std} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22
2	4.10	1.289	44.0	27.67	Intercept : -5.977
3	3.50	1.192	40.0	25.15	Correlation Coefficient : 0.9996
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	

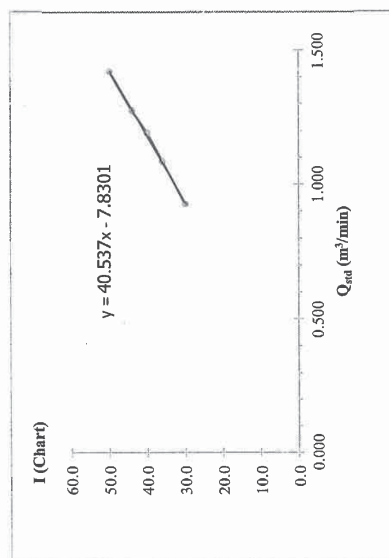


Calibrated by :
Approved by :
Mr. JITTAWEE WONGMAKHEB
Mr. RUNGSASIKORN KOSUM

High Volume Air Sampler Calibration Worksheet

Project Site : **นิคมอุตสาหกรรมไฮเทค ดันพนา**
Location : **โรงเรียนสวนกุหลาบ หมู่ 3**
Date of measurement : **23/5/2024**
Worksheet No. : **C-230524-WWL0099** Calibration Office
High Volume ID : **WWL0099** Calibrator ID : **WWL0103**
High Volume Model : **TE-6070 (PM10)** Calibrator Model : **TE-5028A**
High Volume S/N : **2739** Calibrator S/N : **3271**
Ambient Condition : **27/03/2024**
Temperature (°C) : **26** Quality Standard Slope : **0.99709**
Barometric Pressure (mmHg) : **756** Quality Standard Intercept : **-0.01199**

Test No.	delta H ₂ O (inch)	Q _{ad} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 25.49 Intercept : -4.924 Correlation Coefficient : 0.9996
2	4.00	1.273	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.10	0.926	30.0	18.87	

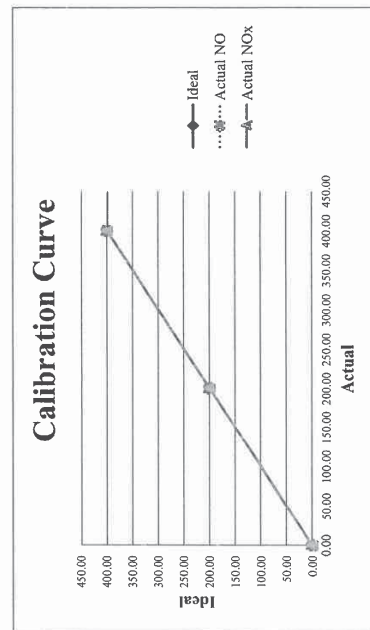


Calibrated by : **Mr. JITTAWEE WONGMAKHEB**
Approved by : **Mr. RUNGSASIKORN KOSUM**

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : **นิคมอุตสาหกรรมไฮเทค ดันพนา**
Location : **บ้านโคกมะม่วง หมู่ 8**
Date of measurement : **23 May 2024**
Worksheet No. : **C-230524-WWL 0116**
Ambient NOx Analyzer ID : **WWL 0116**
Manufacturer : **HORIBA**
Ambient NOx Analyzer Model : **APNA-370**
Ambient NOx Analyzer S/N : **9BRKGTUK**
Multi Gas Calibrator
Calibrator ID : **WWL0124**
Calibrator Model : **Series 6100**
Calibrator S/N : **S/N 7462**
Calibrate Date : **08 March 2024**
Cylinder Std. Gas
Std. Gas Concentration (PPM) : **50.90**
Cylinder Pressure (psi) : **2000**
Certified Date : **07 December 2021**
Expired Date : **07 December 2025**
Serial No. : **CC241587**

Point	CALIBRATION RESULTS					
	Ideal	Actual NO	Error NO	%Error NO	Actual NO _x	Error NO _x
ZERO	0.00	0.10	0.10	-	0.10	0.10
SPAN 200 ppb	200.00	200.00	0.00	0.00	200.10	0.10
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.10	0.10
AVERAGE (%)						0.01
						0.04



Calibrated by : **Miss SUTHIDA SINGHAPHEN**
Approved by : **Mr. RUNGSASIKORN KOSUM**
Chemist Technical Management



Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site :

"ไฮเทค กับเทร่ โลจิสติกส์ จำกัด"

Location :

บ้านลาดตะเคียน หมู่ 1

Date of measurement :

23 May 2024

Worksheet No. :

C-230524-WWL 0115

Ambient NOx Analyzer ID :

WWL 0115

Manufacturer

HORIBA

Ambient NOx Analyzer Model :

APNA-370

Ambient NOx Analyzer SN :

705KA91J

Multi Gas Calibrator

Calibrator ID :

WWL0124

Calibrator Model :

Series 6100

Calibrator S/N :

S/N 7462

Calibrate Date :

08 March 2024

Cylinder Std. Gas

Std. Gas Concentration (PPM) :

50.90

Cylinder Pressure (psi)

2000

Certified Date :

07 December 2021

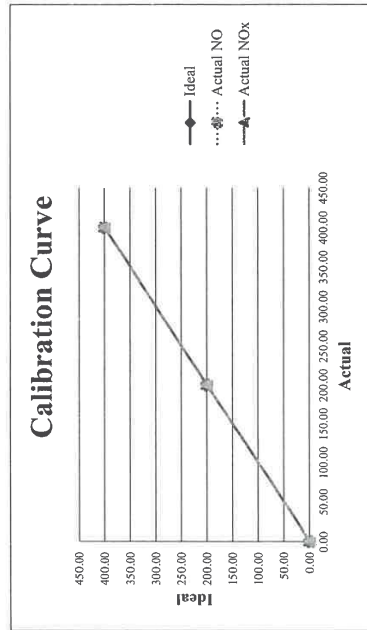
Expired Date :

07 December 2025

Serial No. :

CC241587

Point	CALIBRATION RESULTS				
	Ideal	Actual NO	Error NO	%Error NO	%Error NO _x
ZERO	0.00	0.10	0.10	0.20	0.20
SPAN 200 ppb	200.00	200.10	0.10	0.05	0.10
SPAN 400 ppb	400.00	400.20	0.20	0.05	0.05
AVERAGE (%)					0.07



Calibrated by สุวิธิดา
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by สุวิธิดา
(Mr. RUNGSAKORN KOSUM)
Technical Management



Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site :

"ไฮเทค กับเทร่ โลจิสติกส์ จำกัด"

Location :

บ้านลาดโพธิ์ หมู่ 13

Date of measurement :

23 May 2024

Worksheet No. :

C-230524-WWL 0118

Ambient NOx Analyzer ID :

WWL 0118

Manufacturer

HORIBA

Ambient NOx Analyzer Model :

APNA-370

Ambient NOx Analyzer SN :

W2VNUX08

Multi Gas Calibrator

Calibrator ID :

WWL0124

Calibrator Model :

Series 6100

Calibrator S/N :

S/N 7462

Calibrate Date :

08 March 2024

Cylinder Std. Gas

Std. Gas Concentration (PPM) :

50.90

Cylinder Pressure (psi)

2000

Certified Date :

07 December 2021

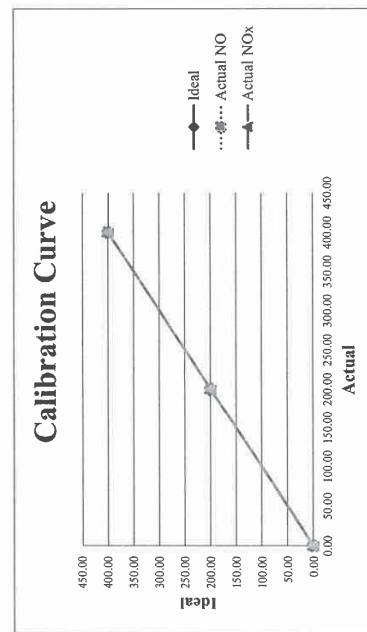
Expired Date :

07 December 2025

Serial No. :

CC241587

Point	CALIBRATION RESULTS				
	Ideal	Actual NO	Error NO	%Error NO	%Error NO _x
ZERO	0.00	0.10	0.10	0.10	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	0.05
SPAN 400 ppb	400.00	400.10	0.10	0.03	0.03
AVERAGE (%)					0.04



Calibrated by สุวิธิดา
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by สุวิธิดา
(Mr. RUNGSAKORN KOSUM)
Technical Management

บริษัท ศูนย์วิเคราะห์น้ำ จำกัด

WATER ANALYSIS CENTER COMPANY LIMITED

194 หมู่ 5 ต.คันหนาม อ.อุทัย จ.พระนครศรีอยุธยา 13210
 194 Moo 5, T. Kanham, A.U.-Thai, Ayutthaya 13210, Thailand
 Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : ไซเทค กบินทร์ โลจิสติกส์ จำกัด

Location : โรงเรือนหมั่นหนองหญ้า 3

Date of measurement : 23 May 2024

Worksheet No. : C-230524-WWL 0022

Ambient NOx Analyzer ID : WWL 0022

Manufacturer : Thermo Environmental Instruments Inc

Ambient NOx Analyzer Model : 43C

Ambient NOx Analyzer S/N : 42C-70988-367

Multi Gas Calibrator

Calibrator ID : WWL0124

Calibrator Model : Series 6100

Calibrator S/N : S/N 7462

Calibrate Date : 08 March 2024

Cylinder Std. Gas

Std. Gas Concentration (PPM) : 50.90

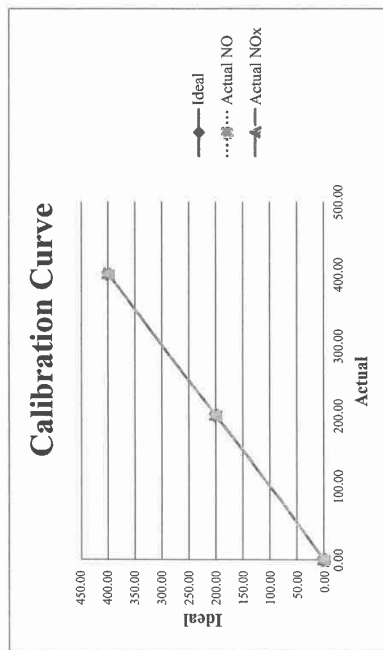
Cylinder Pressure (psi) : 2000

Certified Date : 07 December 2021

Expired Date : 07 December 2025

Serial No. : CC241587

Point	CALIBRATION RESULTS				
	Ideal	Actual NO	Error NO	Actual NO _x	Error NO _x
ZERO	0.00	0.00	0.00	0.10	0.10
SPAN 200 ppb	200.00	200.10	0.10	200.10	0.10
SPAN 400 ppb	400.00	400.10	0.10	400.10	0.10
AVERAGE (%)					0.04
					0.04



Calibrated by สุธิดา (Miss SUTHIDA SINGHAPHEN)
 Chemist

Approved by MR. RUNGSASIKORN KOSUM
 Technical Management

บริษัท ศูนย์วิเคราะห์น้ำ จำกัด

WATER ANALYSIS CENTER COMPANY LIMITED

194 หมู่ 5 ต.คันหนาม อ.อุทัย จ.พระนครศรีอยุธยา 13210
 194 Moo 5, T. Kanham, A.U.-Thai, Ayutthaya 13210, Thailand
 Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ไซเทค กบินทร์ โลจิสติกส์ จำกัด

Location : บ้านโคกมะม่วง หมู่ 8

Date of measurement : 23 May 2024

Worksheet No. : C-230524-WWL 0109

Ambient SOx Analyzer ID : WWL 0109

Manufacturer : HORIBA

Ambient SOx Analyzer Model : AFSA-370

Ambient SOx Analyzer S/N : YDL839W0

Multi Gas Calibrator

Calibrator ID : WWL0124

Calibrator Model : Series 6100

Calibrator S/N : S/N 7462

Calibrate Date : 08 March 2024

Cylinder Std. Gas

Std. Gas Concentration (PPM) : 49.68

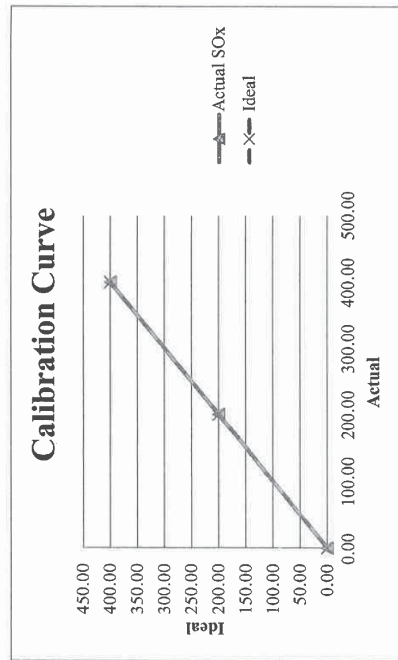
Cylinder Pressure (psi) : 2000

Certified Date : 07 December 2021

Expired Date : 07 December 2025

Serial No. : CC241587

Point	CALIBRATION RESULTS		
	Ideal	Actual SOx	Error Sox
ZERO	0.00	0.10	0.10
SPAN 200 ppb	200.00	200.10	0.10
SPAN 400 ppb	400.00	400.10	0.10
AVERAGE (%)			0.04
			0.04



Calibrated by สุธิดา (Miss SUTHIDA SINGHAPHEN)
 Chemist

Approved by MR. RUNGSASIKORN KOSUM
 Technical Management

บริษัท ศูนย์วิเคราะห์น้ำ จำกัด

WATER ANALYSIS CENTER COMPANY LIMITED

194 หมู่ 5 ต.ลำพาม อ.อุ้ม อ.พระนครศรีอยุธยา 13210
194 Moo 5, T. Kanbham, A. U-Thai, Ayuthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594



Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ไร่เทพ กบินทร์ โฉมที่ดิน 13

Location : บ้านลาดโพธิ์ หมู่ 13

Date of measurement : 23 May 2024

Worksheet No. : C-230524-WWL-0112

Ambient SOx Analyzer ID : WWL 0112

Manufacturer : HORIBA

Ambient SOx Analyzer Model : APSA-370

Ambient SOx Analyzer S/N : 8R18JBBF

Multi Gas Calibrator

Calibrator ID : WWL0124

Calibrator Model : Series 6100

Calibrator S/N : S/N 7462

Calibrate Date : 08 March 2024

Cylinder Std. Gas

Std. Gas Concentration (PPM) : 49.68

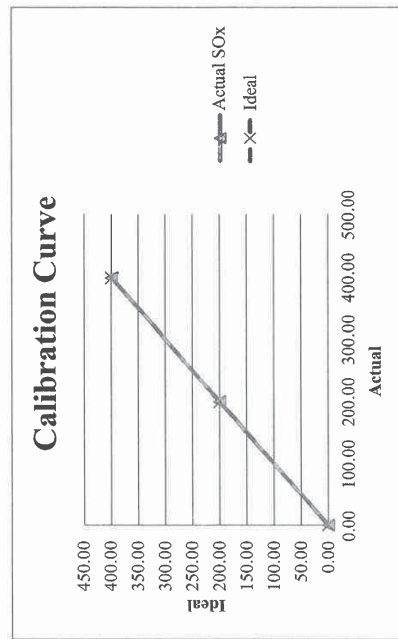
Cylinder Pressure (psi) 2000

Certified Date : 07 December 2021

Expired Date : 07 December 2025

Serial No. : CC241587

Point	CALIBRATION RESULTS		
	Ideal	Actual SOx	Error Sox
ZERO	0.00	0.10	0.10
SPAN 200 ppb	200.00	200.10	0.10
SPAN 400 ppb	400.00	400.10	0.10
AVERAGE (%)			
			0.04



Calibrated by สุธิดา
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by Run
(Mr. RUNGSASIKORN KOSUM)
Technical Management

บริษัท ศูนย์วิเคราะห์น้ำ จำกัด

WATER ANALYSIS CENTER COMPANY LIMITED

194 หมู่ 5 ต.ลำพาม อ.อุ้ม อ.พระนครศรีอยุธยา 13210
194 Moo 5, T. Kanbham, A. U-Thai, Ayuthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594



Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ไร่เทพ กบินทร์ โฉมที่ดิน 13

Location : บ้านลาดโพธิ์ หมู่ 1

Date of measurement : 23 May 2024

Worksheet No. : C-230524-WWL-0110

Ambient SOx Analyzer ID : WWL 0110

Manufacturer : HORIBA

Ambient SOx Analyzer Model : APSA-370

Ambient SOx Analyzer S/N : Y8SW7T00

Multi Gas Calibrator

Calibrator ID : WWL0124

Calibrator Model : Series 6100

Calibrator S/N : S/N 7462

Calibrate Date : 08 March 2024

Cylinder Std. Gas

Std. Gas Concentration (PPM) : 49.68

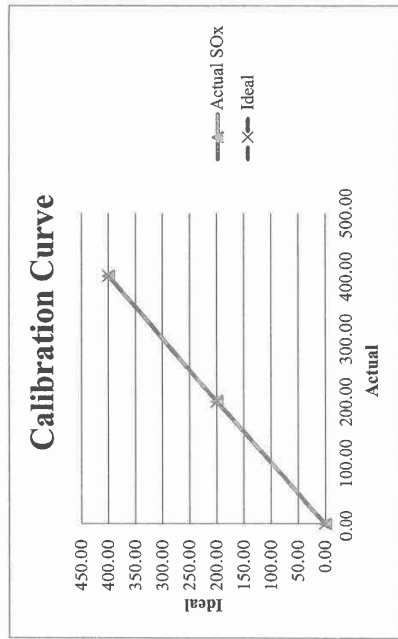
Cylinder Pressure (psi) 2000

Certified Date : 07 December 2021

Expired Date : 07 December 2025

Serial No. : CC241587

Point	CALIBRATION RESULTS		
	Ideal	Actual SOx	Error Sox
ZERO	0.00	0.10	0.10
SPAN 200 ppb	200.00	200.10	0.10
SPAN 400 ppb	400.00	400.10	0.10
AVERAGE (%)			
			0.04



Calibrated by สุธิดา
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by Run
(Mr. RUNGSASIKORN KOSUM)
Technical Management



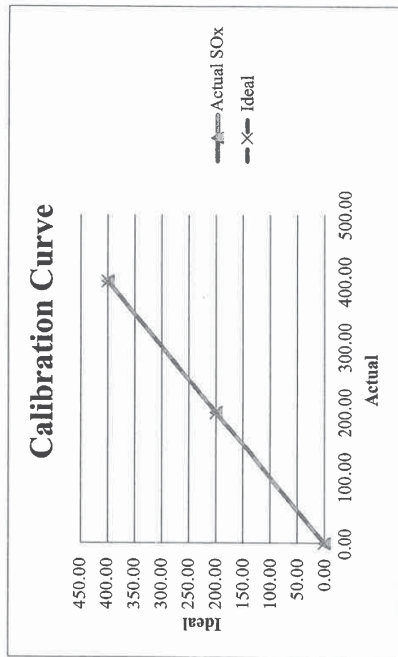
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ไสยทิศ กบินทร์ โลจิสติกส์ จำกัด
Location : โรจสีขนิพนธ์หนองหญ้าใหญ่ 3
Date of measurement : 23 May 2024
Worksheet No. : C-230524-WWL 0021
Ambient SO_x Analyzer ID : WWL 0021
Manufacturer : Thermo Environmental Instruments Inc
Ambient SO_x Analyzer Model : 43C
Ambient SO_x Analyzer S/N : 43C-58282-317

Multi Gas Calibrator
Calibrator ID : WWL0124
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 08 March 2024

Cylinder Std. Gas
Std. Gas Concentration (PPM) : 49.68
Cylinder Pressure (psi) : 2000
Certified Date : 07 December 2021
Expired Date : 07 December 2025
Serial No. : CC241587

Point	CALIBRATION RESULTS		
	Ideal	Actual SO _x	Error Sox
ZERO	0.00	0.10	0.10
SPAN 200 ppb	200.00	200.10	0.10
SPAN 400 ppb	400.00	400.10	0.10
AVERAGE (%)			0.04



Calibrated by : สุธิติ (Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by : [Signature] (Mr. RUNGSASIKORN KOSUM)
Technical Management

W	FO.LAB 6.4-1 /28	แก้ไขครั้งที่ : 0	วันที่บังคับใช้ : 1 ม.ค. 2562	หน้า : 1 ของ 1
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แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 ราชทัณฑ์ SR004 เกณฑ์การยอมรับ 93.77 ± 0.3, 113.88 ± 0.3

วันที่สอบเทียบ 09/05/67 วันที่สอบเทียบเครื่องต่อไป 08/05/68

เครื่อง Digital Thermohygro Meter S/N 105091609 ราชทัณฑ์ WWL 0055

วันที่สอบเทียบ 29/11/66 วันที่สอบเทียบเครื่องต่อไป 28/11/67

เครื่อง Sound Level Meter S/N 00396803 ราชทัณฑ์ WWL 0160

วันที่สอบเทียบ 31/05/66 วันที่สอบเทียบเครื่องต่อไป 30/05/68

การทวนสอบก่อนออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0

ความชื้นสัมพัทธ์ (%) 54 เกณฑ์การยอมรับ 50.0±15.0

วันที่ทวนสอบ 24/05/67 วันที่ทวนสอบ 01/06/67

การทวนสอบหลังการออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0

ความชื้นสัมพัทธ์ (%) 52 เกณฑ์การยอมรับ 50.0±15.0

วันที่ทวนสอบ 01/06/67

Item	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB)	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB)
1	93.8	113.9	113.9
2	93.8	113.9	113.9
3	93.8	113.9	113.9
4	93.8	113.9	113.9
5	93.8	113.9	113.9
6	93.8	113.9	113.9
7	93.8	113.9	113.9
8	93.8	113.9	113.9
9	93.8	113.9	113.9
10	93.8	113.9	113.9
X	93.80	113.90	113.90
SD	0.00	0.00	0.00
%RSD (≤ 10)	0.00	0.00	0.00
ผลการ ทวนสอบ	ผ่าน	ผ่าน	ผ่าน

ผู้บันทึก : สุภาว

ผู้ตรวจสอบ : [Signature]

W	FO.LAB 6.4-1/28	แก้ไขครั้งที่ : 0	วันที่บังคับใช้ : 1 ม.ค. 2562	หน้า : 1 ของ 1
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แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 รหัสเครื่องมือ SR004 เกณฑ์การยอมรับ 93.77 ± 0.3, 113.88 ± 0.3
วันที่สอบเทียบ 09/05/67 วันที่สอบเทียบเครื่องต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 105091609 รหัสเครื่องมือ WWL 0055
วันที่สอบเทียบ 29/11/66 วันที่สอบเทียบเครื่องต่อไป 28/11/67
เครื่อง Sound Level Meter S/N 200051 รหัสเครื่องมือ WWL 0206
วันที่สอบเทียบ 15-18/11/65 วันที่สอบเทียบเครื่องต่อไป 14/11/67

การทวนสอบก่อนออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0 อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 54 เกณฑ์การยอมรับ 50.0±15.0 ความชื้นสัมพัทธ์ (%) 52 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 24/05/67 วันที่ทวนสอบ 01/06/67

Item	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB)
1	93.8	113.9
2	93.8	113.9
3	93.8	113.9
4	93.8	113.9
5	93.8	113.9
6	93.8	113.9
7	93.8	113.9
8	93.8	113.9
9	93.8	113.9
10	93.8	113.9
X	93.80	113.90
SD	0.00	0.00
%RSD (≤ 10)	0.00	0.00
ผลการ ทวนสอบ	ผ่าน	ผ่าน

ผู้บันทึก ส.ก.จ. ผู้ตรวจสอบ ส.ก.จ.

ผู้บันทึก ส.ก.จ. ผู้ตรวจสอบ ส.ก.จ.

W	FO.LAB 6.4-1/28	แก้ไขครั้งที่ : 0	วันที่บังคับใช้ : 1 ม.ค. 2562	หน้า : 1 ของ 1
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แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 รหัสเครื่องมือ SR004 เกณฑ์การยอมรับ 93.77 ± 0.3, 113.88 ± 0.3
วันที่สอบเทียบ 09/05/67 วันที่สอบเทียบเครื่องต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 105091609 รหัสเครื่องมือ WWL 0055
วันที่สอบเทียบ 29/11/66 วันที่สอบเทียบเครื่องต่อไป 28/11/67
เครื่อง Sound Level Meter S/N 200052 รหัสเครื่องมือ WWL 0207
วันที่สอบเทียบ 15-18/11/65 วันที่สอบเทียบเครื่องต่อไป 14/11/67

การทวนสอบก่อนออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0 อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 54 เกณฑ์การยอมรับ 50.0±15.0 ความชื้นสัมพัทธ์ (%) 52 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 24/05/67 วันที่ทวนสอบ 01/06/67

Item	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB)
1	93.8	113.9
2	93.8	113.9
3	93.8	113.9
4	93.8	113.9
5	93.8	113.9
6	93.8	113.9
7	93.8	113.9
8	93.8	113.9
9	93.8	113.9
10	93.8	113.9
X	93.80	113.90
SD	0.00	0.00
%RSD (≤ 10)	0.00	0.00
ผลการ ทวนสอบ	ผ่าน	ผ่าน

ผู้บันทึก ส.ก.จ. ผู้ตรวจสอบ ส.ก.จ.

ผู้บันทึก ส.ก.จ. ผู้ตรวจสอบ ส.ก.จ.

W	FO.LAB 6.4-1/28	แก้ไขครั้งที่ : 0	วันที่บังคับใช้ : 1 ม.ค. 2562	หน้า : 1 ของ 1
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แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272	รหัสเครื่องมือ SR004	เกณฑ์การยอมรับ 93.77 ± 0.3, 113.88 ± 0.3
วันที่สอบเทียบ 09/05/67	วันที่สอบเทียบเครื่องต่อไป 08/05/68	
เครื่อง Digital Thermohygro Meter S/N 105091609	รหัสเครื่องมือ WWL-0055	
วันที่สอบเทียบ 29/11/66	วันที่สอบเทียบเครื่องต่อไป 28/11/67	
เครื่อง Sound Level Meter S/N 200053	รหัสเครื่องมือ WWL-0208	
วันที่สอบเทียบ 15-18/11/65	วันที่สอบเทียบเครื่องต่อไป 14/11/67	

การทวนสอบก่อนออกจำหน่าย

อุณหภูมิ (°C) 25	เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 54	เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 24/05/67	วันที่ทวนสอบ 01/06/67

การทวนสอบหลังจากออกจำหน่าย

อุณหภูมิ (°C) 25	เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 52	เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 01/06/67	

Item	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB)	ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB)
1	93.8	113.9	113.9
2	93.8	113.9	113.9
3	93.8	113.9	113.9
4	93.8	113.9	113.9
5	93.8	113.9	113.9
6	93.8	113.9	113.9
7	93.8	113.9	113.9
8	93.8	113.9	113.9
9	93.8	113.9	113.9
10	93.8	113.9	113.9
X	93.80	113.90	113.90
SD	0.00	0.00	0.00
%RSD (≤ 10)	0.00	0.00	0.00
ผลการ ทวนสอบ	ผ่าน	ผ่าน	ผ่าน

ผู้บันทึก	ผู้ตรวจสอบ
ผู้บันทึก	ผู้ตรวจสอบ