

ภาคผนวก ข

เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์

CERTIFICATE OF CALIBRATION

Certificate No.: C0-1908005/22 Page 1 of total 4 pages

Customer: WATER ANALYSIS CENTER CO., LTD.
30/5 Soi Viphavadee 60, Viphavadee Rangsit Road,
Kwaeng Taladbangkhen, Khet Lakai, Bangkok 10210

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: Jayhawk Laboratory (CL&GL)
Received Date: 19 August 2022
Calibration Date: 19 August 2022

Date of Issue: 22 August 2022

Checked by: Act as Technical Manager

Approved by: Representative of Managing Director

() (Krisyosol K.) () (Sakda Y.)
() (Patiphan K.) () (Onnappa P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttittwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.
FE-169 REV.02 02/24/21

Certificate No.: C0-1908005/22

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	081020	Jan. 22, 2023	NIMT
	7.01	020221	Jan. 18, 2023	
	10.00	091020	Feb. 7, 2023	

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Documenting Process Calibrator	753	3101007	I0-0804001/22	Apr. 7, 2023	THC
Digital Thermometer with Sensor	1523 / 5622	1709138 / 4605984-005	I0-1006004/22	Jun. 9, 2023	

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)

Calibrated by: Kittipong
REV.02 02/24/21



CERTIFICATE OF CALIBRATION

Certificate No.: C0-2007006/22 Page 1 of total 2 pages

Customer: WATER ANALYSIS CENTER CO., LTD.
30/5 Soi Viphavadee 60, Viphavadee Rangsit Road,
Kwaeng Taladbangkhen, Khet Lakki, Bangkok 10210

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

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

Calibration Location: Jayhawk Laboratory (CL&GL)

Received Date: 20 July 2022

Calibration Date: 20 July 2022

Date of Issue: 21 July 2022

Checked by:

Act as Technical Manager

Approved by:

Representative of Managing Director

() (Krisyosi K.) () (Sakda Y.)
() (Patiphan K.) () (Onnape P.)
() (Pongsak H.) () (Nithiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttittong)

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FE-169

REV.02 02/24/21

Certificate No.: C0-2007006/22

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	151.1 µS/cm	S211008031	Jan. 18, 2023	SCP Science
	1.421 mS/cm	S220112015	May 16, 2023	

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

- SCP Science.

Measurement Results:

Conductivity Standard Solution	Measured Value	Correction	Uncertainty (±)
151.1 µS/cm	150.9 µS/cm	0.2 µS/cm	1.5 µS/cm
1.421 mS/cm	1.423 mS/cm	-0.002 mS/cm	0.0052 mS/cm

Note: Adjustment points: 151.1µS/cm 1.421mS/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: Kitipong

REV.02 02/24/21



AUTOMATION SERVICE CO.,LTD.
CALIBRATION LABORATORY

SV 201003/2023

Cert. No. WAC-065
Page 1 of 2

CERTIFICATE OF CALIBRATION

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

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

Date Of Received : 05 / 01 / 2023
Date Of Calibration : 05 / 01 / 2023

Ambient Condition : Temperature 25 °C
Humidity 50 % RH

Calibrated By:

(Ms. Phanee Yooyen)
Technician

Approved By:

(Mr. Nipon Phungomsak)
Technical Manager

Date Of Issue : 09 / 01 / 2023

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 (PB/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	1.06657.0500	K54224057	-	30 Sep 2023

2). Traceability This certification is traceable to

- ☒ Merck KGaA 64271 Darmstadt
☒ DKK Corporation

Result Of Calibration

Standard Solution (mg/l) at 24.1°C	Before Adjust		After Adjust	
	Indicator	Error	Indicator	Error
Zero	0.00	+ 0.05	0.00	-
Span	8.25	- 1.12	8.25	-

DO Electrode No. OE270AA(5) S/N 111F0029

Calibrated By:

(Ms. Phanee Yooyen)
Technician

**TEMPERATURE
CONTROLLER ENCLOSURES**



Certificate No.: MC 2207678

Page 1 of 3

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

Reference Job No. : 22-1601 Received Date : 12 July 2022
Description : Refrigerator
Manufacturer : SANDENINTERCOOL 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 2207678) 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 : (25.8 to 27.5) °C
Relative Humidity : (48.8 to 52.2) %
Date of Calibration : 12 July 2022 Date of Issue : 19 July 2022

Checked by : Thanagorn
Thanagorn Limchaicharoen
(Calibration Supervisor)

Approved by : Aittipong
Aittipong Kanjanawasit
(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 2207678

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	
2.5	3.5	3.6	3.7	3.5	3.6	3.4	3.4	3.3	3.4	1.1

Chamber Characterization Result

Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (°C)	Temperature Uniformity (°C)	Overall Variation (°C)
2.0	2.5	1.5	0.6	3.1

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 report will certify of the calibrated equipment only.

End of Certificate

Checked by : Thanagorn

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

Certificate No.: MC 2207678

Page 2 of 3

The Reference Standard :

Description	Certificate No.	Serial No.	Due date
Data Acquisition/Switch Unit	MC 2114432	MY44096104	20 December 2022
With Thermocouple Type "T" ID. No.2/1 to 2/9			

This certificate is traceable to the international system of units maintained at:

- Master Calibration Co., Ltd.

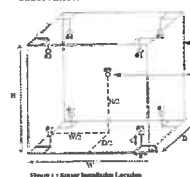
1. Calibration Procedure:

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.



Overall Ambient Temperature around the Chamber variation : 3.4 °C

Overall Line Voltage variation : 0.1 V

Chamber Size (W*H*D) : 171 cm x 157 cm x 60 cm

Checked by : Thanagorn

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

Certificate of Calibration

**TEMPERATURE
CONTROLLER ENCLOSURES**



Certificate No.: MC 2303684

Page 1 of 3

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

Reference Job No. : 23-0729 Received Date : 23 March 2023
Description : Oven
Manufacturer : Memmert Model : UF260
Serial No. : B620.0814 ID. No. : WWL0212
Marking : Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2303684) 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 : (27.1 to 29.3) °C
Relative Humidity : (38.0 to 72.2) %
Date of Calibration : 23 March 2023 Date of Issue : 24 March 2023

Checked by : Thanagorn
Thanagorn Limchaicharoen
(Calibration Supervisor)

Approved by : Aittipong
Aittipong Kanjanawasit
(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 2303684

Page 2 of 3

The Reference Standard :

Description	Certificate No.	Serial No.	Due date
Data Acquisition/Switch Unit	MC 2303173	MY41010916	9 March 2024

With Thermocouple Type "T" ID. No.17/1 to 17/9

This certificate is traceable to the international system of units maintained at:

- Master Calibration Co., Ltd.

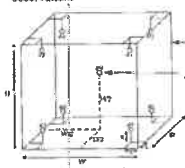
1. Calibration Procedure:

This instrument was calibration according to TIAS 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.



Overall Ambient Temperature around the Chamber variation : 0.7 °C

Overall Line Voltage variation : 0.3 V

Chamber Size (W*H*D) : 65 cm x 80 cm x 50 cm

Certificate No.: MC 2303684

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	
104	103.7	103.9	103.6	103.8	103.7	104.2	104.1	104.2	104.3	0.58
180	179.4	179.8	179.4	179.7	179.4	179.9	179.8	180.2	180.0	1.3

Chamber Characterization Result

Control Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
104	104	0.32	0.84	1.2
180	180	0.4	0.9	1.3

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 report will certify of the calibrated equipment only.

End of Certificate



Certificate of Calibration

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

Certificate No.: C01223710
Issued Date: 07 December 2022
Job No.: KSPR2215481
Page: 1 of 2

Customer: Water Analysis Center Co., Ltd.
1/84 Moo 5, Rojana Industrial Park, Rojana Road,
Tambol Kanham, Amphur U-Thai, Ayutthaya 13210 Thailand

Environment Condition: Temperature 25 °C ± 0.9 °C
Humidity 48 %RH ± 4.9 %RH

Calibration Place: Water Analysis Center Co., Ltd. (วัดคลองจั่น)
1/84 Moo 5, Rojana Industrial Park, Rojana Road,
Tambol Kanham, Amphur U-Thai, Ayutthaya 13210 Thailand

Calibration By: Mr. Pradit Siriboot
Calibration Date: 07 December 2022
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. C02221864

(Signature)
(Mr. Pradit Siriboot)

Person in charge

(Signature)
(Mr. Rungrod Jenkitrakulchai)

Authorized signatory

This certificate is based on the results of measurement according to the International System of Units (SI). It provides traceability of measurement to international (or national) standards or other recognized national standards laboratories.
The measurement uncertainty stated in this certificate 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, collected or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

Water Analysis Center Co., Ltd. only
DKSH Technology Limited
5332 หมู่ 5 ตำบลคลองจั่น อำเภอเมือง จังหวัดอยุธยา ประเทศไทย 13210

Certificate No.: C01223710

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)		100		(g)	
A	B	C	D	E			
-	0.0001	0.0001	-0.0002	-0.0001			

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

Nominal test value (g)	Standard Deviation
20	0.00007
200	0.00007

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	0.00012	2.08
2	2.00001	2.0000	0.0000	0.00012	2.08
5	5.00003	5.0000	0.0000	0.00012	2.07
10	10.00002	10.0000	0.0000	0.00013	2.07
20	20.00001	20.0000	0.0000	0.00013	2.06
50	50.00003	50.0000	0.0000	0.00014	2.04
70	70.00004	70.0001	0.0001	0.00017	2.02
100	100.00002	100.0001	0.0001	0.00018	2.01
120	120.00003	120.0001	0.0001	0.00022	2.01
150	150.00005	150.0003	0.0003	0.00024	2.00
200	200.00006	200.0004	0.0004	0.00030	2.00

The End of Certificate

Water Analysis Center Co., Ltd. only
DKSH Technology Limited
5332 หมู่ 5 ตำบลคลองจั่น อำเภอเมือง จังหวัดอยุธยา ประเทศไทย 13210



บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: 2402 AA X M918230004Customer: Water Analysis Center Co., Ltd.Date: 27 Apr 2023

Safety

- ☒ Flame, Inspect/replace o-ring nebulizer, spray chamber and burner
- ☒ Flame, Clean nebulizer, spray chamber and burner
- ☒ Flame, Check liquid trap interlock, burner interlock, pressure relief bung interlock and shield interlock
- ☐ Furnace, Clean work head, electrode and shroud N/A
- ☐ Furnace, Clean PSD and PSD tray N/A
- ☐ Furnace, Check water pressure N/A
- ☒ Check drain tube
- ☒ Check exhaust system
- ☒ Check gas pressure sensor interlock
- ☒ Check and all gas hoses for SpectraA
- ☒ Clean computer control

Optics

- ☒ Inspect/Replace that external optics surfaces
- ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.6 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 39% (should be $\leq 64\%$ or $\leq 380V$)
- ☒ Flame, Check D2 lamp is work

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บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

Electronics

- ☒ Check power supply voltage
- ☒ Check cables and connectors
- ☒ Check/Clean all boards in the instrument
- ☐ Furnace, Check camera and align** N/A

**Option for Graphite Zeeman only

Mechanisms

- ☐ Flame, Check the burner adjuster
- ☐ Furnace, Check PSD accessories N/A

Analytical performance

- ☒ Clear the sample compartment
- ☒ Flame, Check uptake rate form 7.2-10.6 mL per minute = 9.8 mL/min
- ☒ Test Photometric noise, STDV = 0.0000 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
- Air/acetic Cu 5 ppm = 0.85 Abs, and Precision
- (%RSD) = 0.5 % (should be > 0.55 Abs and $< 0.5\%$ RSD)
- or
- N2O/acet Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be > 0.3 Abs and $< 0.5\%$ RSD)
- ☐ Furnace, Characteristic mass and sensitivity Cu 25 ppb = _____ Abs, and N/A
- Precision (%RSD) = _____ % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: S. S. MahachonCustomer: Water Analysis Center Co., Ltd.

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บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: 2402 AA X M918230004Customer: Water Analysis Center Co., Ltd.Date: 26 Apr 2023

Safety

- ☐ Flame, Inspect/replace o-ring nebulizer, spray chamber and burner N/A
- ☐ Flame, Clean nebulizer, spray chamber and burner N/A
- ☐ Flame, Check liquid trap interlock, burner interlock, pressure relief bung N/A interlock and shield interlock
- ☒ Furnace, Clean work head, electrode and shroud
- ☒ Furnace, Clean PSD and PSD tray
- ☒ Furnace, Check water pressure
- ☒ Check drain tube
- ☒ Check exhaust system
- ☒ Check gas pressure sensor interlock
- ☒ Check and all gas hoses for SpectraA
- ☒ Clean computer control

Optics

- ☒ Inspect/Replace that external optics surfaces
- ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.7 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 49% (should be $\leq 64\%$ or $\leq 380V$)
- ☐ Flame, Check D2 lamp is work N/A

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บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

Electronics

- ☒ Check power supply voltage
- ☒ Check cables and connectors
- ☒ Check/Clean all boards in the instrument
- ☒ Furnace, Check camera and align**

**Option for Graphite Zeeman only

Mechanisms

- ☐ Flame, Check the burner adjuster N/A
- ☒ Furnace, Check PSD accessories

Analytical performance

- ☒ Clear the sample compartment
- ☐ Flame, Check uptake rate form 7.2-10.6 mL per minute = _____ mL/min N/A
- ☒ Test Photometric noise, STDV = 0.0002 Abs (should be ≤ 0.00050 Abs)
- ☐ Flame, Test high solids nebulizer setting use N/A
- Air/acetic Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be > 0.55 Abs and $< 0.5\%$ RSD)
- or
- N2O/acet Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be > 0.3 Abs and $< 0.5\%$ RSD)
- ☒ Furnace, Characteristic mass and sensitivity Cu 25 ppb = 0.49 Abs, and
- Precision (%RSD) = 1.7 % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: S. S. MahachonCustomer: Water Analysis Center Co., Ltd.

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BSC Certification Test Report

Page 1 of 6

Certificate No. : M01075/22
Customer Name : LABORATORY WATER ANALYSIS CENTER COMPANY LIMITED
Customer Address : 1/94 Moo 5 T.Kanburi, A.U.-Thai,
Phra Nakhon Si Ayutthaya 13210
Equipment : Biological Safety Cabinet Class II Type A2
Manufacturer : Microtech
Model : V6-T
Serial No. : 0972
ID No. : WWL0084

Were in accordance with ☒ EN 12469 ☐ NSF 49 ☐ Manufacturer's specification

Test Date : 23/09/2022

Due Date : 23/09/2023 or after HEPA filters are replaced or unit is moved

Test by : Mr. Piyaong Pusua

Approved by :

(Mr. Kridsada Thinhunthoi)
Authorized Signatory

Issued Date : 26/09/2022

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

This certificate may not be reproduced other than in full except with the prior written approval of the Megafil Company Limited.

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Certificate No. : M01075/22

Procedure Used :
: European Standard EN12469 : 2000 has the status of British Standard,
Biotechnology Performance criteria for microbiological safety cabinets.
: NSF International Standard / American National Standard NSF / ANSI 49-2008
Biosafety Cabinet : Design, Construction, Performance and Field Certification.
: Australian Standard : AS 1807.23-2000 Determination of intensity of radiation
from germicidal ultraviolet lamps.
: Manufacturer's specification.

1. Downflow velocity test.

Measurement Information

No. of Rows	No. of Readings	Grid Spacing Front-Back	Grid Spacing Side-Side	Probe height Above sash
2	8	1/4, 3/4	1/8, 3/8	100mm

Measurement Data.

0.36	0.42	0.43	0.41
0.40	0.34	0.34	0.33

Average velocity 0.38 m/s (75 FPM.) Velocity range 0.25-0.50 m/s (49-98 FPM.)

Uniformity(EN: +/-20%avg.) 0.30 - 0.46 m/s (60 - 90 FPM.)

Supply filter dimension 24 x 72 (inch x inch) Supply filter area 10.69 SQ.FT

Downflow volume (Q) 802 CFM.

Result Summary ☒ Pass ☐ Fail

Equipment used : Thermo Anemometer Model 425 S/N : 02623979 Calibration date : 14/07/2022

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Page 3 of 6

Certificate No. : M01075/22

2. Inflow velocity test.

Select method. : ☐ DIM ☒ Exhaust velocity. ☐ MFG's Specifications

0.53	0.47	0.48	0.50	0.51
0.57	0.46	0.52	0.53	0.50
0.54	0.57	0.55	0.52	0.53
0.53	0.51	0.57	0.54	0.51
0.51	0.48	0.53	0.55	0.56

Average Inflow velocity 0.44 m/s (86 FPM.) Velocity range 0.40 m/s (79 FPM.)

Inflow dimension 8 x 72 (inch x inch) Inflow area 4.00 SQ.FT

Inflow volume(Q) 344 CFM

Result Summary ☒ Pass ☐ Fail

Adjustments Required ☐ Fan Speed ☐ Damper

Equipment used : Thermo Anemometer Model 425 S/N : 02623979 Calibration date : 14/07/2022

3. HEPA filter leak test.

Measurement Data

HEPA Filter	PAO Upstream Conc.(calculated)	Specification	Measured leak penetration
Supply HEPA Filter	18 µg/l	<0.003%	<0.003%
Exhaust HEPA Filter	18 µg/l	<0.003%	<0.003%

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ภาคผนวก ข - 6

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Certificate No. : M01075/22

Leak location

Supply HEPA Filter

Back



Exhaust HEPA Filter

Back



Result Summary ☒ Pass ☐ Fail

Equipment used : Aerosol Photometer Model 21 S/N : 26468 Calibration date : 14/07/2022

Equipment used : Smoke Generator Model TDA-6D S/N : 26530

4. Airflow smoke patterns test

Measurement Information

- Downflow Pattern test : Smoke shall be passed from one end of the cabinet to the other, along the centerline of the work surface, at a height of 4 inch (10 cm) above the top of the access opening
- View screen retention test : Smoke shall be passed from one end of the cabinet to the other, 1.0 in (2.5 cm) behind the view screen, at a height 6.0 inch (15 cm) above the top of the access opening.
- Work opening edge retention test : Smoke shall be passed along the entire perimeter of the work opening. Particular attention should be paid to corners and vertical edges.
- Sash/window seal test : Smoke shall be passed up the inside of the window 2 in (5 cm) from the sides and along the top of the work area.

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Certificate No. : M01075/22

Result Summary

Downflow Pattern test	<input checked="" type="checkbox"/> Accept	<input type="checkbox"/> Non-Conforming
View screen retention test	<input checked="" type="checkbox"/> Accept	<input type="checkbox"/> Non-Conforming
Work opening edge retention test	<input checked="" type="checkbox"/> Accept	<input type="checkbox"/> Non-Conforming
Sash/window seal test	<input checked="" type="checkbox"/> Accept	<input type="checkbox"/> Non-Conforming

5. Site installation

Sash Alarm.	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A
Interlock System.	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A
Exhaust System Performance	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A

Remark / Recommendation

๖๕1๐1 Site installation ไม่มีการตรวจสอบ เนื่องจากตู้ไม่ยังฟังก์ชัน

6. Illumination Test (Lighting) : Option

Lighting should be adequate for safe working within the cabinet. Illumination measured at the work surface.

Lux			
620	965	938	561
867	1446	1492	768

Remark :

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Certificate No. : M01075/22

7. Ultraviolet Lamp Test (UV) : Option

Ultraviolet radiation where UV Lamp are fitted, the intensity of radiation at a wavelength of 254 nm. Shall be not less than 400 mW/m² when measures at work floor surface.

mW/m ²			
720	1510	1540	760
470	980	990	450

Remark :

Megafil Co., Ltd.

MG-FM-7.8-001, R00 (01/07/19)

Certificate Number

CL-026-66

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counter-clockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed m/s	D _{meas} Degree (°)	D _{ref} Degree (°)	Error Degree (°)	U (k=2) Degree (°)
5.05	45.000	41	-4	1.0
	90.000	87	-3	1.0
	135.000	133	-2	1.0
	180.000	180	0	1.0
	225.000	227	2	1.0
	270.000	273	3	1.0
	315.000	319	4	1.0
	360.000	359	-1	1.0

Remarks:

¹ Calibration results only count for the stated circumstances and environmental conditions during which calibration took place.

² Direction of standard

³ Direction of Unit Under Calibration



End of Certificate of Calibration



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Tel: +6688388812
Mobile: +66883399453
E-mail: jnac-calibration@jiranate.com
Web site: www.jiranate.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TIS-TIS 17025
CALIBRATION 6367

At speed measurement laboratory
Calibration services department.

Certificate Number

CL-026-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM	Wind Direction Sensor
MANUFACTURER	Novelty
MODEL/TYPE	Sensor: WS-42F Data logger: Z30-WS-25LB
SERIAL NUMBER	Sensor: K6-040 Data logger: AS040
ID NUMBER	-
CONDITION AS RECEIVED	Used item
CUSTOMER	Water Analysis Center Co., Ltd. 94/1 Moo 5, T.kanham, A.U-thai, Ayutthaya 13210

RECEIVED DATE	10 Mar 2023
MEASUREMENT DATE	13 Mar 2023
ISSUE DATE	13 Mar 2023

ENVIRONMENTAL CONDITIONS:	
Ambient condition in the laboratory are as follow:	
Temperature	23.0 ± 3.0 °C
Relative Humidity	55.0 ± 15.0 %RH
Atmospheric Pressure	1010 ± 10 hPa

PLACE OF CALIBRATION : Effel-type wind tunnel of Jiranate Associates Co., Ltd.

CALIBRATION CONDITION	Wind tunnel cross-section area ¹	900	cm ²
	Win direction frontal area ²	119	cm ²
	Diameter of mounting pipe ³	-	mm
	Blockage ratio by test object ⁴	0.143	%

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.8)°C, (41.2) %RH and (1012.5) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
EJ Mr. Sarawit Thanyaphol
CJ Miss Jiraporn Lertchiraphol



Approved signature:

Mr. Parvise Soodchuan
Calibration Department Manager

Remarks:
¹ Nozzle cross-section area of the wind tunnel
² Projected cross-section area of the tested object include mounting pipe
³ Diameter of mounting pipe
⁴ Ratio "to"

1. Absolute Sensitivity

Reference	Unit Under Test				Tolerance
Acoustic Signal (dB)	Measured Value (dB)		Deviation (dB)	Uncertainty (±dB)	Limit Class 2 (±dB)
	Before adjust	After adjust			
	113.88	113.7	113.9	0.0	

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 124.9 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)
18.6	0.10

2.2 The microphone of the sound level meter was replaced by electrical signal input device

Frequency Weighting	Measured Value (dB)	Uncertainty (±dB)
A-Weighting	13.1	0.10
C-Weighting	18.7	0.10
Flat	24.2	0.10

Date of Calibration : 13-14 Jun. 2022

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5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
A-weighting	94.0	0.0	0.20	0.4
C-weighting	94.0	0.0	0.20	0.4
Flat	94.0	0.0	0.20	0.4

5.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
Fast	94.0	0.0	0.20	0.3
Slow	94.0	0.0	0.20	0.3
Leq	94.0	0.0	0.20	0.3

6. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
137	137.0	0.0	0.30	1.4
136	136.0	0.0	0.30	1.4
135	135.0	0.0	0.30	1.4
134	134.0	0.0	0.30	1.4
133	133.0	0.0	0.30	1.4
132	132.0	0.0	0.30	1.4
131	131.0	0.0	0.30	1.4

Date of Calibration : 13-14 Jun. 2022

5 / 8

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3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
125	-0.3	-0.2	-0.2	0.40	2.0
1 000	0.2	0.2	0.2	0.40	1.4
4 000	0.3	0.3	0.3	0.40	3.6

4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from response curve			Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
	A-weighting (dB)	C-weighting (dB)	Flat (dB)		
63	0.0	-0.1	0.0	0.20	2.5
125	-0.1	0.0	0.0	0.20	2.0
250	-0.1	0.0	0.0	0.20	1.9
500	-0.1	0.0	0.0	0.20	1.9
1 000	0.0	0.0	0.0	0.20	1.4
2 000	0.0	0.0	0.0	0.20	2.6
4 000	0.0	0.0	0.0	0.20	3.6
8 000	0.1	0.1	0.0	0.20	5.6

Date of Calibration : 13-14 Jun. 2022

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6. Level linearity on the reference level range (cont.)

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Uncertainty (±dB)	Tolerance Limits Class 2 (±dB)
130	130.0	0.0	0.30	1.4
129	129.0	0.0	0.30	1.4
124	124.0	0.0	0.30	1.4
119	119.0	0.0	0.30	1.4
114	114.0	0.0	0.30	1.4
109	109.0	0.0	0.30	1.4
104	104.0	0.0	0.30	1.4
99	99.0	0.0	0.30	1.4
94	94.0	0.0	0.30	1.4
89	89.0	0.0	0.30	1.4
84	84.1	0.1	0.30	1.4
79	79.0	0.0	0.30	1.4
74	74.0	0.0	0.30	1.4
69	69.0	0.0	0.30	1.4
64	64.0	0.0	0.30	1.4
59	59.0	0.0	0.30	1.4
54	53.9	-0.1	0.30	1.4
49	49.0	0.0	0.30	1.4
44	44.0	0.0	0.30	1.4
39	38.9	-0.1	0.30	1.4
34	34.0	0.0	0.30	1.4
29	29.0	0.0	0.30	1.4
28	28.0	0.0	0.30	1.4

Date of Calibration : 13-14 Jun. 2022

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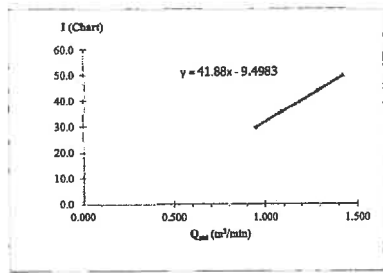


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WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.สามขา อ.อุ้มผาง จ.พิจิตร 33210
194 Moo 5, T.Samkha, A.Um Phang, Ayutthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Project Site : สถานีสถานการณ์โรงเขาสถา (โครงการ 4) Page 1 of 1
Location : บ้านวังจันทน์
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0098 Calibration Office
High Volume ID : WWL0098 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 654 Calibrator S/N : 3271
Ambient Condition : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.00155
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.416	50.0	31.44	Slope: 26.34 Intercept: -5.973 Correlation Coefficient: 0.9996
2	4.10	1.283	44.0	27.67	
3	3.50	1.186	40.0	25.15	
4	2.90	1.081	36.0	22.64	
5	2.20	0.943	30.0	18.87	



Calibrated by : ร.อ.บ.

Mr. RATTAPOL BAIKAI

Approved by : ร.อ.บ.

Mr. RUNGSASIKORN KOSUM

POLAB 5.5-1/25

แก้ไขครั้งที่: 1 วันที่แก้ไข: 1 ธ.ค. 2560 หน้า: 1 ของ 1

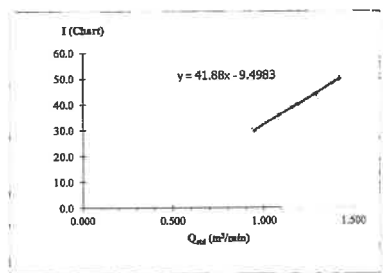


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High Volume Air Sampler Calibration Worksheet

Project Site : สถานีสถานการณ์โรงเขาสถา (โครงการ 4) Page 1 of 1
Location : บ้านวังจันทน์
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0101 Calibration Office
High Volume ID : WWL0101 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 654 Calibrator S/N : 3271
Ambient Condition : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.00155
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.416	50.0	31.44	Slope: 26.34 Intercept: -5.973 Correlation Coefficient: 0.9996
2	4.10	1.283	44.0	27.67	
3	3.50	1.186	40.0	25.15	
4	2.90	1.081	36.0	22.64	
5	2.20	0.943	30.0	18.87	



Calibrated by : ร.อ.บ.

Mr. RATTAPOL BAIKAI

Approved by : ร.อ.บ.

Mr. RUNGSASIKORN KOSUM

POLAB 5.5-1/25

แก้ไขครั้งที่: 1 วันที่แก้ไข: 1 ธ.ค. 2560 หน้า: 1 ของ 1

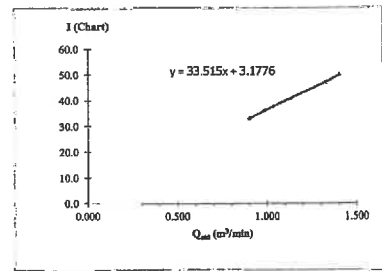


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High Volume Air Sampler Calibration Worksheet

Project Site : สถานีสถานการณ์โรงเขาสถา (โครงการ 4) Page 1 of 1
Location : บ้านวังจันทน์
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0096 Calibration Office
High Volume ID : WWL0096 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2729 Calibrator S/N : 3271
Ambient Condition : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.59945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01874

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.390	50.0	49.80	Slope: 33.38 Intercept: 3.165 Correlation Coefficient: 0.9995
2	4.40	1.318	47.0	46.81	
3	3.20	1.126	41.0	40.83	
4	2.40	0.976	36.0	35.85	
5	2.00	0.892	33.0	32.87	



Calibrated by : ร.อ.บ.

Mr. RATTAPOL BAIKAI

Approved by : ร.อ.บ.

Mr. RUNGSASIKORN KOSUM

POLAB 5.5-1/25

แก้ไขครั้งที่: 1 วันที่แก้ไข: 1 ธ.ค. 2560 หน้า: 1 ของ 1

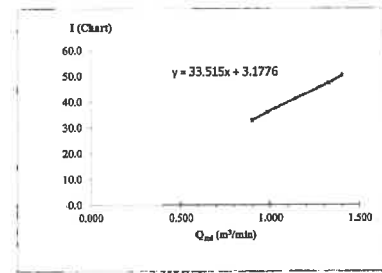


บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.สามขา อ.อุ้มผาง จ.พิจิตร 33210
194 Moo 5, T.Samkha, A.Um Phang, Ayutthaya 13210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Project Site : สถานีสถานการณ์โรงเขาสถา (โครงการ 4) Page 1 of 1
Location : บ้านวังจันทน์
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0095 Calibration Office
High Volume ID : WWL0095 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2729 Calibrator S/N : 3271
Ambient Condition : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.59945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01874

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.390	50.0	49.80	Slope: 33.38 Intercept: 3.165 Correlation Coefficient: 0.9995
2	4.40	1.318	47.0	46.81	
3	3.20	1.126	41.0	40.83	
4	2.40	0.976	36.0	35.85	
5	2.00	0.892	33.0	32.87	



Calibrated by : ร.อ.บ.

Mr. RATTAPOL BAIKAI

Approved by : ร.อ.บ.

Mr. RUNGSASIKORN KOSUM

POLAB 5.5-1/25

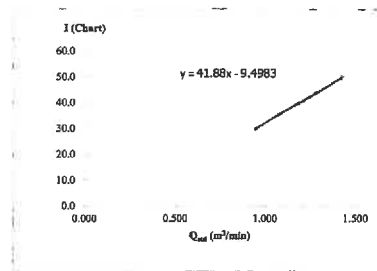
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High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 4) Page 1 of 1
Location : ถนน มุมลงน้ำใหม่
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0100 Calibration Orifice : WWL0103
High Volume ID : WWL0100 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 654 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.00155
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

Test No.	delta H ₂ O (inch)	Q _{as} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.416	50.0	31.44	Slope : 26.34 Intercept : -5.973 Correlation Coefficient : 0.9996
2	4.10	1.283	44.0	27.67	
3	3.50	1.186	40.0	25.15	
4	2.90	1.081	36.0	22.64	
5	2.20	0.943	30.0	18.87	



Calibrated by : Approved by :
Mr. RATTAPOL BAIKAI Mr. RUNGRASAKORN KOSUM

POLAB 5.5-1/25

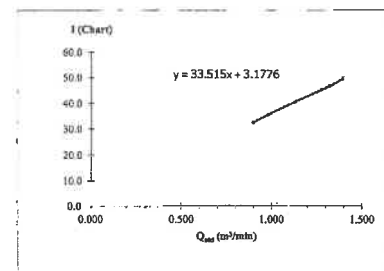
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High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 4) Page 1 of 1
Location : ถนน มุมลงน้ำใหม่
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0094 Calibration Orifice : WWL0094
High Volume ID : WWL0094 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2729 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.59945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01874

Test No.	delta H ₂ O (inch)	Q _{as} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.390	50.0	49.80	Slope : 33.38 Intercept : 3.165 Correlation Coefficient : 0.9995
2	4.40	1.318	47.0	46.81	
3	3.20	1.126	41.0	40.83	
4	2.40	0.976	36.0	35.85	
5	2.00	0.892	33.0	32.87	



Calibrated by : Approved by :
Mr. RATTAPOL BAIKAI Mr. RUNGRASAKORN KOSUM

POLAB 5.5-1/25

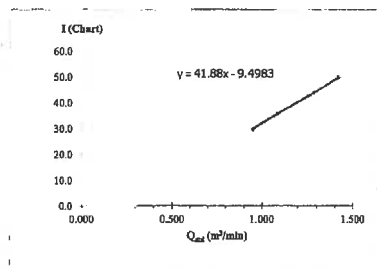
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High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 4) Page 1 of 1
Location : ถนน มุมลงน้ำใหม่
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0099 Calibration Orifice : WWL0099
High Volume ID : WWL0099 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 654 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.00155
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

Test No.	delta H ₂ O (inch)	Q _{as} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.416	50.0	31.44	Slope : 26.34 Intercept : -5.973 Correlation Coefficient : 0.9996
2	4.10	1.283	44.0	27.67	
3	3.50	1.186	40.0	25.15	
4	2.90	1.081	36.0	22.64	
5	2.20	0.943	30.0	18.87	



Calibrated by : Approved by :
Mr. RATTAPOL BAIKAI Mr. RUNGRASAKORN KOSUM

POLAB 5.5-1/25

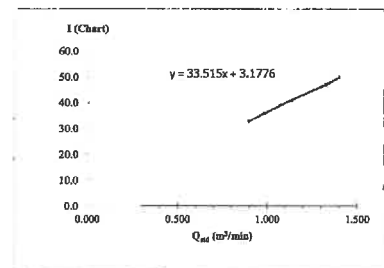
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High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 4) Page 1 of 1
Location : ที่ทำการสำนักงานที่ดินออกของโครงการ (A5)
Date of measurement : 23/6/2023
Worksheet No. : C-230623-WWL0095 Calibration Orifice : WWL0095
High Volume ID : WWL0095 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2729 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 11/02/2022
Temperature (°C) : 26 Quality Standard Slope : 1.59945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01874

Test No.	delta H ₂ O (inch)	Q _{as} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.390	50.0	49.80	Slope : 33.38 Intercept : 3.165 Correlation Coefficient : 0.9995
2	4.40	1.318	47.0	46.81	
3	3.20	1.126	41.0	40.83	
4	2.40	0.976	36.0	35.85	
5	2.00	0.892	33.0	32.87	



Calibrated by : Approved by :
Mr. RATTAPOL BAIKAI Mr. RUNGRASAKORN KOSUM

POLAB 5.5-1/25

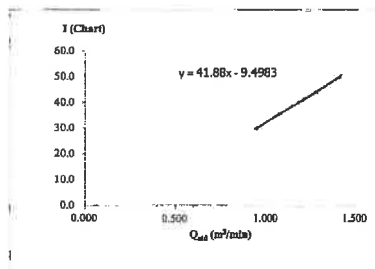
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High Volume Air Sampler Calibration Worksheet

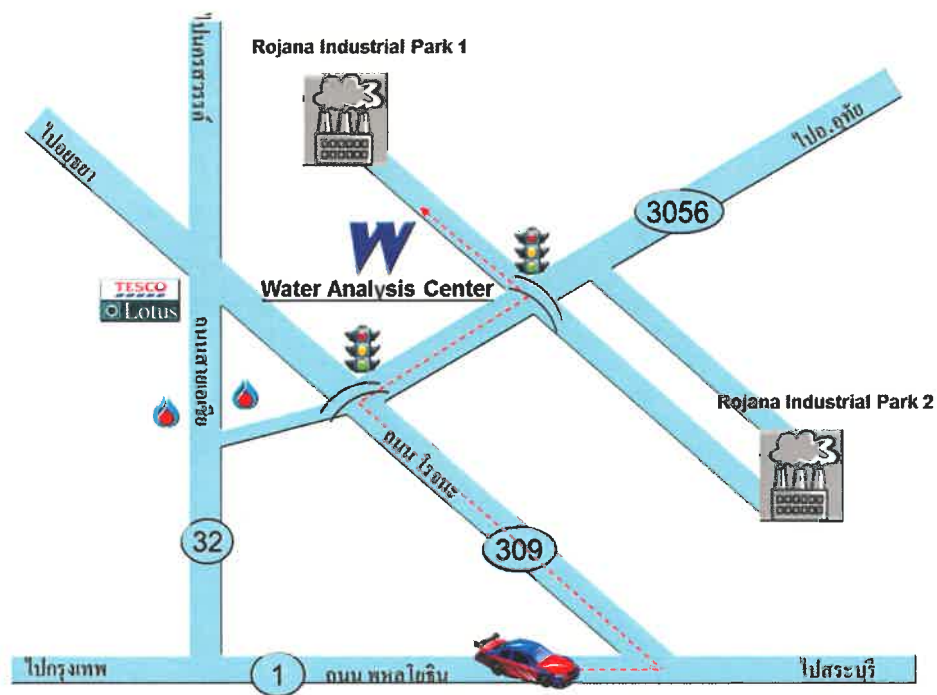
Project Site : ศูนย์พัฒนาการเกษตร (โครงการ 4) Page 1 of 1
Location : พื้นที่การเกษตรที่ศูนย์พัฒนาการเกษตร (AS)
Date of measurement : 23/6/2023
Worksheet No. : C-238623-WWL0100 Calibration Office : WWL0103
High Volume ID : WWL0100 Calibrator ID : TE-5028A
High Volume Model : TE-6070 (PM10) Calibrator Model : 3271
High Volume S/N : 654 Calibrator S/N : 11/02/2022
Ambient Condition : 26 Calibrate Date : 1.00155
Temperature (°C) : 756 Quality Standard Slope : -0.01185
Barometric Pressure (mmHg) : Quality Standard Intercept :

Test No.	delta H ₂ O (inch)	Q _{ad} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.416	50.0	31.44	Slope : 26.34 Intercept : -5.973 Correlation Coefficient : 0.9996
2	4.10	1.283	44.0	27.67	
3	3.50	1.186	40.0	25.15	
4	2.90	1.081	36.0	22.64	
5	2.20	0.943	30.0	18.87	



Calibrated by : Y. Rattapol
Mr. RATTAPOL BAIKAI

Approved by : Mr. Rungrasheerorn Kosum
Mr. RUNGRASHEERORN KOSUM



บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
 1/94 หมู่ที่ 5 ต.คานหาม อ.อุทัย จ.พระนครศรีอยุธยา 13210
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