

ภาคผนวก ช

สำเนาหนังสือรับรองห้องปฏิบัติการวิเคราะห์เอกชน

CERTIFICATE OF CALIBRATION

Certificate No.: CO-1608001/24 Page 1 of total 4 pages

Customer: WATER ANALYSIS CENTER CO., LTD.
1/94 Moo 5, T.Kanham,
A.U-thai, Ayutthaya 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: Jayhawk Laboratory (CL&GL)

Received Date: 16 August 2024

Calibration Date: 16 August 2024

Date of Issue: 19 August 2024

Condition of Artifacts: Used conditions but can be calibrated

Checked by:

Act as Technical Manager

Approved by:

Representative of Managing Director

(Dr. Ekachai Puttiwong)

() (Krisyosi K.) () (Sakda Y.)
() (Patiphan K.) () (Onnapa P.)
() (Pongsak H.) () (Nithiphong 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.

FE-169

REV.02 02/24/21

Certificate No.: CO-1608001/24

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	150823	Feb. 9, 2025	NIMT
	7.01	180723	Jan. 12, 2025	
	10.01	160823	Jan. 16, 2025	

Type	Serial No.	Certificate No.	Due Date	Traceability
Documenting Process Calibrator	2630521	10-2312001/23	Dec. 24, 2024	THC
Digital Thermometer with Sensor	1709138 / 4605984-005	10-0806001/24	Jun. 7, 2025	

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	177.3	0.060
0.00	7.00	7.00	-0.1	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: Athipat
REV.02 02/24/21

FE-169

Certificate No.: CO-1608001/24

Page 3 of total 4 pages

Measurement Results (Cont.):

2. Calibration of pH Electrode (Serial No.: 3222623)

pH Standard Solution (pH)	Measured Value		Uncertainty (± pH)
	(pH)	(mV)	
4.01	4.01	186.1	0.013
7.01	7.01	9.3	0.013
10.01	10.00	-164.5	0.013

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

Temperature stability of micro bath : 25 ± 0.2 °C

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%.

Certificate No.: CO-1608001/24

Page 4 of total 4 pages

Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- 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 Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	B7C853	10-0911001/23	Nov. 8, 2024	THC
Platinum Resistance Thermometer	4854	C0A30047	Oct. 22, 2025	FLUKE
Liquid Bath	XO111019	10-2405001/23	May 25, 2025	THC

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

- THC, Thai Heart Calibration Co., Ltd.
- FLUKE, Fluke Corporation, U.S.A.

Measurement Results:

(X) Without Adjustment

Dimension of probe : Diameter 4 mm, Sensor Type : RTD (PT100)

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
120	22.00	22.2	-0.20	0.065
120	25.00	25.2	-0.20	0.065
120	28.00	28.2	-0.20	0.065

UUC : Unit Under Calibration

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: Athipat
REV.02 02/24/21

FE-169

ภาคผนวก ข-1

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

FE-169

CERTIFICATE OF CALIBRATION

Certificate No.: C0-1607004/24 Page 1 of total 2 pages

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

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

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: -

Calibration Location Jayhawks Laboratory (CI&GI.)

Received Date 16 July 2024

Calibration Date 18 July 2024

Date of Issue 18 July 2024

Condition of Artifacts Used conditions but can be calibrated

Checked by: Approved by:

Act as Technical Manager

Representative of Managing Director

() (Krisyos K.) () (Sakda Y.) (Dr. Ekachai Puttittong)
() (Patiphan K.) (✓) (Onnapa P.)
() (Pongsak H.) () (Nitiphong 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.
FE-169 REV.02 02/24/21

Certificate No.: C0-1607004/24

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	147.1 $\mu\text{S/cm}$ 1.423 mS/cm	S230330005 S231129006	Nov. 9, 2024 May 13, 2025	SCP Science SCP Science

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)
147.1 $\mu\text{S/cm}$	149.0 $\mu\text{S/cm}$	-1.9 $\mu\text{S/cm}$	2.5 $\mu\text{S/cm}$
1.423 mS/cm	1.425 mS/cm	-0.002 mS/cm	0.0052 mS/cm

Note : Adjustment points: 147.1 $\mu\text{S/cm}$ 1.423 mS/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: Aithipet
REV.02 02/24/21

Certificate of Calibration

TEMPERATURE CONTROLLER ENCLOSURES



Certificate No.: MC 2407449

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

Reference Job No. : 24-1546 **Received Date** : 9 July 2024
Description : Refrigerator **Resolution** : 0.1 $^\circ\text{C}$
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 2407449) has been attached to the case.
Method : In-house calibration procedure MWI-T-033 this method Base on TLAS G-20-1402-08 "Temperature Controlled Enclosures".
Location of Calibration : Water Analysis Center Co., Ltd. ; Laboratory.
Environmental Conditions : Ambient Temperature : $(25.2 \text{ to } 25.4) ^\circ\text{C}$
Relative Humidity : $(62.1 \text{ to } 63.3) \%$
Date of Calibration : 9 July 2024 **Date of Issue** : 10 July 2024

Checked by:
Chalermkit Rakphada
(Calibration Engineer)

Approved by:
Aittipong Kanjana-est
(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 2407449

Page 2 of 3

Reference Standard Instrument :

Description : Data Acquisition/Switch Unit
Certificate No. : MC 2309074
Serial No. : MY-44012056
Due date : 7 Aug 2024
Traceable thru : MCAL
With Thermocouple Type " T " ID. No.1471 to 1479

Traceability :

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

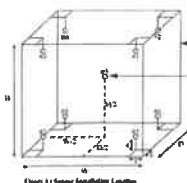
1. Calibration Procedure:

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.



Overall Ambient Temperature around the Chamber variation : 4.2 $^\circ\text{C}$

Overall Line Voltage variation : 0.1 V

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

Checked by:

Certificate No.: MC 2407449

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	
3.0	4.2	4.0	4.0	4.0	4.0	3.7	3.8	3.5	3.3	1.0

Chamber Characterization Result

Desired Temperature (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
4.0	3.0	3.0	0.8	0.9	2.1

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 : Chalermkrit

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



AUTOMATION SERVICE CO.,LTD.
CALIBRATION LABORATORY

Instrument : DO Meter
Model : DO-31P
Serial No. : 789065

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	-	-	-

- 2). Traceability This certification is traceable to
- ☒ Kanto Chemical Co.,INC.
 - ☐ DKK Corporation

Result Of Calibration

Standard Solution (mM) 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(5) S/N 111F0029

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



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. : 789065
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 °C
Humidity 58 % RH

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

Approved By : N. Nipon
(Mr. Nipon Nungsomsak)
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. 525/9251 Soi Pattanakorn32, Pattanakorn Rd., Suanluang, Suanluang, Bangkok 10250
Tel. 02-319-9994 ext. 721,725 | E-mail : info@automation.co.th, service@automation.co.th | www.automation.co.th



Inctech Metrological Center Co.,Ltd.
39/1 Soi 82, Sukhapibon 5 Rd., O ngon,
Salmel, Bangkok 10220, Thailand
Tel. (862) 909-8820 (Auto 10 line) www.imctrustment.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, Ayutthaya 13210

Description : Hot Air Oven
Manufacturer : Memmert
Model : UF 280
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 : (20±10) °C
Humidity : (50±10) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-008 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Eukmet 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	34872A	MY49020095	MT23-7153	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 coverage factor $k = 2$, providing a level of confidence of not less than 95%

Calibrated by : Mr.Yuttakom Jamsensri

Approved by : Mr.Panuwat Phutian
Issue date : Apr 10, 2024

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

Rev.03 / Feb 2024

FM-MT-013



Inctech Metrological Center Co.,Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Salmel, Bangkok 10220, Thailand
Tel. (662) 509-8820 (Auto 10 lines) www.imcinstrument.com



Certificate No. : MT24-3208

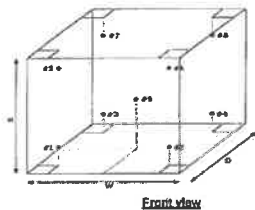
Page : 2 of 2

Function : Temperature measurement
Calibration point : 104, 180 °C

Result : Without adjustment
Resolution : 0.1 °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	103.833	103.871	103.988	103.990	104.081	103.843	104.217	104.022	0.45
180	179.685	179.853	180.047	179.985	179.608	180.088	180.085	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	0.66	1.2



#1 Lower Left Front
#2 Lower Right Front
#3 Lower Left Rear
#4 Lower Right Rear
#5 Upper Left Front
#6 Upper Right Front
#7 Upper Left Rear
#8 Upper Right Rear
#9 Geometric Center

Front View

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.

Rev.03 / Feb 2024

-00-

FM-MT-015



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		100 (g)				
		Reference Points (g)				
A	B	C	D	E		
-	0.0000	0.0001	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	0.00018	2.01
100	99.99998	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

IMC Instrument Center Co., Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Salmel, Bangkok 10220, Thailand
Tel. (662) 509-8820 (Auto 10 lines) www.imcinstrument.com

Delivering Growth - In Asia and Beyond.

CAL-FIM-C01-14: 12 Sep 2022



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.
1/84 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. (วัดน้ำสะอาด)
1/84 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

Mr. Polawad Ruamrup

(Mr. Polawad Ruamrup)
Person in charge

Mr. Rungrod Jenkitrakulchai

(Mr. Rungrod Jenkitrakulchai)
Authorized signatory

This certificate is issued to the unit of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratory.

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.

DKSH Technology Limited
2525 Sukhumvit Road, Bangkok, Thailand 10110
Phone: +66 2628 2000 Email: info@dksh.com Website: www.dksh.com

Delivering Growth - In Asia and Beyond.

CAL-FIM-C01-14: 12 Sep 2022



MEGAFIL CO., LTD.

99/183 Moo 3 Tambon Bang Rak Noi Amphur Muang Nonthaburi 11000
Tel. 0-2528-6081-2 Fax. 0-2528-6083, 0-2525-7034
www.megafil.co.th E-mail: megafil.group@gmail.com

BSC Certification Test Report

Page 1 of 6

Certificate No. : M1439/24

Customer Name : LABORATORY WATER ANALYSIS CENTER COMPANY LIMITED

Customer Address : 1/84 Moo 5 Khan Ham Subdistrict,
Uthai District, Phra Nakhon Si Ayutthaya 13210

Equipment : Biological Safety Cabinet Class II Type A2

Manufacturer : Microtech

Model : V6-T

Serial No : 09728097272

ID No. : WWL 0084

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

Test Date : 15/10/2024

Due Date : 15/10/2025 or after HEPA filters are replaced or unit is moved

Test by : Mr. Pawut Wongnarakornkul

Approved by :

(Mr. Kridsada Thinhutoci)

Authorized Signatory

Issued Date : 16/10/2024

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.

Megafil Co., Ltd.

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

ภาคผนวก ข-4

Certificate No. : M1439/24

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. (m/s.)

0.37	0.43	0.41	0.39
0.36	0.35	0.32	0.34

Average velocity 0.37 m/s (73 FPM.) Velocity range 0.25-0.50 m/s (49-98 FPM.)

Uniformity(EN: +/-20%avg.) 0.30 - 0.44 m/s (58 - 88 FPM.)

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

Downflow volume (Q) 780 CFM.

Result Summary ☒ Pass ☐ Fail

Equipment used : Thermo Anemometer Model 425 S/N : 02968605 Calibration date : 10/05/2024

Certificate No. : M1439/24

2. Inflow velocity test.

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

MFG's Specifications method

0.54	0.57	0.55	0.54	0.55
0.56	0.55	0.56	0.57	0.54
0.59	0.53	0.54	0.57	0.56
0.53	0.6	0.56	0.53	0.58
0.55	0.58	0.54	0.53	0.55

(m/s.)

Average Inflow velocity 0.47 m/s (93 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) 372 CFM

Result Summary ☒ Pass ☐ Fail

Adjustments Required ☐ Fan Speed ☐ Damper

Equipment used : Thermo Anemometer Model 425 S/N : 02968605 Calibration date : 10/05/2024

3. HEPA filter leak test.

Measurement Data

HEPA Filter	PAO Upstream Conc.(calculated)	Specification	Measured leak penetration
Supply HEPA Filter	18 µg/L	<0.01%	<0.01%
Exhaust HEPA Filter	18 µg/L	<0.01%	<0.01%

Certificate No. : M1439/24

Leak location

Supply HEPA Filter
Back

Exhaust HEPA Filter
Back



Result Summary ☒ Pass ☐ Fail

Equipment used : Aerosol Photometer Model TDA-2H S/N : 20138 Calibration date : 08/05/2024

Equipment used : Smoke Generator Model TDA-6C S/N : 20192

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.

Certificate No. : M1439/24

Result Summary

Downflow Pattern test ☒ Accept ☐ Non-Conforming
View screen retention test ☒ Accept ☐ Non-Conforming
Work opening edge retention test ☒ Accept ☐ Non-Conforming
Sash/window seal test ☒ Accept ☐ Non-Conforming

5. Site installation

Sash Alarm. ☐ Pass ☐ Fail ☒ N/A
Interlock System. ☐ Pass ☐ Fail ☒ N/A
Exhaust System Performance ☐ Pass ☐ Fail ☒ N/A

Remark / Recommendation

ระบบ Site installation ไม่มีการตรวจสอบ เนื่องจากไม่มีฟังก์ชันนี้

6. Illumination Test (Lighting) : Option

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

Lux

585	936	917	514
849	1400	1465	755

Equipment used : Digital Light Meter Model Bry View 31 S/N : 160404993 Calibration date : 08/05/2024

Remark :

Certificate No. : M1439/24

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/m²

630	1450	1480	690
380	920	930	390

Equipment used : UVC LIGHT METER Model UVC-254SD S/N : Q879819 Calibration date : 08/05/2024

Remark :

-o0o-

Certificate of Calibration

LIQUID BATH



Certificate No.: MC 2314268

Page 1 of 3

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

Reference Job No. : 23-2833 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 Karjaneaset
(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	MC 2301270	MY44020009	9 Mar 2024	MCAL

With Thermocouple Type " T " ID. No.27/1 to 27/5

Traceability :

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

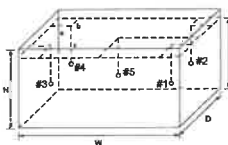
1. Calibration Procedure:

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 : Chalermkit

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

ภาคผนวก ข-6

Certificate No.: MC 2314268

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	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 : Chalermkit

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

Certificate of Calibration

TEMPERATURE CONTROLLER ENCLOSURES



Certificate No.: MC 2314270

Page 1 of 3



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

Reference Job No. : 23-2833 Received Date : 15 December 2023
Description : Incubator
Manufacturer : Memmert Model : IN260
Serial No. : D619.0170 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 Kanjanasit
(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 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

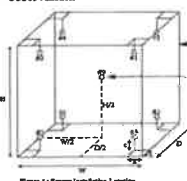
1. Calibration Procedure:

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.



Overall Ambient Temperature around the Chamber variation : 0.4 °C

Overall Line Voltage variation : 0.0 V

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

Checked by : Chalermkit

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

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 : Chalermkit

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

Certificate of Calibration

AUTOClave



Certificate No.: MC 2314269

Page 1 of 3



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

Reference Job No. : 23-2833 Received Date : 15 December 2023
Description : Autoclave
Manufacturer : TOMY Model : Autoclave ES-315
Serial No. : 51135128 ID. No. : WWL 0083
Marking : Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2314269) has been attached to the case.
Method : In-House calibration procedure MWI-T-036 this method is reference to based on BS 2646 : 1993 Part 5 "Autoclave".
Location of Calibration : Water Analysis Center Co., Ltd. ; Laboratory.
Environmental Condition : Ambient Temperature : (29.4 to 30.7) °C
Relative Humidity : (50.0 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 Kanjanasit
(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 2314269

Page 2 of 3

Reference Standard Instrument :

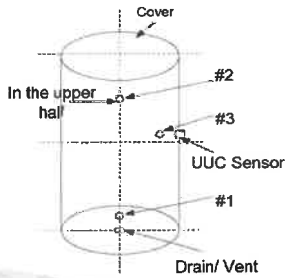
Description	Certificate No.	Serial No.	Due date	Traceable thru
Temperature Recorder RTD 100 Ohm	MC 2300163	M79252	9 Jan 2024	MCAL
Temperature Recorder RTD 100 Ohm	MC 2300164	5978194	9 Jan 2024	MCAL
Temperature Recorder RTD 100 Ohm	MC 2300165	M79251	9 Jan 2024	MCAL

Traceability :

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

1. Calibration Procedure:

The equipment list above was calibrated an accuracy of temperature in a chamber of the sterilizer.
The calibration was performed by direct measurement of generated temperatures using the standard thermometer with three temperature sensors. The data was recorded in a period of fifteen minutes of the sterilizing status. The temperature scale used was based on ITS-90.
The calibration of sterilizer was carried out at the point indicated by following the In-house calibration method No. MWI-T-036 based on BS 2646 : 1993 : Part 5 in Tests for performance section.



- Overall Line Voltage variation : 0.0 V

Checked by : Chalermpol

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

Certificate No.: MC 2314269

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	
121	121.72	121.73	121.95	0.61

Characterization Result

Desired Temperature (°C)	Setting Temperature (°C)	Timer Setting (min)	Indicating Temperature (°C)	Indicating Pressure (kPa)	Measured Stability (±°C)	Measured Uniformity (°C)	Overall Variation (°C)
121	121	15.0	121	120	0.60	0.35	1.35

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 : Chalermpol

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

**PREVENTATIVE MAINTENANCE (PM) CHECK LIST
FOR ATOMIC ABSORPTION SPECTROMETER**

Model & Serial Number: 240FS AA & M418250004
Customer: Water analysis center Co., Ltd.
Date: 25 Apr 2024

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 shield 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 SpectraAA
- ☒ 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 = 29.7% (should be $\leq 64\%$ or $\leq 380V$)
- ☒ Flame, Check D2 lamp is work

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

- ☒ Clean the sample compartment
- ☒ Flame, Check uptake rate from 7.2-10.6 mL per minute = 8.5 mL/min
- ☒ Test Photometric noise, STDV = 0.0001 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
- Alracet Cu 5 ppm = 0.79 Abs, and Precision (%RSD) = 0.4 % (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 : Sunira Achareon

Customer : Water analysis center Co., Ltd.



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 : thuwat@thaiunique.com, Website : www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: 2402 AA & MY18230004Customer : Water Analysis Center Co., Ltd.Date: 26 Apr 2024

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 = 324.8 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 90 % (should be $\leq 64\%$ or $\leq 380V$)
- ☐ Flame, Check D2 lamp is work N/A



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 : thuwat@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/acct Cu 5 ppm = Abs, and Precision
(%RSD) = % (should be > 0.55 Abs and $< 0.5\%$ RSD)
- or
- N2O/acct Cu 5 ppm = Abs, and Precision
(%RSD) = % (should be > 0.3 Abs and $< 0.5\%$ RSD)
- ☒ Furnace, Characteristic mass and sensitivity Cu 25 ppb = 0.16 Abs, and
Precision (%RSD) = 3 % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN :

Engineer : Suriga NakharaenCustomer :
()

1/2

2/2



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 : thuwat@thaiunique.com, Website : www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: AA 240F9 & MA09117073Customer : Water Analysis Center Co., Ltd.Date: 12 Feb 2024

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 = 324.8 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 94 % (should be $\leq 64\%$ or $\leq 380V$)
- ☒ Flame, Check D2 lamp is work



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 : thuwat@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 = 9.5 mL/min
- ☒ Test Photometric noise, STDV = 0.0002 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
- Air/acct Cu 5 ppm = 0.78 Abs, and Precision
(%RSD) = 0.3 % (should be > 0.55 Abs and $< 0.5\%$ RSD)
- or
- N2O/acct 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 : Suriga NakharaenCustomer :
()

1/2

PR-SV-453 Rev. 01

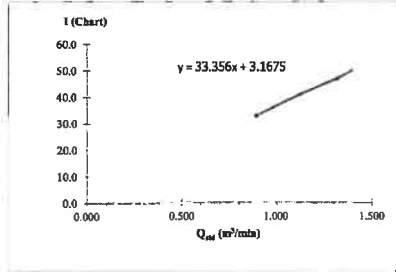
2/2

PR-SV-453 Rev. 05

High Volume Air Sampler Calibration Worksheet

Project Site : ตามสถานที่ตรวจวัด Page 1 of 1
Location : วัดบางนา
Date of measurement : 28/11/2024
Worksheet No. : C-281124-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 _{air} (m³/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	

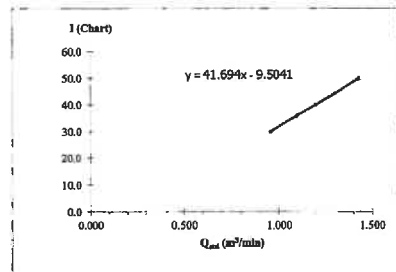


Calibrated by : Mr. JITTAWEE WONGMAKIEB Chemist
Approved by : Mr. RUNGSASIKORN KOSUM Technical Management
FO.LAB 5.5-1/25 วันที่ใช้ : วันจันทร์ที่ 11 เดือน 11 พ.ศ. 2568 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : ตามสถานที่ตรวจวัด Page 1 of 1
Location : วัดบางนา
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0100 Calibration Office
High Volume ID : WWL0100 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2735 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 _{air} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	51.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.085	36.0	22.64	
5	2.20	0.947	30.0	18.87	

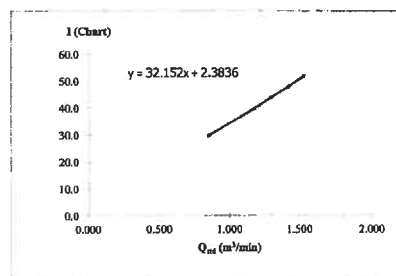


Calibrated by : Mr. JITTAWEE WONGMAKIEB Chemist
Approved by : Mr. RUNGSASIKORN KOSUM Technical Management
FO.LAB 5.5-1/25 วันที่ใช้ : วันจันทร์ที่ 11 เดือน 11 พ.ศ. 2568 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : ตามสถานที่ตรวจวัด Page 1 of 1
Location : วัดบางนา
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0097 Calibration Office
High Volume ID : WWL0097 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2726 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 _{air} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.90	1.532	52.0	51.79	Slope : 32.02 Intercept : 2.374 Correlation Coefficient : 0.9993
2	5.10	1.425	48.0	47.81	
3	4.20	1.294	44.0	43.82	
4	3.50	1.183	40.0	39.84	
5	1.80	0.851	30.0	29.88	

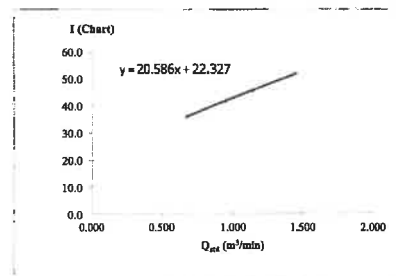


Calibrated by : Mr. JITTAWEE WONGMAKIEB Chemist
Approved by : Mr. RUNGSASIKORN KOSUM Technical Management
FO.LAB 5.5-1/25 วันที่ใช้ : วันจันทร์ที่ 11 เดือน 11 พ.ศ. 2568 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : ตามสถานที่ตรวจวัด Page 1 of 1
Location : วัดบางนา
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0102 Calibration Office
High Volume ID : WWL0102 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2731 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 _{air} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.20	1.450	52.0	32.70	Slope : 12.95 Intercept : 14.040 Correlation Coefficient : 0.9996
2	3.20	1.140	46.0	28.93	
3	2.20	0.947	42.0	26.41	
4	1.60	0.810	39.0	24.52	
5	1.10	0.673	36.0	22.64	



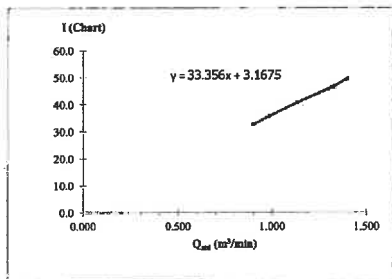
Calibrated by : Mr. JITTAWEE WONGMAKIEB Chemist
Approved by : Mr. RUNGSASIKORN KOSUM Technical Management
FO.LAB 5.5-1/25 วันที่ใช้ : วันจันทร์ที่ 11 เดือน 11 พ.ศ. 2568 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
 Location : บ้านนาโพธิ์
 Date of measurement : 28/11/2024
 Worksheet No. : C-281124-WWL0094 Calibration Office
 High Volume ID : WWL0094 Calibrator ID : WWL0103
 High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
 High Volume S/N : 2736 Calibrator S/N : 3271
 Ambient Condition : Calibrate Date : 27/03/2024
 Temperature (°C) : 26 Quality Standard Slope : 1.59186
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01922

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{std} (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 :
 Mr. JITTAWEE WONGMAKHEEB
 Chemist
 FO.LAB 5.5-1/25

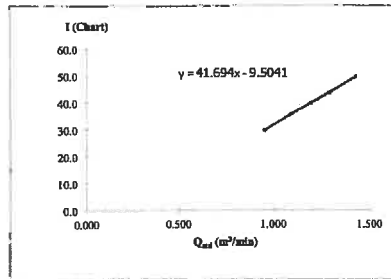
Approved by :
 Mr. RUNGSASIKORN KOSUM
 Technical Management
 แผนกเทคนิค : รับผิดชอบ : 1 ส.ร. 2560 หน้า : 1 หน้า 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
 Location : บ้านนาโพธิ์
 Date of measurement : 28/11/2024
 Worksheet No. : C-281124-WWL0099 Calibration Office
 High Volume ID : WWL0099 Calibrator ID : WWL0103
 High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
 High Volume S/N : 2732 Calibrator S/N : 3271
 Ambient Condition : Calibrate Date : 27/03/2024
 Temperature (°C) : 26 Quality Standard Slope : 0.99709
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01199

Page 1 of 1

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 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by :
 Mr. JITTAWEE WONGMAKHEEB
 Chemist
 FO.LAB 5.5-1/25

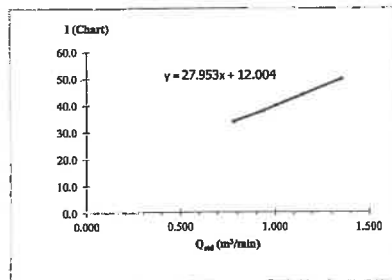
Approved by :
 Mr. RUNGSASIKORN KOSUM
 Technical Management
 แผนกเทคนิค : รับผิดชอบ : 1 ส.ร. 2560 หน้า : 1 หน้า 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
 Location : บ้านนาโพธิ์
 Date of measurement : 28/11/2024
 Worksheet No. : C-281124-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 : Calibrate Date : 27/03/2024
 Temperature (°C) : 26 Quality Standard Slope : 1.59186
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01922

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{std} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.60	1.354	50.0	49.80	Slope : 27.84 Intercept : 11.956 Correlation Coefficient : 0.9994
2	3.30	1.149	44.0	43.82	
3	2.50	1.001	40.0	39.84	
4	2.20	0.940	38.0	37.85	
5	1.50	0.778	34.0	33.86	



Calibrated by :
 Mr. JITTAWEE WONGMAKHEEB
 Chemist
 FO.LAB 5.5-1/25

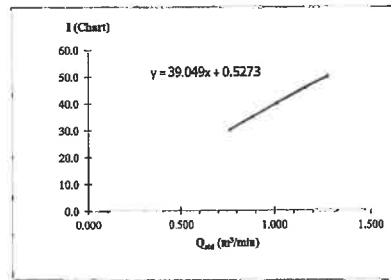
Approved by :
 Mr. RUNGSASIKORN KOSUM
 Technical Management
 แผนกเทคนิค : รับผิดชอบ : 1 ส.ร. 2560 หน้า : 1 หน้า 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
 Location : บ้านนาโพธิ์
 Date of measurement : 28/11/2024
 Worksheet No. : C-281124-WWL0101 Calibration Office
 High Volume ID : WWL0101 Calibrator ID : WWL0103
 High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
 High Volume S/N : 2731 Calibrator S/N : 3271
 Ambient Condition : Calibrate Date : 27/03/2024
 Temperature (°C) : 26 Quality Standard Slope : 0.99709
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01199

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{std} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.00	1.273	50.0	31.44	Slope : 24.56 Intercept : 0.332 Correlation Coefficient : 0.9997
2	3.30	1.158	46.0	28.93	
3	2.50	1.009	40.0	25.15	
4	1.90	0.881	35.0	22.01	
5	1.40	0.758	30.0	18.87	



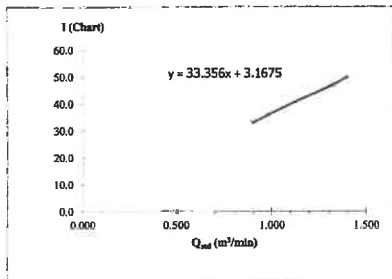
Calibrated by :
 Mr. JITTAWEE WONGMAKHEEB
 Chemist
 FO.LAB 5.5-1/25

Approved by :
 Mr. RUNGSASIKORN KOSUM
 Technical Management
 แผนกเทคนิค : รับผิดชอบ : 1 ส.ร. 2560 หน้า : 1 หน้า 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา Page 1 of 1
Location : บ้านหนองโสน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0223 Calibration Office
High Volume ID : WWL0223 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2738 Calibrator S/N : 3271
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 _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.397	50.0	49.80	Slope : 35.22 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	



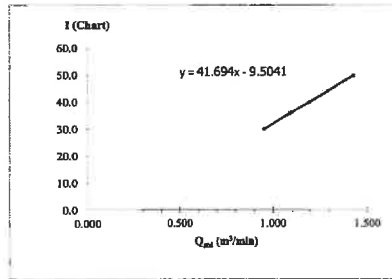
Calibrated by :
Mr. JITTAWEE WONGMAKHEEB
Chemist
POLAB 5.5-1025

Approved by :
Mr. RUNGSASIKORN KOSUM
Technical Manager
แก้ไขครั้งที่ : 1 วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา Page 1 of 1
Location : บ้านหนองโสน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0224 Calibration Office
High Volume ID : WWL0224 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2739 Calibrator S/N : 3271
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 _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



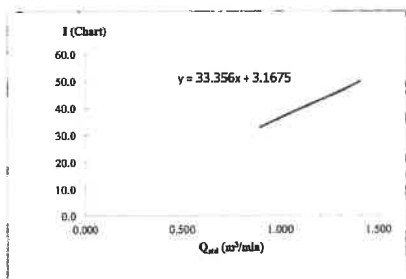
Calibrated by :
Mr. JITTAWEE WONGMAKHEEB
Chemist
POLAB 5.5-1025

Approved by :
Mr. RUNGSASIKORN KOSUM
Technical Manager
แก้ไขครั้งที่ : 1 วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา Page 1 of 1
Location : บ้านหนองโสน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0093 Calibration Office
High Volume ID : WWL0093 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 : 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 _{std} (m³/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	



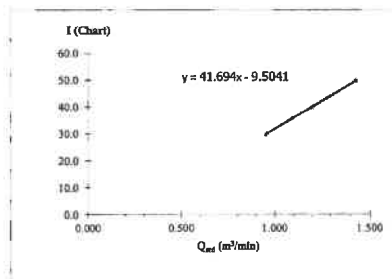
Calibrated by :
Mr. JITTAWEE WONGMAKHEEB
Chemist
POLAB 5.5-1025

Approved by :
Mr. RUNGSASIKORN KOSUM
Technical Manager
แก้ไขครั้งที่ : 1 วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา Page 1 of 1
Location : บ้านหนองโสน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-WWL0098 Calibration Office
High Volume ID : WWL0098 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2739 Calibrator S/N : 3271
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 _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by :
Mr. JITTAWEE WONGMAKHEEB
Chemist
POLAB 5.5-1025

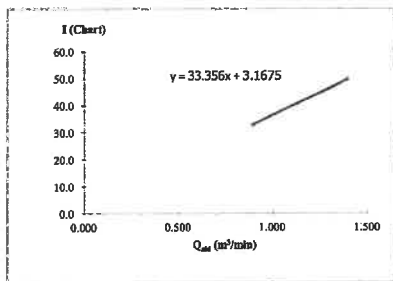
Approved by :
Mr. RUNGSASIKORN KOSUM
Technical Manager
แก้ไขครั้งที่ : 1 วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงาน Page 1 of 1
Location : บ้านดอนใหญ่
Date of measurement : 28/11/2024
Worksheet No. : C-281124-TSPR1 Calibration Office
High Volume ID : TSPNO.1 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 3271 Calibrator S/N : 3271
Ambient Condition : 26 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 _{std} (m³/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	



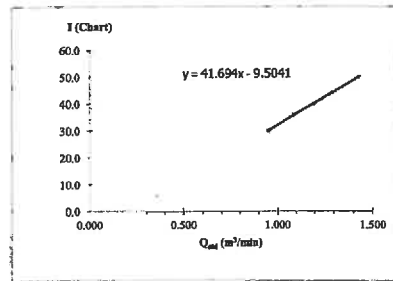
Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ 1 วันที่แก้ไข: 1 ต.ค. 2560 หน้า: 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงาน Page 1 of 1
Location : บ้านดอนใหญ่
Date of measurement : 28/11/2024
Worksheet No. : C-281124-PM10R1 Calibration Office
High Volume ID : PM10NO.1 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 3271 Calibrator S/N : 3271
Ambient Condition : 26 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 _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



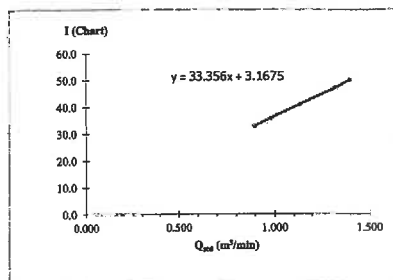
Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ 1 วันที่แก้ไข: 1 ต.ค. 2560 หน้า: 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงาน Page 1 of 1
Location : บ้านดอนใหญ่
Date of measurement : 28/11/2024
Worksheet No. : C-281124-TSPR2 Calibration Office
High Volume ID : TSPNO.2 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 3271 Calibrator S/N : 3271
Ambient Condition : 26 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 _{std} (m³/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	



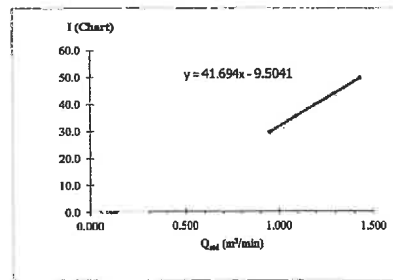
Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ 1 วันที่แก้ไข: 1 ต.ค. 2560 หน้า: 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงาน Page 1 of 1
Location : บ้านดอนใหญ่
Date of measurement : 28/11/2024
Worksheet No. : C-281124-PM10R2 Calibration Office
High Volume ID : PM10NO.2 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 3271 Calibrator S/N : 3271
Ambient Condition : 26 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 _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ 1 วันที่แก้ไข: 1 ต.ค. 2560 หน้า: 1 ของ 1

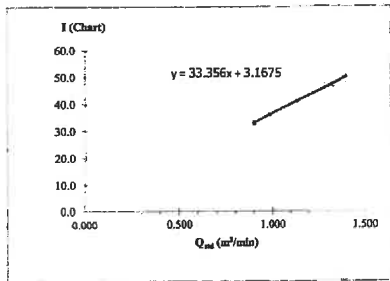


High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
Location : บ้านดอน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-TSPR3 Calibration Orifice : WWL0103
High Volume ID : TSPNO.3 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
High Volume S/N : Calibrator S/N :
Ambient Condition :
Temperature (°C) : 26 Calibrate Date : 27/03/2024
Barometric Pressure (mmHg) : 756 Quality Standard Slope : 1.59186
Quality Standard Intercept : -0.01922

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{del} (m³/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 : Mr. JITTAWEE WONMAKHEB

Approved by : Mr. RUNGSASIKORN KOSUM

POLAB 55-1/25

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

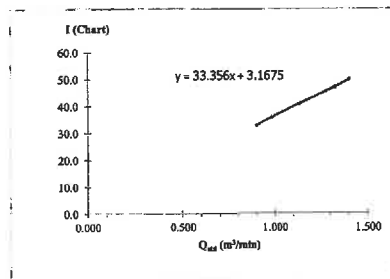


High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
Location : บ้านดอน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-TSPR4 Calibration Orifice : WWL0103
High Volume ID : TSPNO.4 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
High Volume S/N : Calibrator S/N :
Ambient Condition :
Temperature (°C) : 26 Calibrate Date : 27/03/2024
Barometric Pressure (mmHg) : 756 Quality Standard Slope : 1.59186
Quality Standard Intercept : -0.01922

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{del} (m³/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 : Mr. JITTAWEE WONMAKHEB

Approved by : Mr. RUNGSASIKORN KOSUM

POLAB 55-1/25

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

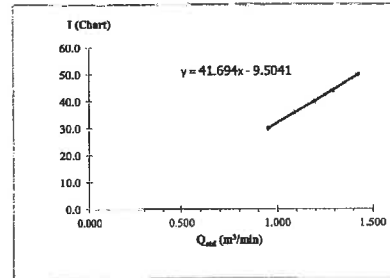


High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
Location : บ้านดอน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-PM10R3 Calibration Orifice : WWL0103
High Volume ID : PM10NO.3 Calibrator ID : TE-5028A
High Volume Model : TE-6070 (PM10) Calibrator Model : 3271
High Volume S/N : Calibrator S/N :
Ambient Condition :
Temperature (°C) : 26 Calibrate Date : 27/03/2024
Barometric Pressure (mmHg) : 756 Quality Standard Slope : 0.99709
Quality Standard Intercept : -0.01199

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{del} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by : Mr. JITTAWEE WONMAKHEB

Approved by : Mr. RUNGSASIKORN KOSUM

POLAB 55-1/25

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

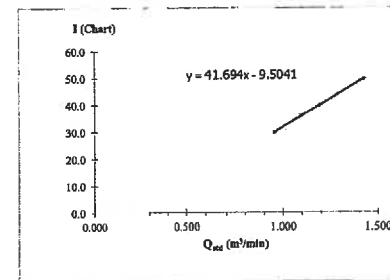


High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม
Location : บ้านดอน
Date of measurement : 28/11/2024
Worksheet No. : C-281124-PM10R4 Calibration Orifice : WWL0103
High Volume ID : PM10NO.4 Calibrator ID : TE-5028A
High Volume Model : TE-6070 (PM10) Calibrator Model : 3271
High Volume S/N : Calibrator S/N :
Ambient Condition :
Temperature (°C) : 26 Calibrate Date : 27/03/2024
Barometric Pressure (mmHg) : 756 Quality Standard Slope : 0.99709
Quality Standard Intercept : -0.01199

Page 1 of 1

Test No.	delta H ₂ O (inch)	Q _{del} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.422	50.0	31.44	Slope : 26.22 Intercept : -5.977 Correlation Coefficient : 0.9996
2	4.10	1.289	44.0	27.67	
3	3.50	1.192	40.0	25.15	
4	2.90	1.086	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by : Mr. JITTAWEE WONMAKHEB

Approved by : Mr. RUNGSASIKORN KOSUM

POLAB 55-1/25

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



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 (SI-WL-21) and is within manufacturer's specification at the time when the calibration is done.

Client: Envir Service Co., Ltd.
Serial: Z302DR0081
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	1.0	0.0	0.3-1.1	Pass
1.9	1.9	0.0	1.2-2.2	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.9-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	19.7	0.3	19.0-21.0	Pass

Wind Direction				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
49°	49°	0	47-48	Pass
135°	135°	0	132-136	Pass
225°	225°	0	222-228	Pass
315°	315°	0	312-318	Pass
357°	357°	0	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	1001-1007	Pass

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

Performed by:
Certified by Head of Engineering Department

This certificate may not be published or reproduced, except in full, unless obtaining permission in writing from Scarlet Tech Ltd.
4F-3, No. 347, 2nd Sec., Heping E Rd., Dean Dist. Taipei City 106, Taiwan

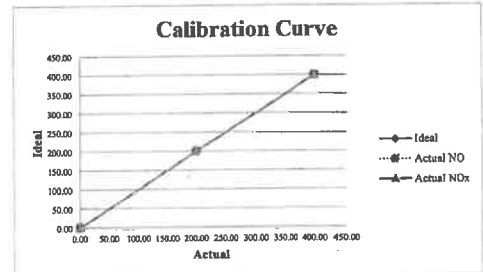


บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
1/94 หมู่ 5 ต.สามขา อ.สูงเม่น จ.แพร่ 53210
1/94 Moo 5, T.Kanham, A.U-Thai, Ayutthaya 13210, Thailand
Tel: 0-33226-383, 0-33800-593 Fax: 0-33800-594

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site:	สวนอุตสาหกรรมโรจนะ อุบลราชธานี	Multi Gas Calibrator	
Location:	วัด โขกมวน	Calibrator ID:	WWL0124
Date of measurement:	28 November 2024	Calibrator Model:	Series 6100
Worksheet No.:	C-281124-WWL 0116	Calibrator S/N:	S/N 7462
Ambient NOx Analyzer ID:	WWL 0116	Calibrate Date:	08 March 2024
Manufacturer:	HORIBA	Cylinder Std. Gas	
Ambient NOx Analyzer Model:	APNA-370	Std. Gas Concentration (PPM):	50.90
Ambient NOx Analyzer S/N:	9BRKGTUK	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 ₂	Error NO ₂	%Error NO ₂
ZERO	0.00	0.10	0.10	-	0.00	0.00	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.20	0.20	0.05	400.10	0.10	0.03
AVERAGE (%)				0.05			0.06



Calibrated by:
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by:
(Mr. RUNGSAKORN KOSUM)
Technical Management

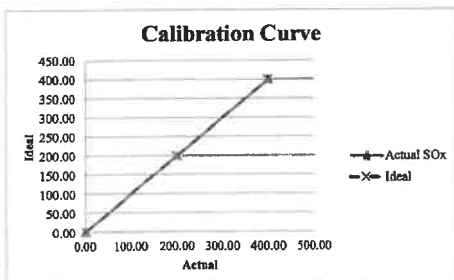


บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
1/94 หมู่ 5 ต.สามขา อ.สูงเม่น จ.แพร่ 53210
1/94 Moo 5, T.Kanham, A.U-Thai, Ayutthaya 13210, Thailand
Tel: 0-33226-383, 0-33800-593 Fax: 0-33800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site:	สวนอุตสาหกรรมโรจนะ อุบลราชธานี	Multi Gas Calibrator	
Location:	วัด โขกมวน	Calibrator ID:	WWL0124
Date of measurement:	28 November 2024	Calibrator Model:	Series 6100
Worksheet No.:	C-281124-WWL 0111	Calibrator S/N:	S/N 7462
Ambient SO ₂ Analyzer ID:	WWL 0111	Calibrate Date:	08 March 2024
Manufacturer:	HORIBA	Cylinder Std. Gas	
Ambient SO ₂ Analyzer Model:	APSA-370	Std. Gas Concentration (PPM):	50.90
Ambient SO ₂ Analyzer S/N:	PGRKTBDX	Cylinder Pressure (psi):	2000
		Certified Date:	07 December 2021
		Expired Date:	07 December 2025
		Serial No.:	CC241587

Point	CALIBRATION RESULTS			
	Ideal	Actual SO ₂	Error SO ₂	%Error SO ₂
ZERO	0.00	0.10	0.10	-
SPAN 200 ppb	200.00	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.10	0.10	0.03
AVERAGE (%)				0.04



Calibrated by:
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by:
(Mr. RUNGSAKORN KOSUM)
Technical Management

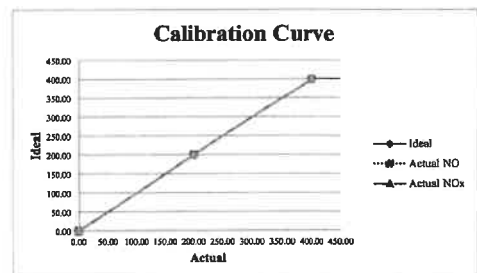


บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
1/94 หมู่ 5 ต.สามขา อ.สูงเม่น จ.แพร่ 53210
1/94 Moo 5, T.Kanham, A.U-Thai, Ayutthaya 13210, Thailand
Tel: 0-33226-383, 0-33800-593 Fax: 0-33800-594

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site:	สวนอุตสาหกรรมโรจนะ อุบลราชธานี	Multi Gas Calibrator	
Location:	วัด โขกมวน	Calibrator ID:	WWL0124
Date of measurement:	28 November 2024	Calibrator Model:	Series 6100
Worksheet No.:	C-281124-WWL 0118	Calibrator S/N:	S/N 7462
Ambient NOx Analyzer ID:	WWL 0118	Calibrate Date:	08 March 2024
Manufacturer:	HORIBA	Cylinder Std. Gas	
Ambient NOx Analyzer Model:	APNA-370	Std. Gas Concentration (PPM):	50.90
Ambient NOx Analyzer S/N:	W2VNUX08	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 ₂	Error NO ₂	%Error NO ₂
ZERO	0.00	0.10	0.10	-	0.10	0.10	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.20	0.20	0.05
AVERAGE (%)				0.04			0.05



Calibrated by:
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by:
(Mr. RUNGSAKORN KOSUM)
Technical Management



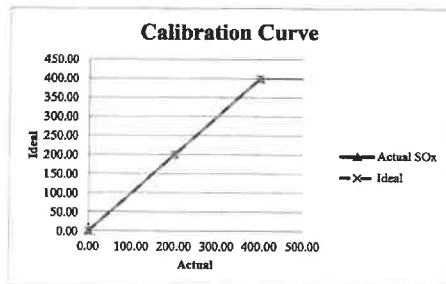
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : สวนสุทธาภิบาลโรจนะ อุทยาน
Location : วัดคันหนาม
Date of measurement : 28 November 2024
Worksheet No. : C-281124-WWL-0112
Ambient SO_x Analyzer ID : WWL 0112
Manufacturer : HORIBA
Ambient SO_x Analyzer Model : APSA-370
Ambient SO_x 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) : 50.90
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	%Error Sox
ZERO	0.00	0.10	0.10	-
SPAN 200 ppb	200.00	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.10	0.10	0.03
AVERAGE (%)				0.04



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



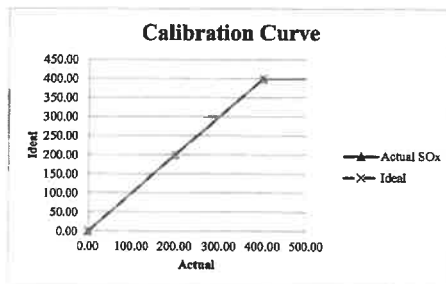
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : สวนสุทธาภิบาลโรจนะ อุทยาน
Location : บ้านคันหนาม
Date of measurement : 28 November 2024
Worksheet No. : C-281124-WWL-0110
Ambient SO_x Analyzer ID : WWL 0110
Manufacturer : HORIBA
Ambient SO_x Analyzer Model : APSA-370
Ambient SO_x Analyzer S/N : Y8SW7700

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 SO _x	Error Sox	%Error Sox
ZERO	0.00	0.00	0.00	-
SPAN 200 ppb	200.00	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.20	0.20	0.05
AVERAGE (%)				0.05



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



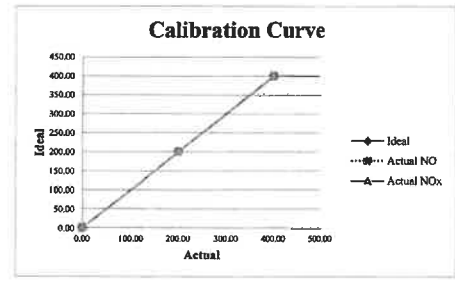
Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนสุทธาภิบาลโรจนะ อุทยาน
Location : บ้านคันหนาม
Date of measurement : 28 November 2024
Worksheet No. : C-281124-WWL-0115
Ambient NO_x Analyzer ID : WWL 0115
Manufacturer : HORIBA
Ambient NO_x Analyzer Model : APNA-370
Ambient NO_x Analyzer S/N : 70SKASJ

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



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



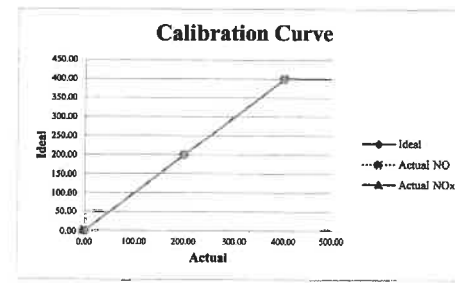
Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนสุทธาภิบาลโรจนะ อุทยาน
Location : บ้านคันหนาม
Date of measurement : 28 November 2024
Worksheet No. : C-281124-WWL-0114
Ambient NO_x Analyzer ID : WWL 0114
Manufacturer : HORIBA
Ambient NO_x Analyzer Model : APNA-370
Ambient NO_x Analyzer S/N : PIEJ99E5

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	%Error NO _x
ZERO	0.00	0.10	0.10	-	0.00	0.00	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.20	0.20	0.05
AVERAGE (%)				0.04			0.05



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management

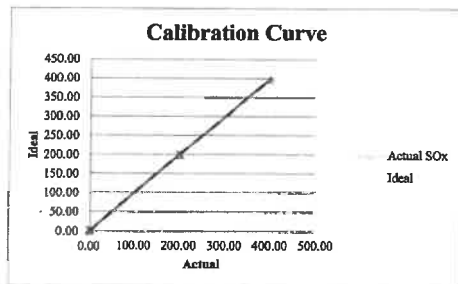


Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมบริเวณ อยุธยา
Location : สำนักงานโครงการ
Date of measurement : 28 November 2024
Worksheet No. : C-281124-WWL 0109
Ambient SO_x Analyzer ID : WWL 0109
Manufacturer : HORIBA
Ambient SO_x Analyzer Model : AFSA-370
Ambient SO_x 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) : 50.90
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 SO _x	%Error SO _x
ZERO	0.00	0.10	0.10	
SPAN 200 ppb	200.00	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.20	0.20	0.05
AVERAGE (%)				0.05

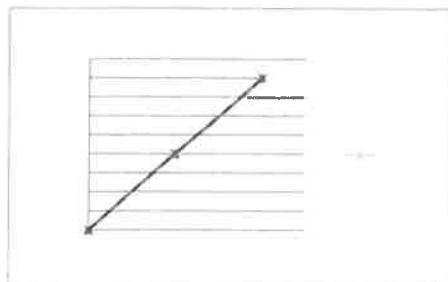


Calibrated by
(Miss SUTHIDA SINGHAPHEN)
Chemist

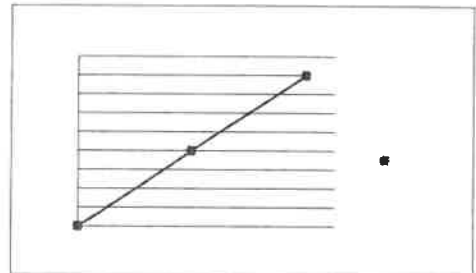
Approved by
(Mr. RUNGSASIKORN KOSUM)
Technical Management

1/1





1/1



1/1



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 08 November 2024

Instruments Information

Analyzer Type : NO-NO₂-NO_x Analyzer
Model : 42C

Manufacturer : Thermo Environmental
Serial Number : 0329002531

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

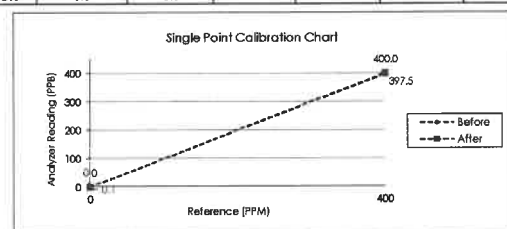
Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report (Before Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Diff (PPB)	Reference (PPB)	Reading (PPB)	Diff%
NO	0.0	0.1	0.1	400.0	397.5	-0.6
NO _x	0.0	0.0	0.0	400.0	397.6	-0.6

Calibration Report (After Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Diff (PPB)	Reference (PPB)	Reading (PPB)	Diff%
NO	0.0	0.1	0.1	400.0	400.0	0.0
NO _x	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทะวงษ์
MR. KITTISAK JANSANGWATTANA

Approve by : MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 08 November 2024

Instruments Information

Analyzer Type : SO₂ Analyzer
Model : 43C
Manufacturer : Thermo Environmental
Serial Number : 0433509449

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

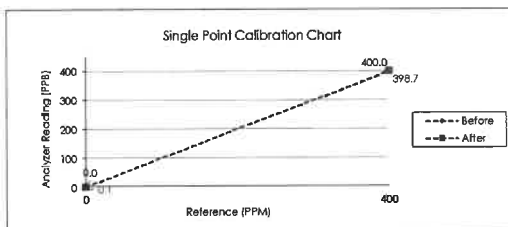
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Diff (PPB)	Reference (PPB)	Reading (PPB)	Diff%
Before	0.0	0.1	0.1	400.0	398.7	-0.3
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทะวงษ์
MR. KITTISAK JANSANGWATTANA

Approve by : MR. PASAGORN SAMOL

Analyzer Performance Test

Calibrated Date: 11 November 2024

Instruments Information

Analyzer Type : NO-NO₂-NO_x Analyzer
Model : M200E

Manufacturer : API
Serial Number : 645

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

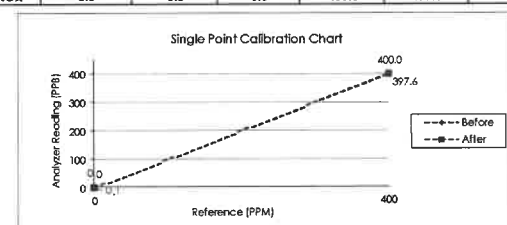
Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report (Before Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Diff (PPB)	Reference (PPB)	Reading (PPB)	Diff%
NO	0.0	0.1	0.1	400.0	397.6	-0.6
NO _x	0.0	0.0	0.0	400.0	397.7	-0.6

Calibration Report (After Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Diff (PPB)	Reference (PPB)	Reading (PPB)	Diff%
NO	0.0	0.1	0.1	400.0	400.0	0.0
NO _x	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทะวงษ์
MR. KITTISAK JANSANGWATTANA

Approve by : MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 06 November 2024

Instruments Information

Analyzer Type : SO₂ Analyzer
Model : 431
Manufacturer : Thermo Environmental
Serial Number : 0614416629

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

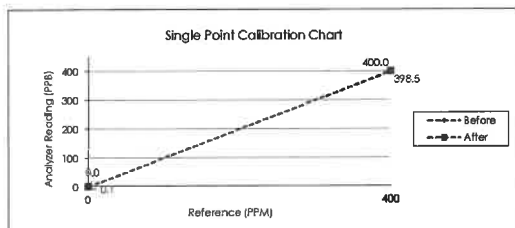
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.1	0.1	400.0	398.5	-0.4
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทน์วงษ์วัฒนา
MR. KITTISAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 10 October 2024

Instruments Information

Analyzer Type : NO-NO₂-NO_x Analyzer
Model : 42C
Manufacturer : Thermo Environmental
Serial Number : 42C-66375-352

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

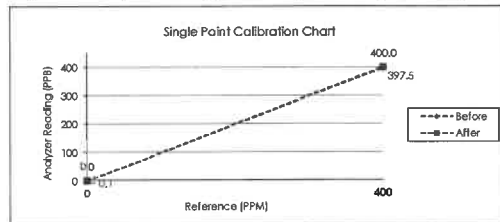
Environment : Temperature 25.5 °C Humidity 51 %RH

Calibration Report (Before Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	397.5	-0.6
NO _x	0.0	0.0	0.0	400.0	397.6	-0.6

Calibration Report (After Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	400.0	0.0
NO _x	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทน์วงษ์วัฒนา
MR. KITTISAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 07 October 2024

Instruments Information

Analyzer Type : SO₂ Analyzer
Model : 45C
Manufacturer : Thermo Environmental
Serial Number : 45C 67193 356

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

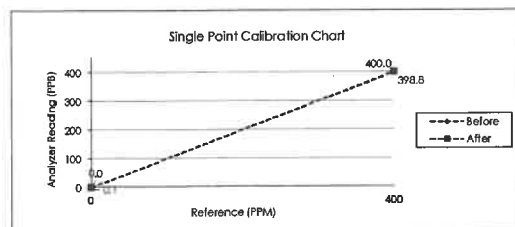
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.1	0.1	400.0	398.8	-0.3
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทน์วงษ์วัฒนา
MR. KITTISAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 19 July 2024

Instruments Information

Analyzer Type : NO-NO₂-NO_x Analyzer
Model : 42C
Manufacturer : Thermo Environmental
Serial Number : 78440-389

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4,535 PPM
Cylinder number EB0129027
Expiry Date: 29 Oct. 2027

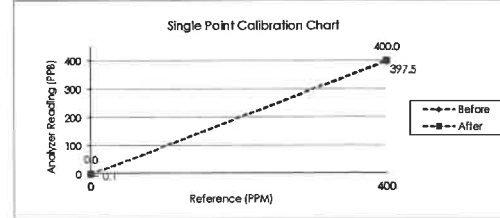
Environment : Temperature 25.5 °C Humidity 51 %RH

Calibration Report (Before Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	397.5	-0.6
NO _x	0.0	0.0	0.0	400.0	396.5	-0.9

Calibration Report (After Adjust)

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	400.0	0.0
NO _x	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By : กิตติศักดิ์ จันทน์วงษ์วัฒนา
MR. KITTISAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Rammitra 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230
Tel. 02-9435814-5 Fax. 02-9438201 www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 29 November 2024

Instruments Information

Analyzer Type : SO₂ Analyzer
Model : 45C
Manufacturer : Thermo Environmental
Serial Number : 45C-66999-359

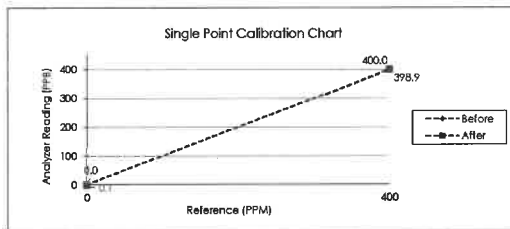
Calibrator Unit
Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

Standard Gas Concentration
Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4.535 PPM
Cylinder number EB0129027
Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
Before	0.0	0.1	0.1	400.0	398.9	-0.3
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By: กิตติศักดิ์ จันทะวงษ์
MR. KITSACK JANSANGWATANA

Approve by: MR. PASAGORN SAMOL

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

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 วันที่สอบเทียบครั้งต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 385011742 รหัสเครื่องมือ PWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 820956 รหัสเครื่องมือ PWL 0225
วันที่สอบเทียบ 12/02/67 วันที่สอบเทียบครั้งต่อไป 11/02/69

การทวนสอบก่อนออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 02/12/67

การทวนสอบหลังจากออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 07/12/67

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

ผู้บันทึก: MR. PASAGORN SAMOL
ผู้ตรวจสอบ: MR. PASAGORN SAMOL

ผู้บันทึก: MR. PASAGORN SAMOL
ผู้ตรวจสอบ: MR. PASAGORN SAMOL

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

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 วันที่สอบเทียบครั้งต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 385011742 รหัสเครื่องมือ PWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 00396801 รหัสเครื่องมือ PWL 0159
วันที่สอบเทียบ 12/02/67 วันที่สอบเทียบครั้งต่อไป 11/02/69

การทวนสอบก่อนออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 02/12/67

การทวนสอบหลังจากออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 07/12/67

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

ผู้บันทึก: MR. PASAGORN SAMOL
ผู้ตรวจสอบ: MR. PASAGORN SAMOL

ผู้บันทึก: MR. PASAGORN SAMOL
ผู้ตรวจสอบ: MR. PASAGORN SAMOL

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

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 วันที่สอบเทียบครั้งต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 385011742 รหัสเครื่องมือ PWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 00396803 รหัสเครื่องมือ PWL 0160
วันที่สอบเทียบ 31/05/66 วันที่สอบเทียบครั้งต่อไป 30/05/68

การทวนสอบก่อนออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 02/12/67

การทวนสอบหลังจากออกหน้างาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 07/12/67

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

ผู้บันทึก: MR. PASAGORN SAMOL
ผู้ตรวจสอบ: MR. PASAGORN SAMOL

ผู้บันทึก: MR. PASAGORN SAMOL
ผู้ตรวจสอบ: MR. PASAGORN SAMOL

แบบบันทึกการตรวจสอบเครื่อง 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 วันที่สอบเทียบครั้งต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 385011742 รหัสเครื่องมือ WWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 820957 รหัสเครื่องมือ WWL 0226
วันที่สอบเทียบ 12/02/67 วันที่สอบเทียบครั้งต่อไป 11/02/69

การตรวจสอบก่อนออกใช้งาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ตรวจสอบ 02/12/67

การตรวจสอบหลังจากออกใช้งาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ตรวจสอบ 07/12/67

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 ตรวจสอบ	ผ่าน	ผ่าน

ผู้บันทึก กนก
ผู้ตรวจสอบ กนก

ผู้บันทึก กนก
ผู้ตรวจสอบ กนก

แบบบันทึกการตรวจสอบเครื่อง 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 วันที่สอบเทียบครั้งต่อไป 08/05/68
เครื่อง Digital Thermohygro Meter S/N 385011742 รหัสเครื่องมือ WWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 00396923 รหัสเครื่องมือ WWL 0161
วันที่สอบเทียบ 31/05/66 วันที่สอบเทียบครั้งต่อไป 30/05/68

การตรวจสอบก่อนออกใช้งาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ตรวจสอบ 02/12/67

การตรวจสอบหลังจากออกใช้งาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ตรวจสอบ 07/12/67

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 ตรวจสอบ	ผ่าน	ผ่าน

ผู้บันทึก กนก
ผู้ตรวจสอบ กนก

ผู้บันทึก กนก
ผู้ตรวจสอบ กนก



รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ตรวจสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	1,2-Dichloroethane	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,2-Dichloropropane	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,3-Butadiene	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	Benzene	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	Chloroform	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,4-Dichlorobenzene	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,1,2,2-Tetrachloroethane	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,1-Dichloroethane	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,1,1-Trichloroethane	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18
Ambient	1,1,2-Trichloroethane	GC-MSD	RYG_EN0136	5-Jan-24	4-Jul-25	18

© 2023 by Agilent Technologies

Agilent GreenLab Compliance Services

Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: RYG_EN0136
Organization Name: ALS Laboratory Group (Thailand) Co.Ltd.
Organization Location: 619/10, Moo 5, Tambol Mae Nam Khui, Phak Deang, Rayong, 21140, Thailand
Date: January 5, 2024 10:53:24 AM
EQP Name: Agilent Recommended, Agilent Recommended
EQP Revision: GC.02.54, GCMS.02.54
Overall Qualification Status: Pass
REVIEW BY: Chonlida
APPROVED BY: Chonlida
NEXT CAL DATE: 4-Jul-25

CDS Logon Verification - GC

Logon: chonlida.khunkhiew
Overall CDS Logon Verification - GC Test Status: Pass

System Inspection and Basic Safety and Operation

Name: 7890
Setup Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
Front: SS
Setup Status: Pass
Inlet Pressure: 25.0 psi
Accuracy: 0.0 psi
Agilent Recommended: 1.2 psi

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890
Setpoint Status: Pass
Zone: Oven
Setpoint/Actual:
Temperature: 1230.0 229 °C
Accuracy: -1.0 °C
Agilent Recommended: ≥ -1.0 °C % setpoint in K (-5.0 °C)
 ≤ 1.0 °C % setpoint in K (5.0 °C)
Setpoint Status: Pass
Zone: Oven
Setpoint/Actual:
Temperature: 100.0 100.8 °C
Accuracy: 0.8 °C
Agilent Recommended: ≥ -1.0 °C % setpoint in K (-3.7 °C)
 ≤ 1.0 °C % setpoint in K (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890
Setpoint Status: Pass
Setpoint/Average:
Temperature: 100.0 100.8167 °C
Stability: 0.1 °C
Agilent Recommended: ≤ 0.5 °C

Overall GC Oven Temperature Stability Test Status

Pass

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0135

Page 2 / 14

Log Amp

Tested Combination1 Front SSL / External SQ
Name: 5877B
Setpoint Status: Pass

Overall Log Amp Test Status

Pass

RPFA

Tested Combination1 Front SSL / External SQ
Name: 5877B
Setpoint Status: Pass
Amu: 1050 m/z Drift After Five Minutes: 6 mV RPFA Voltage: 1600 mV
Agilent Recommended: $\geq 1-100$ and ≤ 100 ≤ 1100

Overall RPFA Test Status

Pass

Tune EI

Tested Combination1 Front SSL / External SQ
Name: 5877B
Setpoint Status: Pass
Filament:
Setpoint Status: Pass
Filament: 2

Overall Tune EI Test Status

Pass

Scouting Run

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0135

Page 3 / 14

Tested Combination1 Front SSL / External SQ
Name: Manual Injection
Source: Not applicable
Source: (EI) - Extractor

Setpoint Status: Completed
Injection Volume on Column: 1.0 µL

Overall Scouting Run Status

Completed

Signal to Noise EI

Tested Combination1 Front SSL / External SQ
Name: 5877B
Source: (EI) - Extractor Filament: 1
Setpoint Status: Pass
Signal to Noise: 5113
Agilent Recommended: ≥ 1200
Source: (EI) - Extractor Filament: 2
Setpoint Status: Pass
Signal to Noise: 4468
Agilent Recommended: ≥ 1200

Overall Signal to Noise EI Test Status

Pass

NOTE: This test's 2 comment(s) and 3 deviation(s) are available in the Attachments section.

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0135

Page 4 / 14

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System
System ID: RYG_EN0135
Manufacturer: Agilent Technologies
Name: 7890
Flow Data Input: Manual Data
Temperature Data Input: Manual Data or Other Data Logging
Tested Combination1
Injection Technique: Manual Injection
Inlet: Front
Detector: External
LTM Included?: No
Sampler 1
Manufacturer: Agilent Technologies
Type: Manual Injection
Usage: Sample Injection
Syringe Volume (µL): 10
Mainframe 1
Manufacturer: Agilent Technologies
Name: 7890
Model Number: G3442B
Serial Number: CN184653238
Firmware Revision: B.02.04.3
Component ID/Asset No.: 051117000235
Oven Type: Standard

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0135

Page 5 / 14

Inlet 1

Manufacturer	Agilent Technologies
Name	7890
Type	BSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes
Detector 1	
Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External
Mass Spectrometer 1	
Manufacturer	Agilent Technologies
Type	SG
Name	5877B
Model Number	GT077B
Serial Number	U81701M008
Firmware Revision	5877_5.00.34
High Vacuum System	Turbo Pump
Scouting Run Standard	OFN Std
Component ID/Asset No.	D81117000236
MS EI Source 1	
Manufacturer	Agilent Technologies
Type	EI - Extractor
Number of filaments	2

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0135

Page 6 / 14

Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and login to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	Eaknarin Puangsopa
Logged On User Name:	eaknarin_puangsope@sglsonl.com
Signature Creation Date:	January 5, 2024
Reason for Signature:	Executed protocol and published this original version of document

Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our integration of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

Warranty

Agilent Technologies makes no warranty of any kind to this material, including but not limited to, the implied warranties or merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Page 7 / 14

User Name: admin@_merrys

Report Generated by Medication: ABR/GRW/2074

System ID: RYX_DSN138

Print Date: January 5, 2024 19:33:35 AM

ALS_QD_RYX_DSN138 Transaction Log :

Date	Transaction Item	Activity Performed	Type of Transaction	Optional Information
January 4, 2024 10:27:21 AM	Audit	Session/Created	Session	None
January 4, 2024 10:27:31 AM	Start	Configuration	Session	None
January 4, 2024 10:27:31 AM	Audit	End/parament	Licensing	User is Predefined user and does not require an unlock code
January 4, 2024 10:28:29 AM	Audit	Eg/Loaded	Session	SCP details for primary technique [0x] - File path: [Protocol\Products\OscConfigItem\02_MMR\02_MMR_Avg], EOP File Name: [0x\02_MMR_Avg], EOP Name: [AgilentRecommended_Protocol Revision :30.52.54] SCP details for hypertextual techniques [0xfile] - File path: [Protocol\Products\OscConfigItem\02_MMR\02_MMR_Avg], EOP File Name: [0xfile\02_MMR_Avg], EOP Name: [AgilentRecommended]
January 4, 2024 10:28:40 AM	End Audit	Configuration	Session	None
January 4, 2024 10:32:44 AM	Start Audit	Configuration	Session	OQ
January 4, 2024 10:32:44 AM	Audit	Execution	C2E Logon Verification - OC-7890 - Qualitative test	None
January 4, 2024 10:41:50 AM	End Audit	Execution	C2E Logon Verification - OC-7890 - Qualitative test	Run Count : 1

Page 117

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0130

Page 5 / 14

Star Haniel: eskumar_jumanga

Report Generated by Hsianme: ASRYGV0074

System Id: RYQ_0103

Print Date: January 6, 2024 10:23:29 AM

ALB_OQ_RYQ_0103_M Transaction Log :

Time	Transaction Date	Activity Performed	Type of Transaction	Optional Information
January 4, 2024 10:48:05 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7800 - Qualitative Test - No endpoints associated	None
January 4, 2024 10:48:18 AM	End	Execution	System Inspection and Basic Safety and Operation - 7800 - Qualitative Test - No endpoints associated	Run Count : 1
January 4, 2024 10:46:22 AM	Start	Execution	Intel Pressure Accuracy - Front 68L - Pressure Controlled Inlet - @ 25.0 psi - L = 1.2 psi	None
January 4, 2024 10:48:52 AM	End	Execution	Intel Pressure Accuracy - Front 68L - Pressure Controlled Inlet - @ 25.0 psi - L = 1.2 psi	Run Count : 1
January 4, 2024 10:48:34 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Temperature - 1 Down - @ 235.0°C - L = -1.0 AND - @ 1.0 % septolit in K	None
January 4, 2024 10:51:08 AM	Auto	Data	GC Oven Temperature Accuracy - 7800 - Temperature - 1 Down - @ 235.0°C - L = -1.0 AND - @ 1.0 % septolit in K	Manual Data Entry
January 4, 2024 10:51:05 AM	End	Execution	GC Oven Temperature Accuracy - 7800 - Temperature - 1 Down - @ 235.0°C - L = -1.0 AND - @ 1.0 % septolit in K	Run Count : 1
January 4, 2024 10:51:43 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Temperature - 1 Down - @ 160.0°C - L = -1.0 AND - @ 1.0 % septolit in K	None
January 4, 2024 10:58:43 AM	Auto	Data	GC Oven Temperature Accuracy - 7800 - Temperature - 1 Down - @ 160.0°C - L = -1.0 AND - @ 1.0 % septolit in K	Manual Data Entry

Page 217

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Page 9 / 14

User Name: admin@_permgps
Report Generated by Hostname: ASRY0W0374
System ID: RYG_EN0136
Print Date: January 8, 2024 10:57:26 AM

ALB_OQ_RYG_EN0136 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
January 4, 2024 10:52:44 AM	End	Execution	QC Oven Temperature Accuracy - 7882 - Temperature : Oven - 8: 160.0°C - L: >= 1.0 AND <= 1.0 % adjust to K	Run Count: 1
January 4, 2024 11:23:29 AM	Start	Execution	QC Oven Temperature Stability - 7882 - Temperature : Oven - 8: 160.0°C - L: <= 0.5°C	None
January 4, 2024 11:23:26 AM	Auto	Data	QC Oven Temperature Stability - 7882 - Temperature : Oven - 8: 160.0°C - L: <= 0.5°C	Manual Data Entry
January 4, 2024 11:23:29 AM	End	Execution	QC Oven Temperature Stability - 7882 - Temperature : Oven - 8: 160.0°C - L: <= 0.5°C	Run Count: 1
January 4, 2024 11:23:30 AM	Start	Execution	Log Avg. - 99778 SQ - Source: None	None
January 4, 2024 11:43:23 AM	End	Execution	Log Avg. - 99778 SQ - Source: None	None
January 4, 2024 11:43:23 AM	Start	Execution	99778 - 99778 SQ - Source: None	None
January 4, 2024 11:43:23 AM	End	Execution	99778 - 99778 SQ - Source: None	None
January 4, 2024 11:53:26 AM	Start	Execution	Turn E1 - 99778 SQ - Source: None	None
January 4, 2024 11:53:26 AM	Start	Execution	E1 - Extractor Filament 1 (Qualitative - No samples associated)	None
January 4, 2024 12:27:28 PM	End	Execution	Turn E1 - 99778 SQ - Source: None	Run Count: 1
January 4, 2024 12:27:28 PM	Start	Execution	E1 - Extractor Filament 1 (Qualitative - No samples associated)	None

Page 3 / 7

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Page 10 / 14

User Name: admin@_permgps
Report Generated by Hostname: ASRY0W0374
System ID: RYG_EN0136
Print Date: January 8, 2024 10:57:26 AM

ALB_OQ_RYG_EN0136 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
January 4, 2024 1:43:28 PM	End	Execution	Turn E1 - 99778 SQ - Source: None	Run Count: 1
January 4, 2024 1:43:28 PM	Start	Execution	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	None
January 4, 2024 2:20:39 PM	Auto	AcqClosed	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	None
January 4, 2024 2:20:39 PM	Auto	AcqReopened	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	None
January 4, 2024 2:20:39 PM	Auto	ScoutingRunClosed	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	None
January 4, 2024 2:20:39 PM	Start	Qualification	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	OQ
January 4, 2024 2:20:39 PM	Start	Execution	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	None
January 4, 2024 2:21:29 AM	Auto	Data	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	Data File Path: D:\GCMS\SYSTEM\1.D
January 4, 2024 2:21:29 AM	End	Execution	Scouting Run - Manual Injection, Front SSL, SQ - Source: E1 - Extractor Part of GCMS System Preparation	Run Count: 1
January 4, 2024 2:21:29 AM	Start	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L: >= 1200	None

Page 4 / 7

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Page 11 / 14

User Name: admin@_permgps
Report Generated by Hostname: ASRY0W0374
System ID: RYG_EN0136
Print Date: January 8, 2024 10:57:26 AM

ALB_OQ_RYG_EN0136 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
January 5, 2024 9:25:19 AM	End	Qualification	Scouting	OQ
January 5, 2024 9:25:39 AM	Start	Reporting	Scouting	None
January 5, 2024 9:27:56 AM	End	Reporting	Scouting	None
January 5, 2024 9:27:56 AM	Start	Qualification	Scouting	OQ
January 5, 2024 9:27:56 AM	Start	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L: >= 1200	None
January 5, 2024 9:33:18 AM	Auto	Data	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L: >= 1200	Data File Path: D:\GCMS\SYSTEM\F1.D
January 5, 2024 9:45:22 AM	End	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L: >= 1200	Run Count: 1
January 5, 2024 9:45:22 AM	Start	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L: >= 1200	None
January 5, 2024 9:55:15 AM	Auto	Data	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Data File Path: D:\GCMS\SYSTEM\F2.D
January 5, 2024 9:55:15 AM	End	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Run Count: 1

Page 5 / 7

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Page 12 / 14

User Name: admin@_permgps
Report Generated by Hostname: ASRY0W0374
System ID: RYG_EN0136
Print Date: January 8, 2024 10:57:26 AM

ALB_OQ_RYG_EN0136 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
January 5, 2024 10:03:53 AM	Auto	TestUnlocked	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Deviation Noted for Run Count: 1
January 5, 2024 10:03:53 AM	Start	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	None
January 5, 2024 10:13:48 AM	Auto	Data	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Data File Path: D:\GCMS\SYSTEM\F2.D
January 5, 2024 10:17:58 AM	End	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Run Count: 2
January 5, 2024 10:22:04 AM	Auto	TestUnlocked	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Deviation Noted for Run Count: 2
January 5, 2024 10:22:04 AM	Start	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	None
January 5, 2024 10:22:15 AM	Auto	Data	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Data File Path: D:\GCMS\SYSTEM\F2.D
January 5, 2024 10:25:37 AM	End	Execution	Signal to Hold E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L: >= 1200	Run Count: 3

Page 6 / 7

Date: January 5, 2024 10:53:24 AM
System ID: RYG_EN0136

Page 13 / 14

User Name: volmer_s_puangsupan
Report Generated by Hostname: ABRV000074

System ID: RY0_E00136
Print Date: January 6, 2024 10:53:26 AM

ALS_O0_RY0_E00136 Transaction log 1

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
January 5, 2024 10:28:11 AM	Auto	Test/Inched	Signal to Noise EI - Liquid Injection, Front SBL, SOC - Source: EI - Extractor using Filament 2 - L: >= 1200	Device Used for Run Count : 3
January 5, 2024 10:28:11 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SBL, SOC - Source: EI - Extractor using Filament 2 - L: >= 1200	None
January 5, 2024 10:28:05 AM	Auto	Data	Signal to Noise EI - Liquid Injection, Front SBL, SOC - Source: EI - Extractor using Filament 2 - L: >= 1200	Data File Path : D:\GSP\ABR\FILED
January 5, 2024 10:48:04 AM	End	Execution	Signal to Noise EI - Liquid Injection, Front SBL, SOC - Source: EI - Extractor using Filament 2 - L: >= 1200	Run Count : 4
January 5, 2024 10:48:41 AM	End	Qualification	Session	QC
January 5, 2024 10:48:41 AM	Start	Reporting	Session	None
January 5, 2024 10:50:27 AM	Auto	Reporting	Session	Report Generated : Certificate
January 5, 2024 10:51:07 AM	Auto	Reporting	Session	Report Generated : Report
January 5, 2024 10:51:28 AM	Auto	Reporting	Session	Report Generated : Certificate
January 5, 2024 10:52:00 AM	Auto	Reporting	Session	Report Generated : Report

Page 7 / 7

Date: January 5, 2024 10:53:24 AM
System ID: RY0_E00136

Page 14 / 14

