

ภาคผนวก ข

เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์

Certificate of Calibration

TEMPERATURE CONTROLLER ENCLOSURES



Certificate No.: MC 2307702

Page 1 of 5

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

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

Checked by : Thanagorn
Thanagorn Linnchaicharoen
(Calibration Supervisor)

Approved by : Aitipong
Aitipong Kanjanawisit
(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; Rev6; Date: 22/04/2021)

Certificate No.: MC 2307702

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

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

Chamber Characterization Result

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

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

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by : Thanagorn

(MCF-Q-077; Rev6; Date: 22/04/2021)

ภาคผนวก ข-1

Certificate No.: MC 2307702

Page 2 of 3

The Reference Standard Instrument :

Description	Certificate No.	Serial No.	Due date	Traceable thru
Data Acquisition/Switch Unit	MC 2303173	MY41010916	9 Mar 2024	MCAL
With Thermocouple Type "T" ID. No.17/1 to 17/9				

Traceability :

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

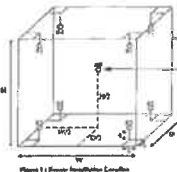
1. Calibration Procedure:

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 : 3.2 °C

Overall Line Voltage variation : 0.1 V

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

Checked by : Thanagorn

(MCF-Q-077; Rev6; Date: 22/04/2021)

CERTIFICATE OF CALIBRATION

Certificate No.: CO-1907007/23

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 ± 2) °C
Relative Humidity: (50 ± 10) %
Atmospheric Pressure: -

Calibration Location : Jayhawk Laboratory (CL&GL)

Received Date : 19 July 2023

Calibration Date : 19 July 2023

Date of Issue : 20 July 2023

Condition of Artifacts : Used conditions but can be calibrated

Checked by : [Signature]
Act as Technical Manager

Approved by : [Signature]
Representative of Managing Director

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

(Dr. Ekachai Puttithong)

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

FB-169

REV.02 02/04/21



Certificate No.: CO-1907007/23

Page 2 of total 2 pages

Reference Method:

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

Reference Standard:

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

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

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

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

Note: Adjustment points: 147.8 μ S/cm 1.425mS/cm

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

FE-169

Calibrated by Onnape
REV.02 02/24/21

CERTIFICATE OF CALIBRATION

Certificate No.: CO-1808005/23

Page 1 of total 4 pages

Customer

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

Equipment

pH Meter

Manufacturer

METTLER TOLEDO

Model

SevenCompact S220

Serial No.

B327527211

ID No.

WWL 0068

Description

Range : 0 - 14 pH, Resolution : 0.01 pH

Environmental Conditions

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

Calibration Location

Jayhawk Laboratory (CL&GL)

Received Date

18 August 2023

Calibration Date

18 August 2023

Date of Issue

21 August 2023

Condition of Artifacts

Used conditions but can be calibrated

Checked by

Act as Technical Manager

Approved by

Representative of Managing Director

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

(Dr. Ekachai Puttiwong)

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-1808005/23

Page 2 of total 4 pages

Reference Method:

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

Reference Standard:

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

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

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:
- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

1. Function Simulated pH Meter

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

UUC : Unit Under Calibration

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

Certificate No.: CO-1808005/23

Page 3 of total 4 pages

Measurement Results (Cont.):

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

pH Standard Solution (pH)	Measured Value		Uncertainty (\pm pH)
	(pH)	(mV)	
4.01	4.01	180.0	0.013
7.01	7.00	4.0	0.013
10.01	10.01	-172.0	0.013

Note: Adjust Curve to Buffer Solution pH (4,7,10)
Temperature stability of micro bath : 25 \pm 0.2 $^{\circ}$ 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%.

Calibrated by Kitipong
REV.02 02/24/21

FE-169

ภาคผนวก ข-2

Calibrated by Kitipong
REV.02 02/24/21

Certificate No.: MC 2303684

Page 2 of 3

The Reference Standard :

Description Certificate No. Serial No. Due date
Data Acquisition/Switch Unit MC 2303173 MY41010916 9 March 2024
With Thermocouple Type "T" ID. No.17/1 to 17/9

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

- Master Calibration Co., Ltd.

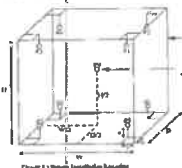
1. Calibration Procedure:

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

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

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

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



Overall Ambient Temperature around the Chamber variation : 0.7 °C

Overall Line Voltage variation : 0.3 V

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

Certificate No.: MC 2303684

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

Indicating Temperature (°C)	Measured Temperature (°C) at Spread Location									Uncertainty (°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. #9	
104	103.7	103.9	103.6	103.8	103.7	104.2	104.1	104.2	104.3	0.58
180	179.4	179.5	179.4	179.7	179.4	179.9	179.8	180.2	180.0	1.3

Chamber Characterization Result

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

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

This report will certify of the calibrated equipment only.

End of Certificate



Certificate of Calibration

Equipment: Balance
Model: BL 210S
Serial No. (or ID.): 15908131 (WWW.0022)
Manufacturer: Sartorius
Condition: In condition

Certificate No.: C01223710
Issued Date: 07 December 2022
Job No.: KSPR2215491
Page: 1 of 2

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

Environment Condition: Temperature 25 °C ± 0.5 °C
Humidity 48 %RH ± 4.8 %RH

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

Calibration By: Mr. Predt Silboot
Calibration Date: 07 December 2022
The Method used: In-house method, CAL-WI-47, based on UKAS Lab 14
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Co., Ltd. Certificate No. C02221864

(Mr. Predt Silboot)
Person in charge

(Mr. Rungrod Jenkitrakulchai)
Authorized signatory

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

DKSH Technology Limited
547 ถนนรัชดาภิเษก แขวงคลองสาน เขตสุววงษ์ กรุงเทพมหานคร 10310

Certificate No.: C01223710

Page: 2 of 2

Calibration Results:

Without Adjustment

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

Nominal Test Value		Reference Points (g)				
		100				
		A	B	C	D	E
100		-	0.0001	0.0001	-0.0002	-0.0001

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

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

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

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
1	1.00001	1.0000	0.0000	0.00012	2.08
2	2.00001	2.0000	0.0000	0.00012	2.08
5	5.00003	5.0000	0.0000	0.00012	2.07
10	10.00002	10.0000	0.0000	0.00013	2.07
20	20.00001	20.0000	0.0000	0.00013	2.06
50	50.00003	50.0000	0.0000	0.00014	2.04
70	70.00004	70.0001	0.0001	0.00017	2.02
100	100.00002	100.0001	0.0001	0.00018	2.01
120	120.00003	120.0001	0.0001	0.00022	2.01
150	150.00005	150.0003	0.0003	0.00024	2.00
200	200.00006	200.0004	0.0003	0.00030	2.00

The End of Certificate

DKSH Technology Limited
547 ถนนรัชดาภิเษก แขวงคลองสาน เขตสุววงษ์ กรุงเทพมหานคร 10310



บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาธิปไตย แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkhunphrom, Pranakorn, Bangkok 10200

Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST
FOR ATOMIC ABSORPTION SPECTROMETERModel & Serial Number: 2402 AA & M518230004Customer: Water Analysis Center Co., Ltd.Date: 27 Apr 2023

Safety

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

Optics

- ☒ Inspect/Replace that external optics surfaces
- ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.6 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 99% (should be $\leq 64\%$ or $\leq 380V$)
- ☒ Flame, Check D2 lamp is work

1/2



บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาธิปไตย แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkhunphrom, Pranakorn, Bangkok 10200

Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

Electronics

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

**Option for Graphite Zeeman only

Mechanisms

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

Analytical performance

- ☒ Clear the sample compartment
- ☒ Flame, Check uptake rate form 7.2-10.6 mL per minute = 9.8 mL/min
- ☒ Test Photometric noise, STDV = 0.0000 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
 - Air/acel Cu 5 ppm = 0.85 Abs, and Precision
 - (%RSD) = 0.5 % (should be > 0.55 Abs and $< 0.5\%$ RSD)
- or
- N2O/Acel 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: Samya MahachonCustomer: Water Analysis Center Co., Ltd.

2/2



บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาธิปไตย แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkhunphrom, Pranakorn, Bangkok 10200

Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST
FOR ATOMIC ABSORPTION SPECTROMETERModel & Serial Number: 2402 AA & M518230004Customer: Water Analysis Center Co., Ltd.Date: 26 Apr 2023

Safety

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

Optics

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

1/2



บริษัท ไทยยูนิค จำกัด

THAI UNIQUE CO., LTD.

80-82 ถนนประชาธิปไตย แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkhunphrom, Pranakorn, Bangkok 10200

Tel. 0-2629-0191-6, 0-2280-1787, Fax. 0-2280-1788, E-mail : thawan@thaiunique.com, Website : www.thaiunique.com

Electronics

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

**Option for Graphite Zeeman only

Mechanisms

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

Analytical performance

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

SIGN:

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

2/2

BSC Certification Test Report

Page 1 of 6

Certificate No. : M1333/23

Customer Name : LABORATORY WATER ANALYSIS CENTER COMPANY LIMITED

Customer Address : 1/94 Moo 5 T.Kanharu, A.U-Thai,
Phra Nakhon Si Ayutthaya 13210

Equipment : Biological Safety Cabinet Class II Type A2

Manufacturer : Microtech

Model : V6-T

Serial No. : 0972

ID No. : WWL 0084

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

Test Date : 12/10/2023

Due Date : 11/10/2024 or after HEPA filters are replaced or unit is moved

Test by : Mr. Puwadol Keawila

Approved by :

(Mr.Krissada Thinhustoci)
Authorized Signatory

Issued Date : 16/10/2023

This calibration certificate documents the traceability to national standards, which realizes 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)

Page 2 of 6

Certificate No. : M1333/23

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	100 mm

Measurement Data. (m/s.)

0.35	0.41	0.42	0.41
0.39	0.34	0.35	0.34

Average velocity 0.38 m/s (75 FPM.) Velocity range 0.35-0.50 m/s (69-98 FPM.)

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

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

Downflow volume (Q) 802 CFM.

Result Summary ☒ Pass ☐ Fail

Equipment used : Thermo Anemometer Model 425 S/N : 03004786 Calibration date : 16/02/2023

Megafil Co.,Ltd.

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

Page 3 of 6

Certificate No. : M1333/23

2. Inflow velocity test.

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

MPG's Specifications method

0.56	0.56	0.57	0.56	0.54
0.59	0.54	0.55	0.56	0.57
0.57	0.56	0.57	0.54	0.58
0.56	0.58	0.57	0.58	0.59
0.57	0.54	0.54	0.55	0.57

(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 : 03004786 Calibration date : 16/02/2023

3. HEPA filter leak test.

Measurement Data

HEPA Filter	FAO Upstream Conc.(calculated)	Specification	Measured leak penetration
Supply HEPA Filter	17 µg/l.	<0.003%	<0.003%
Exhaust HEPA Filter	17 µg/l.	<0.003%	<0.003%

Megafil Co.,Ltd.

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

Page 4 of 6

Certificate No. : M1333/23

Leak location

Supply HEPA Filter
Back



Exhaust HEPA Filter
Back



Result Summary ☒ Pass ☐ Fail

Equipment used : Aerosol Photometer Model TDA-2H S/N : 21683 Calibration date : 16/02/2023

Equipment used : Smoke Generator Model TDA-6C S/N : 21623

4. Airflow smoke pattern 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.

Megafil Co.,Ltd.

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

Certificate No. : M1333/23

Result Summary

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

5. Site Installation

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

Remark / Recommendation

ระบบ Site installation ไม่มีการตรวจสอบ เนื่องจากตู้ไม่เปิดใช้งาน

6. Illumination Test (Lighting) : Option

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

Lux			
609	959	932	557
861	1439	1486	765

Remark :

Certificate No. : M1333/23

7. Ultraviolet Lamp Test (UV) : Option

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

mW/m ²			
690	1490	1520	720
440	960	970	430

Remark :

-o-o-

Certificate of Calibration

TEMPERATURE CONTROLLER ENCLOSURES




Certificate No.: MC 2213617

Page 1 of 3

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

Reference Job No. : 22-2848 Received Date : 12 December 2022
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 2213617) has been attached to the case.
Method : In-House calibration procedure MWL-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 : (24.3 to 24.6) °C
Relative Humidity : (61.4 to 70.1) %
Date of Calibration : 12 December 2022 Date of Issue : 13 December 2022

Checked by : 
Thanagorn Limchaicharoen
(Calibration Supervisor)

Approved by : 
Aitipong Kijjanawasit
(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 2213617

Page 2 of 3

The Reference Standard :

Description	Certificate No.	Serial No.	Due date
Data Acquisition/Switch Unit	MC 2208932	MY4401 2056	8 August 2023

With Thermocouple Type " T " ID. No.11/1 to 11/9

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

- Master Calibration Co., Ltd.

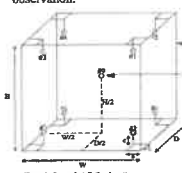
1. Calibration Procedure:

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

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

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

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




Overall Ambient Temperature around the Chamber variation : 1.7 °C

Overall Line Voltage variation : 0.0 V

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

Figure 1 : Sensor Installation Location

Checked by : 

Certificate No.: MC 2213617

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	35.4	35.3	35.2	35.1	35.0	34.9	34.8	34.9	34.9	0.33

Chamber Characterization Result

Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	0.17	0.63	0.8

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

This report will certify of the calibrated equipment only.

End of Certificate

Checked by: *Thanyaporn*

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

Certificate of Calibration

LIQUID BATH



Certificate No.: MC 2213615

Page 1 of 3

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

Reference Job No. : 22-2848 Received Date : 12 December 2022
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 2213615) 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 31.9) °C
Relative Humidity : (46.0 to 52.0) %
Date of Calibration : 12 December 2022 Date of Issue : 13 December 2022

Checked by: *Thanyaporn*
Thanaporn Limchaicharoen
(Calibration Supervisor)

Approved by: *Aitipong*
Aitipong Kanyasavasi
(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 2213615

Page 2 of 3

The Reference Standard :

Description	Certificate No.	Serial No.	Due date
Data Acquisition/Switch Unit	MC 2114430	MY44020009	25 February 2023

With Thermocouple Type " T " ID. No.271 to 275

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

- Master Calibration Co., Ltd.

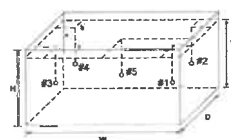
1. Calibration Procedure:

This instrument was calibrated 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 : 1.7 °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: *Thanyaporn*

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

Certificate No.: MC 2213615

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	44.5	44.5	44.5	44.6	0.44

Chamber Characterization Result

Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
45.0	45.0	0.84	0.57	1.7

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

This report will certify of the calibrated equipment only.

End of Certificate

Checked by: *Thanyaporn*

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

Certificate of Calibration

AUTOCLAVE



Certificate No.: MC 2213616

Page 1 of 3

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

Reference Job No. 22-2848 Received Date : 12 December 2022
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 2213616) has been attached to the case.
Method In-House calibration procedure MWL-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 : (49.0 to 52.0) %
Date of Calibration : 12 December 2022 Date of Issue : 13 December 2022

Checked by : Thangorn Approved by : Aitipong
Thangorn Linchaicharoen Aitipong Kanyasawat
(Calibration Supervisor) (Technical Manager)

The uncertainties are for a confidence probability of approximately 95%

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

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

Certificate No.: MC 2213616

Page 2 of 3

The Reference Standard :

Description	Certificate No.	Serial No.	Due date
Temperature Recorder RTD 100 Ohm	MC 2114437	M79251	17 January 2023
Temperature Recorder RTD 100 Ohm	MC 2114435	M79252	17 January 2023
Temperature Recorder RTD 100 Ohm	MC 2114436	S978194	17 January 2023

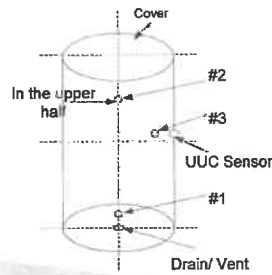
This certificate is traceable to the international system of units maintained at:

- Master Calibration Co., Ltd.

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. MWL-T-036 based on BS 2646 : 1993 : Part 5 in Tests for performance section.



- Overall Line Voltage variation : 0.0 V

Checked by : Thangorn

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

Certificate No.: MC 2213616

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	121.94	122.05	122.02	0.60

Characterization Result

Setting Temperature (°C)	Timer Setting (min)	Indicating Temperature (°C)	Indicating Pressure (kPa)	Measured Stability (±°C)	Measured Uniformity (°C)	Overall Variation (°C)
121	15.0	121	120	0.42	0.20	0.90

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

This report will certify of the calibrated equipment only.

End of Certificate

Checked by : Thangorn

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

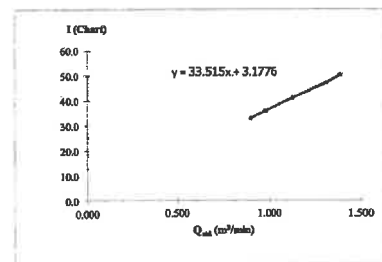
ภาคผนวก ข-9

High Volume Air Sampler Calibration Worksheet

Page 1 of 1

Project Site : <u>สถานีวิทยุโทรทัศน์กองทัพบก</u>	Location : <u>วัดบวรนิเวศ</u>	Date of measurement : <u>5/12/2023</u>	Worksheet No. : <u>C-651223-WWL0093</u>	Calibration Office : <u>WWL0103</u>
High Volume ID : <u>WWL0093</u>	Calibrator ID : <u>TE-5028A</u>	High Volume Model : <u>TE-5170 (TSP)</u>	Calibrator Model : <u>3271</u>	Calibrator S/N : <u>13/03/2023</u>
High Volume S/N : <u>2729</u>	Calibrator Date : <u>159945</u>	Ambient Condition : <u>26</u>	Quality Standard Slope : <u>-0.01674</u>	Quality Standard Intercept : <u>49.80</u>
Temperature (°C) : <u>26</u>	Barometric Pressure (mmHg) : <u>756</u>			

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



Calibrated by : Mr. JITTAWEE WONGAKHOB
Charist

Approved by : Mr. RUNGASIKORN KOSUM
Technical Manager

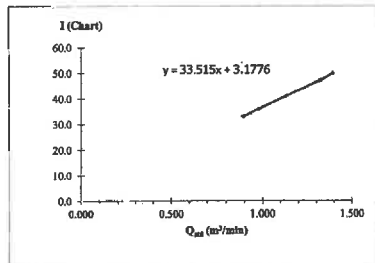
POLAR 1.5-103

วันที่รับเข้า : 22/04/2567 : 18.25:00 วันที่ : 18/04/2567

High Volume Air Sampler Calibration Worksheet

Project Site : สถานีอุตสาหกรรมโรงกลั่น Page 1 of 1
 Location : บ้านนาโพธิ์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0094 Calibration Orifice : WWL0103
 High Volume ID : WWL0094 Calibrator ID : TE-5028A
 High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
 High Volume S/N : 2736 Calibrator S/N : 13/03/2023
 Ambient Condition : 26 Calibrator Date : 1.59945
 Temperature (°C) : 756 Quality Standard Slope : -0.01874
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept :

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

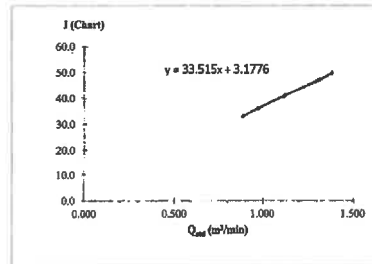


Calibrated by : [Signature] Approved by : [Signature]
 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5.5-125 ฉบับแก้ไขที่ : 1 วันที่แก้ไข : 1 ต.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานีอุตสาหกรรมโรงกลั่น Page 1 of 1
 Location : บ้านนาโพธิ์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0095 Calibration Orifice : WWL0103
 High Volume ID : WWL0095 Calibrator ID : TE-5028A
 High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
 High Volume S/N : 2727 Calibrator S/N : 13/03/2023
 Ambient Condition : 26 Calibrator Date : 1.59945
 Temperature (°C) : 756 Quality Standard Slope : -0.01874
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept :

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

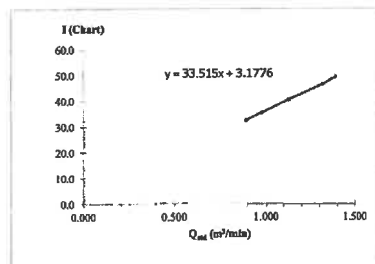


Calibrated by : [Signature] Approved by : [Signature]
 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5.5-125 ฉบับแก้ไขที่ : 1 วันที่แก้ไข : 1 ต.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานีอุตสาหกรรมโรงกลั่น Page 1 of 1
 Location : บ้านนาโพธิ์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0096 Calibration Orifice : WWL0103
 High Volume ID : WWL0096 Calibrator ID : TE-5028A
 High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
 High Volume S/N : 2730 Calibrator S/N : 13/03/2023
 Ambient Condition : 26 Calibrator Date : 1.59945
 Temperature (°C) : 756 Quality Standard Slope : -0.01874
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept :

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

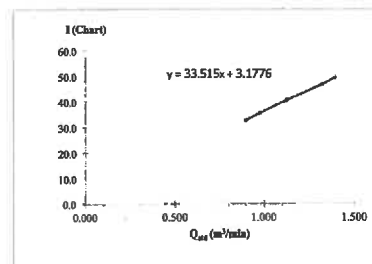


Calibrated by : [Signature] Approved by : [Signature]
 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5.5-125 ฉบับแก้ไขที่ : 1 วันที่แก้ไข : 1 ต.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานีอุตสาหกรรมโรงกลั่น Page 1 of 1
 Location : บ้านนาโพธิ์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0097 Calibration Orifice : WWL0103
 High Volume ID : WWL0097 Calibrator ID : TE-5028A
 High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
 High Volume S/N : 2726 Calibrator S/N : 13/03/2023
 Ambient Condition : 26 Calibrator Date : 1.59945
 Temperature (°C) : 756 Quality Standard Slope : -0.01874
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept :

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



Calibrated by : [Signature] Approved by : [Signature]
 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5.5-125 ฉบับแก้ไขที่ : 1 วันที่แก้ไข : 1 ต.ค. 2560 หน้า : 1 ของ 1

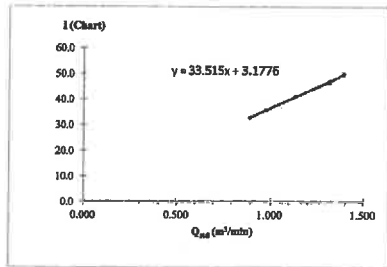


High Volume Air Sampler Calibration Worksheet

Page 1 of 1

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา
Location : บ้านนาโพธิ์
Date of measurement : 5/12/2023
Worksheet No. : C-851223-WWL0223 Calibration Office : WWL0103
High Volume ID : WWL0223 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
High Volume S/N : 2738 Calibrator S/N : 13/03/2024
Ambient Condition : 26 Quality Standard Slope : 1.59945
Temperature (°C) : 756 Quality Standard Intercept : -0.01874
Barometric Pressure (mmHg) :

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



Calibrated by :

Mr. JITTAWEE WONGMAKHEB

FO.LAB 53-125

Approved by :

Mr. RUNOSASORN KOSUM

แก้ไขครั้งที่ : 1 วันที่พิมพ์ไฟล์ : 1 ธ.ค. 2568 หน้า : 1 ของ 1

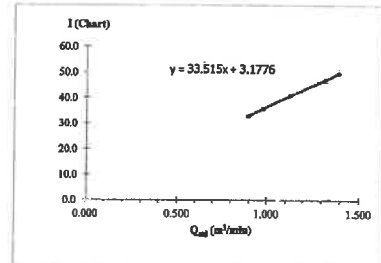


High Volume Air Sampler Calibration Worksheet

Page 1 of 1

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา
Location : บ้านนาโพธิ์
Date of measurement : 5/12/2023
Worksheet No. : C-851223-TSPR1 Calibration Office : WWL0103
High Volume ID : TSPNO.5 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
High Volume S/N : - Calibrator S/N : 13/03/2024
Ambient Condition : 26 Quality Standard Slope : 1.59945
Temperature (°C) : 756 Quality Standard Intercept : -0.01874
Barometric Pressure (mmHg) :

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



Calibrated by :

Mr. JITTAWEE WONGMAKHEB

FO.LAB 53-125

Approved by :

Mr. RUNOSASORN KOSUM

แก้ไขครั้งที่ : 1 วันที่พิมพ์ไฟล์ : 1 ธ.ค. 2568 หน้า : 1 ของ 1

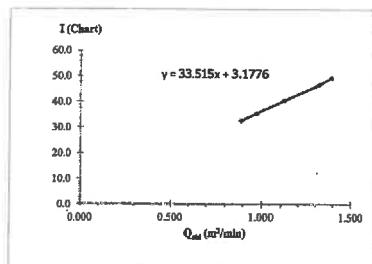


High Volume Air Sampler Calibration Worksheet

Page 1 of 1

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา
Location : บ้านนาโพธิ์
Date of measurement : 5/12/2023
Worksheet No. : C-851223-TSPR2 Calibration Office : WWL0103
High Volume ID : TSPNO.8 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
High Volume S/N : - Calibrator S/N : 13/03/2024
Ambient Condition : 26 Quality Standard Slope : 1.59945
Temperature (°C) : 756 Quality Standard Intercept : -0.01874
Barometric Pressure (mmHg) :

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



Calibrated by :

Mr. JITTAWEE WONGMAKHEB

FO.LAB 53-125

Approved by :

Mr. RUNOSASORN KOSUM

แก้ไขครั้งที่ : 1 วันที่พิมพ์ไฟล์ : 1 ธ.ค. 2568 หน้า : 1 ของ 1

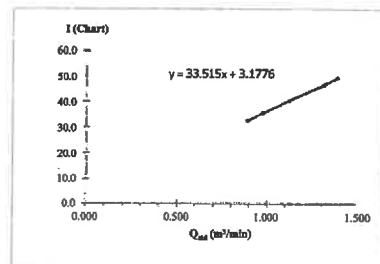


High Volume Air Sampler Calibration Worksheet

Page 1 of 1

Project Site : สวนอุตสาหกรรมโรจนะอยุธยา
Location : บ้านนาโพธิ์
Date of measurement : 5/12/2023
Worksheet No. : C-851223-TSPR3 Calibration Office : WWL0103
High Volume ID : TSPNO.10 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
High Volume S/N : - Calibrator S/N : 13/03/2024
Ambient Condition : 26 Quality Standard Slope : 1.59945
Temperature (°C) : 756 Quality Standard Intercept : -0.01874
Barometric Pressure (mmHg) :

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



Calibrated by :

Mr. JITTAWEE WONGMAKHEB

FO.LAB 53-125

Approved by :

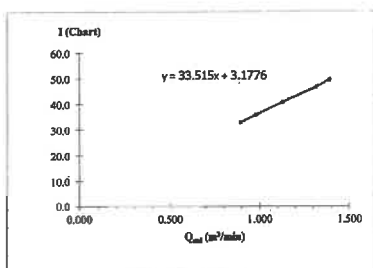
Mr. RUNOSASORN KOSUM

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High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : วัดนาทราย
 Date of measurement : 5/12/2023
 Worksheet No. : C-451223-TSPM4 Calibration Office : WWL0103
 High Volume ID : TSPM0.1 Calibrator ID : TE-5028A
 High Volume Model : TE-5170 (TSP) Calibrator Model : 3271
 High Volume S/N : - Calibrator S/N : 13/03/2023
 Ambient Condition : - Calibrate Date : 1.59945
 Temperature (°C) : 26 Quality Standard Slope : -0.01874
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -

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

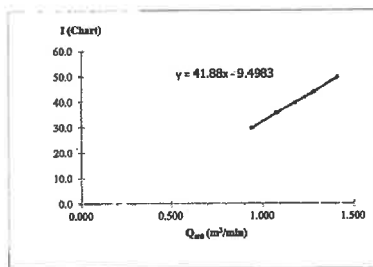


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 Mr. JITTAWEE WONGMAKHEB Mr. RUNGRASIKORN KOSUM
 Chemist Technical Management
 POLAB 5.5-125 แก้ไขครั้งที่ : วันที่ส่งไฟล์ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : วัดนาทราย
 Date of measurement : 5/12/2023
 Worksheet No. : C-451223-WWL0098 Calibration Office : WWL0103
 High Volume ID : WWL0098 Calibrator ID : TE-5028A
 High Volume Model : TE-6070 (PM10) Calibrator Model : 3271
 High Volume S/N : 2734 Calibrator S/N : 13/03/2023
 Ambient Condition : - Calibrate Date : 1.00155
 Temperature (°C) : 26 Quality Standard Slope : -0.01185
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -

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

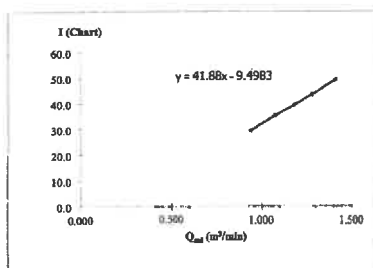


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 POLAB 5.5-125 แก้ไขครั้งที่ : วันที่ส่งไฟล์ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : วัดนาทราย
 Date of measurement : 5/12/2023
 Worksheet No. : C-451223-WWL0099 Calibration Office : WWL0103
 High Volume ID : WWL0099 Calibrator ID : TE-5028A
 High Volume Model : TE-6070 (PM10) Calibrator Model : 3271
 High Volume S/N : 2732 Calibrator S/N : 13/03/2023
 Ambient Condition : - Calibrate Date : 1.00155
 Temperature (°C) : 26 Quality Standard Slope : -0.01185
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -

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

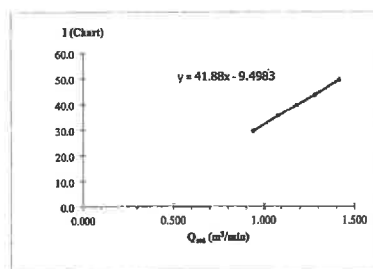


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 Chemist Technical Management
 POLAB 5.5-125 แก้ไขครั้งที่ : วันที่ส่งไฟล์ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : วัดนาทราย
 Date of measurement : 5/12/2023
 Worksheet No. : C-451223-WWL0100 Calibration Office : WWL0103
 High Volume ID : WWL0100 Calibrator ID : TE-5028A
 High Volume Model : TE-6070 (PM10) Calibrator Model : 3271
 High Volume S/N : 2735 Calibrator S/N : 13/03/2023
 Ambient Condition : - Calibrate Date : 1.00155
 Temperature (°C) : 26 Quality Standard Slope : -0.01185
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -

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

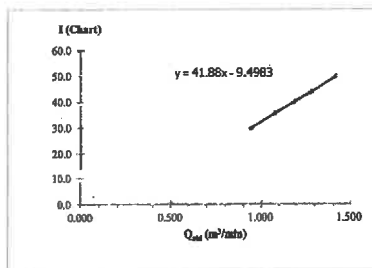


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 Chemist Technical Management
 POLAB 5.5-125 แก้ไขครั้งที่ : วันที่ส่งไฟล์ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานอุตสาหกรรมโรจนะอุดร Page 1 of 1
 Location : ลำน้ำจันทน์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0103 Calibration Office
 High Volume ID : WWL0101 Calibration ID : WWL0103
 High Volume Model : TE-6070 (PM10) Calibration Model : TE-5028A
 High Volume S/N : 2733 Calibration S/N : 3271
 Ambient Condition : 13/03/2023
 Temperature (°C) : 26 Quality Standard Slope : 1.00155
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

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

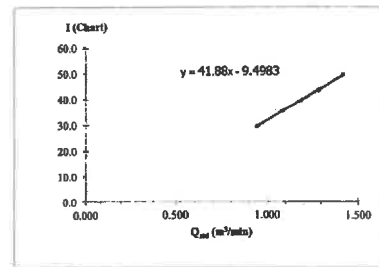


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 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5-5-1/5 แก้ไขครั้งที่ : วันที่แก้ไข/ปี : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานอุตสาหกรรมโรจนะอุดร Page 1 of 1
 Location : ลำน้ำจันทน์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0102 Calibration Office
 High Volume ID : WWL0102 Calibration ID : WWL0103
 High Volume Model : TE-6070 (PM10) Calibration Model : TE-5028A
 High Volume S/N : 2731 Calibration S/N : 3271
 Ambient Condition : 13/03/2023
 Temperature (°C) : 26 Quality Standard Slope : 1.00155
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

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

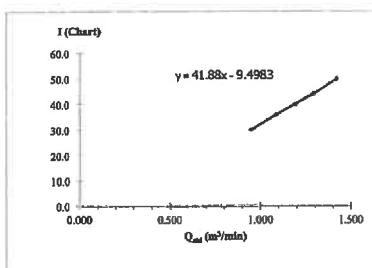


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 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5-5-1/5 แก้ไขครั้งที่ : วันที่แก้ไข/ปี : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานอุตสาหกรรมโรจนะอุดร Page 1 of 1
 Location : ลำน้ำจันทน์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-WWL0224 Calibration Office
 High Volume ID : WWL0224 Calibration ID : WWL0103
 High Volume Model : TE-6070 (PM10) Calibration Model : TE-5028A
 High Volume S/N : 2739 Calibration S/N : 3271
 Ambient Condition : 13/03/2022
 Temperature (°C) : 26 Quality Standard Slope : 1.00155
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

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

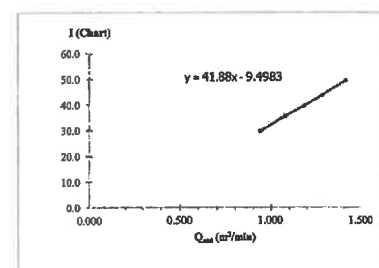


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 Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
 Chemist Technical Management
 POLAB 5-5-1/5 แก้ไขครั้งที่ : วันที่แก้ไข/ปี : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สถานอุตสาหกรรมโรจนะอุดร Page 1 of 1
 Location : ลำน้ำจันทน์
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-PM10R1 Calibration Office
 High Volume ID : PM10NO.6(1) Calibration ID : WWL0103
 High Volume Model : TE-6070 (PM10) Calibration Model : TE-5028A
 High Volume S/N : 2731 Calibration S/N : 3271
 Ambient Condition : 13/03/2022
 Temperature (°C) : 26 Quality Standard Slope : 1.00155
 Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01185

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

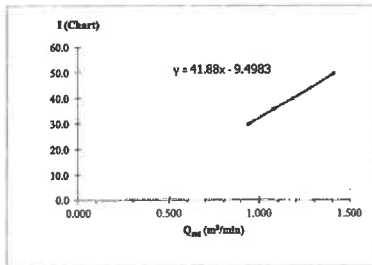


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 POLAB 5-5-1/5 แก้ไขครั้งที่ : วันที่แก้ไข/ปี : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : บ้านนาเหนือ
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-FM10R2 Calibration Office : WWL0103
 High Volume ID : FM10NO.6(2) Calibrator ID : TE-5028A
 High Volume Model : TE-6070 (FM10) Calibrator Model : 3271
 High Volume S/N : - Calibrator S/N : 13/03/2024
 Ambient Condition : 26 Quality Standard Slope : 1.00155
 Temperature (°C) : 756 Quality Standard Intercept : -0.01185
 Barometric Pressure (mmHg) : -

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

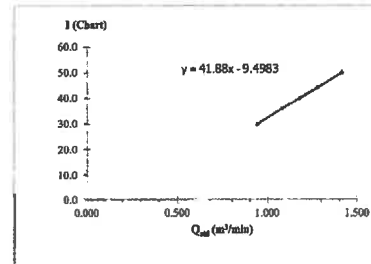


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 POLAB 55-125 วันที่ใช้ : วันที่รับใช้ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : บ้านนาเหนือ
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-FM10R3 Calibration Office : WWL0103
 High Volume ID : FM10NO.5 Calibrator ID : TE-5028A
 High Volume Model : TE-6070 (FM10) Calibrator Model : 3271
 High Volume S/N : - Calibrator S/N : 13/03/2024
 Ambient Condition : 26 Quality Standard Slope : 1.00155
 Temperature (°C) : 756 Quality Standard Intercept : -0.01185
 Barometric Pressure (mmHg) : -

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

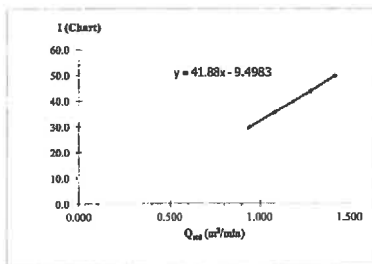


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 POLAB 55-125 วันที่ใช้ : วันที่รับใช้ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม Page 1 of 1
 Location : บ้านนาเหนือ
 Date of measurement : 5/12/2023
 Worksheet No. : C-051223-FM10R4 Calibration Office : WWL0103
 High Volume ID : PM10NO.1 Calibrator ID : TE-5028A
 High Volume Model : TE-6070 (FM10) Calibrator Model : 3271
 High Volume S/N : - Calibrator S/N : 13/03/2023
 Ambient Condition : 26 Quality Standard Slope : 1.00155
 Temperature (°C) : 756 Quality Standard Intercept : -0.01185
 Barometric Pressure (mmHg) : -

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

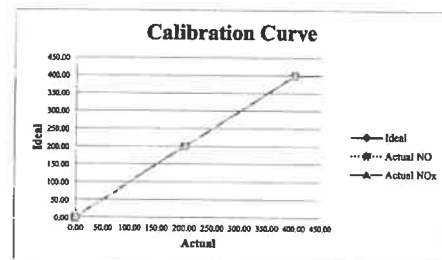


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 POLAB 55-125 วันที่ใช้ : วันที่รับใช้ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม
 Location : บ้านนาเหนือ
 Date of measurement : 05 December 2023
 Worksheet No. : C-051223-WWL 0116
 Ambient NO_x Analyzer ID : WWL 0116
 Manufacturer : HORIBA
 Ambient NO_x Analyzer Model : APNA-370
 Ambient NO_x Analyzer S/N : 9BRKGTUK
 Multi Gas Calibrator
 Calibrator ID : WWL0128
 Calibrator Model : Series 6100
 Calibrator S/N : S/N 7462
 Calibrate Date : 10 January 2023
 Cylinder Std. Gas
 Std. Gas Concentration (PPM) : 50.90
 Cylinder Pressure (psf) : 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	0.20	0.20	-	0.20	0.20	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.20	0.20	0.05
AVERAGE (%)				0.04			0.07



Calibrated by : (Miss) SU THIDA SINGHAPHEN Approved by : (Mr. RUNGSASIKORN KOSUM)
 Chemist Technical Management



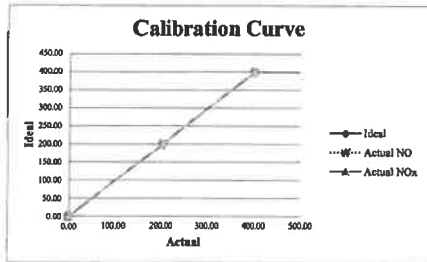
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1/94 Moo 5, T.Bangna, A.U-Thai, Ayutthaya 10210, Thailand
Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม
Location : อุตสาหกรรม
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0117
Ambient NOx Analyzer ID : WWL 0117
Manufacturer : HORIBA
Ambient NOx Analyzer Model : APNA-370
Ambient NOx Analyzer S/N : VJLYC3K0

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.99
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	0.20	0.20	-	0.20	0.20	-
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)
Client

Approved by : (Mr. RUNGSASIKORN KOSUM)
Technical Management



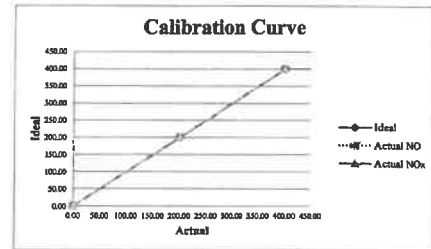
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Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม
Location : อุตสาหกรรม
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0118
Ambient NOx Analyzer ID : WWL 0118
Manufacturer : HORIBA
Ambient NOx Analyzer Model : APNA-370
Ambient NOx Analyzer S/N : W2VNUX08

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.99
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	0.20	0.20	-	0.20	0.20	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.20	0.20	0.05
AVERAGE (%)				0.04			0.07



Calibrated by : (Miss SUTHIDA SINGHAPHEN)
Client

Approved by : (Mr. RUNGSASIKORN KOSUM)
Technical Management



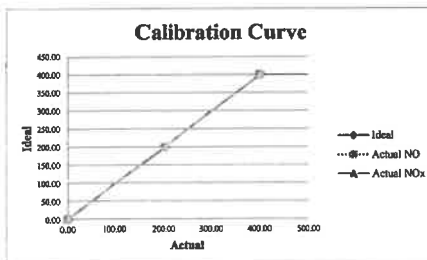
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Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม
Location : อุตสาหกรรม
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0115
Ambient NOx Analyzer ID : WWL 0115
Manufacturer : HORIBA
Ambient NOx Analyzer Model : APNA-370
Ambient NOx Analyzer S/N : 705KA911

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.99
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	0.20	0.20	-	0.20	0.20	-
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	400.20	0.20	0.05
AVERAGE (%)				0.05			0.07



Calibrated by : (Miss SUTHIDA SINGHAPHEN)
Client

Approved by : (Mr. RUNGSASIKORN KOSUM)
Technical Management



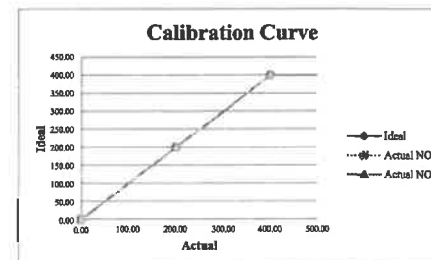
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Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม
Location : อุตสาหกรรม
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0022
Ambient NOx Analyzer ID : WWL 0022
Manufacturer : Thermo Environmental Instruments Inc
Ambient NOx Analyzer Model : 43C
Ambient NOx Analyzer S/N : 42C-70988-367

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.99
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	0.20	0.20	-	0.20	0.20	-
SPAN 200 ppb	200.00	200.20	0.20	0.10	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.10	0.10	0.03
AVERAGE (%)				0.06			0.06



Calibrated by : (Miss SUTHIDA SINGHAPHEN)
Client

Approved by : (Mr. RUNGSASIKORN KOSUM)
Technical Management



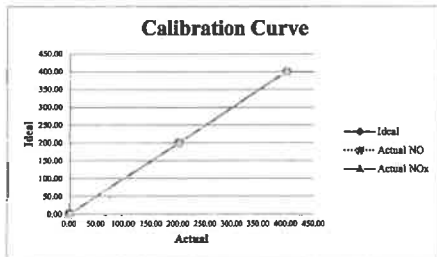
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194 Moo 5, T.Bung Na Phoo, A.B. Thung, Phichit 35110, Thailand
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Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : ต.บึงสามพัน อ.บึงสามพัน จ.พิจิตร
Location : ต.บึงสามพัน อ.บึงสามพัน จ.พิจิตร
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0114
Ambient NOx Analyzer ID : WWL0114
Manufacturer : HORIBA
Ambient NOx Analyzer Model : APNA-370
Ambient NOx Analyzer S/N : PIEJ99E5

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
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 NOx	Error NOx	%Error NOx
ZERO	0.00	0.20	0.20	-	0.20	0.20	-
SPAN 200 ppb	200.00	200.20	0.20	0.10	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.20	0.20	0.05	400.20	0.20	0.05
AVERAGE (%)				0.07			0.05



Calibrated by :
(Miss SULTIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Manager



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

Analyzer Performance Test

Calibrated Date: 29 November 2023

Instruments Information
Analyzer Type : NO-NO2-NOx Analyzer
Model : 42C
Manufacturer : Thermo Environmental
Serial Number : 0413406268

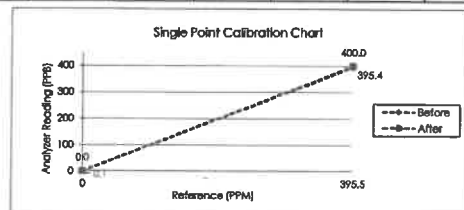
Calibrator Unit
Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

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

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	395.4	-1.2
NOx	0.0	0.0	0.0	400.0	395.5	-1.1

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
NOx	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By :
MR. KITTSAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



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

Analyzer Performance Test

Calibrated Date: 29 November 2023

Instruments Information
Analyzer Type : NO-NO2-NOx Analyzer
Model : 200E
Manufacturer : Teledyne
Serial Number : 1831

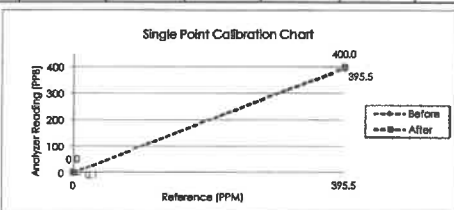
Calibrator Unit
Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

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

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	395.5	-1.1
NOx	0.0	0.0	0.0	400.0	395.5	-1.1

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
NOx	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By :
MR. KITTSAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



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Analyzer Performance Test

Calibrated Date: 30 November 2023

Instruments Information
Analyzer Type : NO-NO2-NOx Analyzer
Model : 200A
Manufacturer : API
Serial Number : 597

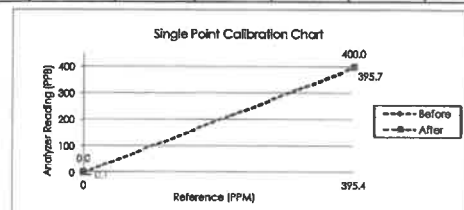
Calibrator Unit
Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924

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

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (PPB)	Reference (PPB)	Reading (PPB)	Drift%
NO	0.0	0.1	0.1	400.0	395.7	-1.1
NOx	0.0	0.0	0.0	400.0	395.4	-1.2

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
NOx	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By :
MR. KITTSAK JANSANGWATTANA

Approve by :
MR. PASAGORN SAMOL



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Analyzer Performance Test

Calibrated Date: 30 November 2023

Instruments Information

Analyzer Type: NO-NO₂-NO_x Analyzer
Model: 200A

Manufacturer: API
Serial Number: 608

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: EBO129027
Expiry Date: 29 Oct. 2027

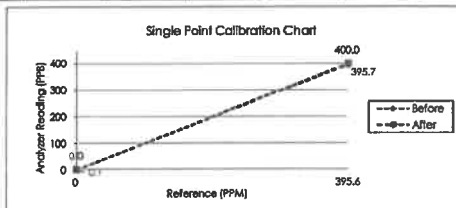
Environment: Temperature 25.5 °C Humidity: 51 %RH

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	395.7	-1.1
NO _x	0.0	0.0	0.0	400.0	395.6	-1.1

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



Calibrated By: กิตติศักดิ์ จันทะวงษ์
MR. KITTISAK JANSANGWATANA

Approved by: MR. PASAGORN SAMOL



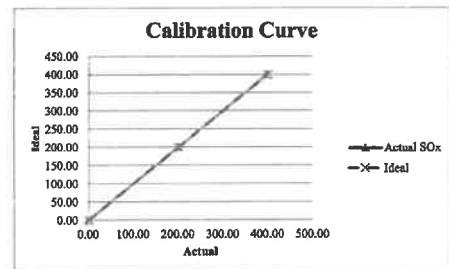
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Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site: สวนอุตสาหกรรมโรจนะ อู่ทอง
Location: วัดโคกมะเขิน
Date of measurement: 05 December 2023
Worksheet No.: C-051223WWL 0111
Ambient SO_x Analyzer ID: WWL 0111
Manufacturer: HORIBA
Ambient SO_x Analyzer Model: AFSA-370
Ambient SO_x Analyzer S/N: PGRKTBDX

Multi Gas Calibrator
Calibrator ID: WWL0128
Calibrator Model: Series 6100
Calibrator S/N: S/N 7462
Calibrate Date: 10 January 2023
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	400.10	0.10	0.03
AVERAGE (%)				0.04



Calibrated by: MR. SUTHIDA SINGHAPHEN
Chemist

Approved by: MR. RUNGSASIKORN KOSUM
Technical Management



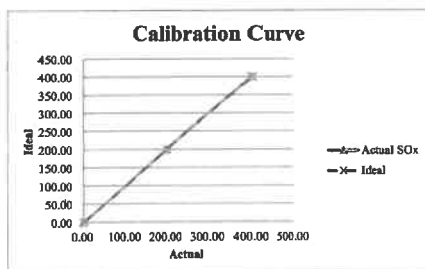
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Tel: 0-35226-383, 0-35800-593 Fax: 0-35800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site: สวนอุตสาหกรรมโรจนะ อู่ทอง
Location: วัดโคกมะเขิน
Date of measurement: 05 December 2023
Worksheet No.: C-051223-WWL0113
Ambient SO_x Analyzer ID: WWL 0113
Manufacturer: HORIBA
Ambient SO_x Analyzer Model: AFSA-370
Ambient SO_x Analyzer S/N: WDMYBHT8

Multi Gas Calibrator
Calibrator ID: WWL0128
Calibrator Model: Series 6100
Calibrator S/N: S/N 7462
Calibrate Date: 10 January 2023
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	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.20	0.20	0.05
AVERAGE (%)				0.07



Calibrated by: MR. SUTHIDA SINGHAPHEN
Chemist

Approved by: MR. RUNGSASIKORN KOSUM
Technical Management



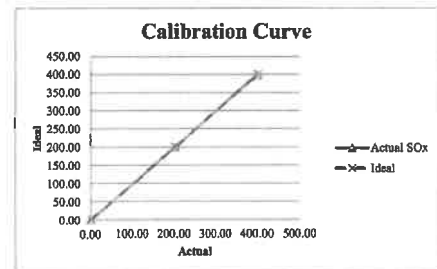
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Sulfur Dioxide Analyzer Calibration Worksheet

Project Site: สวนอุตสาหกรรมโรจนะ อู่ทอง
Location: บ้านนาหมื่น
Date of measurement: 05 December 2023
Worksheet No.: C-051223-WWL 0112
Ambient SO_x Analyzer ID: WWL 0112
Manufacturer: HORIBA
Ambient SO_x Analyzer Model: AFSA-370
Ambient SO_x Analyzer S/N: 8R1UBBF

Multi Gas Calibrator
Calibrator ID: WWL0128
Calibrator Model: Series 6100
Calibrator S/N: S/N 7462
Calibrate Date: 10 January 2023
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	400.10	0.10	0.03
AVERAGE (%)				0.04



Calibrated by: MR. SUTHIDA SINGHAPHEN
Chemist

Approved by: MR. RUNGSASIKORN KOSUM
Technical Management



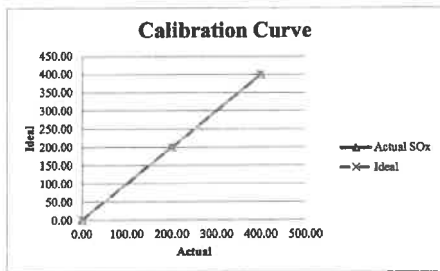
บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี 73110
194 Moo 5, T.Na Pho, A.U-Thai, Ayutthaya 13110, Thailand
Tel: 0-35226-381, 0-35800-593 Fax: 0-35800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี
Location : ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0110
Ambient SO₂ Analyzer ID : WWL 0110
Manufacturer : HORIBA
Ambient SO₂ Analyzer Model : APSA-370
Ambient SO₂ Analyzer S/N : YBSW7700

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.96
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 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. RUNGASIKORN KOSUM)
Technical Management



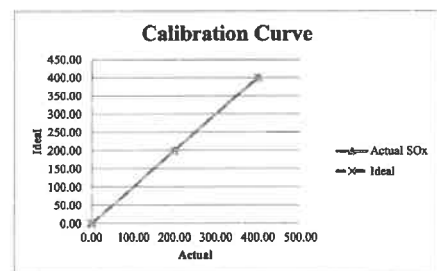
บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี 73110
194 Moo 5, T.Na Pho, A.U-Thai, Ayutthaya 13110, Thailand
Tel: 0-35226-381, 0-35800-593 Fax: 0-35800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี
Location : ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี
Date of measurement : 05 December 2023
Worksheet No. : C-200423-WWL 0021
Ambient SO₂ Analyzer ID : WWL 0021
Manufacturer : Thermo Environmental Instruments Inc
Ambient SO₂ Analyzer Model : 43C
Ambient SO₂ Analyzer S/N : 43C-58282-317

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.99
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 Sox	%Error Sox
ZERO	0.00	0.00	0.00	-
SPAN 200 ppb	200.00	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.20	0.20	0.05
AVERAGE (%)				0.07



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGASIKORN KOSUM)
Technical Management



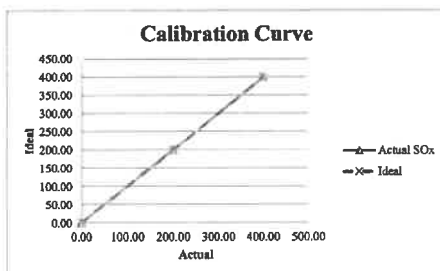
บริษัท ศูนย์วิเคราะห์น้ำ จำกัด
WATER ANALYSIS CENTER COMPANY LIMITED
194 หมู่ 5 ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี 73110
194 Moo 5, T.Na Pho, A.U-Thai, Ayutthaya 13110, Thailand
Tel: 0-35226-381, 0-35800-593 Fax: 0-35800-594

Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี
Location : ต.นาโพธิ์ 8.ต.อ. อ.เมืองราชบุรี
Date of measurement : 05 December 2023
Worksheet No. : C-051223-WWL 0109
Ambient SO₂ Analyzer ID : WWL 0109
Manufacturer : HORIBA
Ambient SO₂ Analyzer Model : APSA-370
Ambient SO₂ Analyzer S/N : YDL839W0

Multi Gas Calibrator
Calibrator ID : WWL0128
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 10 January 2023
Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.96
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 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	400.20	0.20	0.05
AVERAGE (%)				0.05



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGASIKORN KOSUM)
Technical Management



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: 28 November 2023

Instruments Information

Analyzer Type : SO₂ Analyzer
Model : 43C

Manufacturer : Thermo Environmental
Serial Number : 0614416629

Calibrator Unit

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

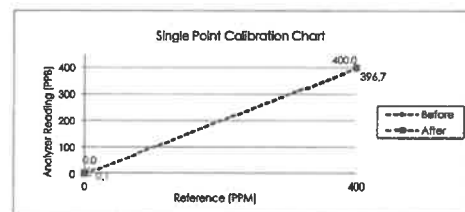
Standard Gas Concentration

Nitric Oxide (NO) : 55.47 PPM
Sulphur Dioxide (SO₂) : 55.11 PPM
Carbon Monoxide (CO) : 4.535 PPM
Cylinder number : E80129027
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	396.7	-0.8
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate by :
MR. KITSIAK JANGSAWATANA

Approve by :
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramindra 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: 27 November 2023

Instruments Information

Analyzer Type: SO₂ Analyzer Manufacturer: Thermo Environmental
Model: 45C Serial Number: 0630718534

Calibrator Unit

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

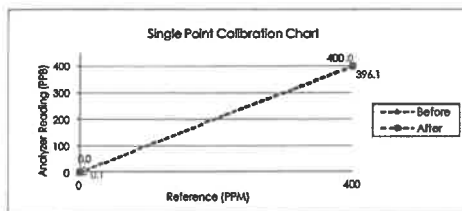
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4.535 PPM
Cylinder number: EBO129027
Expiry Date: 29 Oct. 2027

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (%)	Reference (PPB)	Reading (PPB)	Drift (%)
Before	0.0	0.1	0.1	400.0	396.1	-1.0
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By: วิศวกร วิศวกรสิ่งแวดล้อม
MR. KITSIAK JANSANGWATANA

Approve by: วิศวกร วิศวกรสิ่งแวดล้อม
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramindra 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: 27 November 2023

Instruments Information

Analyzer Type: SO₂ Analyzer Manufacturer: Thermo Environmental
Model: 45C Serial Number: 0433509449

Calibrator Unit

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

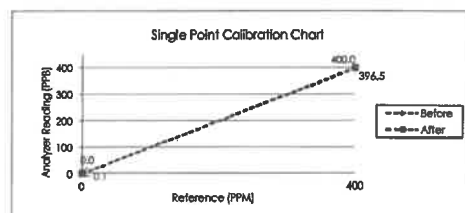
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4.535 PPM
Cylinder number: EBO129027
Expiry Date: 29 Oct. 2027

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (%)	Reference (PPB)	Reading (PPB)	Drift (%)
Before	0.0	0.1	0.1	400.0	396.5	-0.9
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By: วิศวกร วิศวกรสิ่งแวดล้อม
MR. KITSIAK JANSANGWATANA

Approve by: วิศวกร วิศวกรสิ่งแวดล้อม
MR. PASAGORN SAMOL



ENVIR SERVICE CO., LTD.
42 Ramindra 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: 28 November 2023

Instruments Information

Analyzer Type: SO₂ Analyzer Manufacturer: API
Model: 100A Serial Number: 375

Calibrator Unit

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

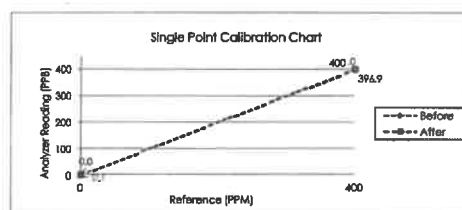
Standard Gas Concentration

Nitric Oxide (NO) 55.47 PPM
Sulphur Dioxide (SO₂) 55.11 PPM
Carbon Monoxide (CO) 4.535 PPM
Cylinder number: EBO129027
Expiry Date: 29 Oct. 2027

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

Status	Zero			Span		
	Reference (PPB)	Reading (PPB)	Drift (%)	Reference (PPB)	Reading (PPB)	Drift (%)
Before	0.0	0.1	0.1	400.0	396.9	-0.8
After	0.0	0.0	0.0	400.0	400.0	0.0



Calibrate By: วิศวกร วิศวกรสิ่งแวดล้อม
MR. KITSIAK JANSANGWATANA

Approve by: วิศวกร วิศวกรสิ่งแวดล้อม
MR. PASAGORN SAMOL



JIRANATEE ASSOCIATES CO., LTD.
82/14-15, 87/35-36
Pattana 7/2, Rd. Watthana, Bangkok,
Bangkok 10110 (Thailand)
Tel: +662-0500000
Mobile: +662-0500000
E-mail: jeeo-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
ASQ-T91-TS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

Certificate Number

CL-026-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM

NAME/FACTORY

MODEL/TYPE

SERIAL NUMBER

ID NUMBER

CONNECTION AS-RECEIVED

CUSTOMER

RECEIVED DATE

MEASUREMENT DATE

ISSUE DATE

ENVIRONMENTAL CONDITIONS

Ambient condition in the laboratory are as follow:

Temperature: 23.0 ± 0.6 °C

Relative Humidity: 55.0 ± 35.0 %RH

Atmospheric Pressure: 1012.0 hPa

PLACE OF CALIBRATION: Efflu-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

Wind tunnel cross-section Area: 900 cm²

Wind direction frontal area: 129 cm²

Diameter of measuring pipe: 10 mm

Blockage ratio of test object: 0.143 [-]

Preconditioning: 24 hours in standard conditions.

Measurement Condition: The average values during measurement are [23.0] °C, [51.2] %RH and [1012.3] hPa.

TABULATION OF RESULTS

The table on next page give the respective values.

Calibrated by:

Mr. Sorasak Thongthong

Mr. Nita (Nita) Thongthong



Approved signature:

Mr. Parinya Boonchareon

Calibration Department Manager

Remarks:

1. Inside cross-section area of the wind tunnel

2. Probed cross-section area of the tested object include measuring pipe

3. Diameter of measuring pipe

4. Ratio = 1

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Certificate Number
CL-026-66

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

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

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

Remarks:

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

² Direction of standard

³ Direction of Unit Under Calibration



J NAC
JIRANATEE ASSOCIATES CO., LTD.

Bangkok Branch
8/15-15, 67/66-66
Petchburi 72/1, 16, Watthana, Bangkok, 10330
Bangkok 10330 (Thailand)
Tel: +662-055-2111
Mobile: +662-055-2111
E-mail: jna-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
ASQ-TS-17025
CALIBRATION 0207

Air speed measurement laboratory
Calibration services department

Certificate Number
CL-026-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novatec
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25UB
SERIAL NUMBER : Sensor: TS-040
Data logger: ASD40
ID NUMBER : -
CONDITION AS RECEIVED : Used item
CUSTOMER : Water Analysis Center Co., Ltd.
54/1 Moo 5, T.Janthon, A-U-doi, Amphetwey 13210

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

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follows:
Temperature : 23.0 ± 0.5 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

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

CALIBRATION CONDITIONS : Wind tunnel cross-section area¹ : 900 cm²
Win direction frontal area² : 100 cm²
Diameter of mounting pipe : 100 mm
Blockage ratio of test object³ : 0.111 [-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.5) °C, (42.3) %RH and (1008.6) hPa.

TABULATION OF RESULTS:
The table on next page give the tabulated values.

Calibrated by:
Dr. Mr. Sorayut Thirapong
Chief Metrologist (Calibration)



Approved signature:
Mr. Pinyea Booncharan
Calibration Department Manager

Remarks:
¹ Inside projection area of the wind tunnel
² Projected cross-section area of the tested object include mounting pipe
³ Diameter of mounting pipe
⁴ Ratio "a/b"

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Certificate Number
CL-026-66

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

The cup anemometer, Unit Under Calibration (UUC) was exercised at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer and above 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 40 mm and 300 mm respectively away from wind tunnel nozzle. UUC was installed at center of the test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 35 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

V _{ref} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V _{meas} (m/s)	Error (m/s)	U (k=2) (m/s)
1.037	24.24	24.45	0.9	-0.1	0.31
2.032	24.70	24.45	1.9	-0.1	0.31
3.054	24.46	24.45	3.0	-0.1	0.31
4.217	24.70	24.45	4.0	-0.2	0.31
5.02	24.40	24.45	4.9	-0.1	0.31
5.99	24.70	24.45	5.9	-0.1	0.31
7.04	24.40	24.45	6.9	-0.1	0.31
8.12	24.62	24.45	8.1	-0.1	0.31
9.07	24.34	24.45	9.0	-0.2	0.31
10.07	24.40	24.45	10.0	-0.1	0.31
11.13	24.50	24.45	11.1	0.0	0.31
12.12	24.36	24.45	12.0	-0.1	0.31
13.18	24.50	24.45	13.1	-0.1	0.31
14.24	24.40	24.45	14.1	-0.1	0.31
15.22	24.40	24.45	15.1	-0.1	0.31
16.27	24.40	24.45	16.1	-0.2	0.31

Remarks:

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

² Velocity of standard

³ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



Calibration set-up of the cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.



W	PO.LAB 64-1/28	ปีที่จัดทำ: 0	วันที่บังคับใช้: 1 ม.ค. 2562	วันที่: 1 พ.ค. 1
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แบบบันทึกการตรวจสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 รหัสเครื่องอื่น SR004 เกณฑ์การยอมรับ 93.77 ± 0.3, 113.84 ± 0.3
วันที่สอบเทียบ 24/05/65 วันที่สอบเทียบครั้งที่ 23/05/66
เครื่อง Digital Thermohygro Meter S/N 105091609 รหัสเครื่องอื่น WWL 0055
วันที่สอบเทียบ 29/11/66 วันที่สอบเทียบครั้งที่ 29/11/67
เครื่อง Sound Level Meter S/N 200051 รหัสเครื่องอื่น WWL 0206
วันที่สอบเทียบ 15-18/11/65 วันที่สอบเทียบครั้งที่ 14/11/67

การตรวจสอบก่อนออกใช้งาน

อุณหภูมิ (°C) 24 เกณฑ์การยอมรับ 23.0±3.0

ความชื้นสัมพัทธ์ (%) 49 เกณฑ์การยอมรับ 50.0±15.0

วันที่พบพบ 05/12/66

การตรวจสอบหลังจากออกใช้งาน

อุณหภูมิ (°C) 24 เกณฑ์การยอมรับ 23.0±3.0

ความชื้นสัมพัทธ์ (%) 49 เกณฑ์การยอมรับ 50.0±15.0

วันที่พบพบ 11/12/66

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	113.8	1	93.8	113.8
2	93.8	113.8	2	93.8	113.8
3	93.8	113.8	3	93.8	113.8
4	93.8	113.8	4	93.8	113.8
5	93.8	113.8	5	93.8	113.8
6	93.8	113.8	6	93.8	113.8
7	93.8	113.8	7	93.8	113.8
8	93.8	113.8	8	93.8	113.8
9	93.8	113.8	9	93.8	113.8
10	93.8	113.8	10	93.8	113.8
X	93.80	113.80	X	93.80	113.80
SD	0.00	0.00	SD	0.00	0.00
%RSD (≤ 10)	0.00	0.00	%RSD (≤ 10)	0.00	0.00
ผลการ พบพบ	ผ่าน	ผ่าน	ผลการ พบพบ	ผ่าน	ผ่าน

ผู้บันทึก 01/11/66
ผู้ตรวจสอบ 01/11/66

ผู้บันทึก 01/11/66
ผู้ตรวจสอบ 01/11/66

Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: RYG_EN0136
 Organization Name: ALS Laboratory Group (Thailand) Co Ltd.
 Organization Location: 618/10 Moo 5, Tambol Mae Nam Koo, A.Pluakdaeng, Rayong, 21140, Thailand

Date: July 7, 2022 11:27:53 AM
 EOP Name: Agilent Recommended, Agilent Recommended
 EOP Revision: GC.02.02, GCMS.02.02
 Overall Qualification Status: Pass

REVIEW BY: *N. Benjif*
 APPROVED BY: *D*
 NEXT CAL DATE: 07/01/24

CDS Logon Verification - GC

Logon: dejchangchom

Overall CDS Logon Verification - GC Test Status

Pass

System Inspection and Basic Safety and Operation

Name: 7890
 Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
 Front SSL
 Setpoint Status: Pass
 Setpoint: 25.0 psi
 Actual: 25.1 psi
 Accuracy: 0.1 psi
 Agilent Recommended: <= 1.2 psi

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Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890
 Setpoint Status: Pass
 Zone: Oven
 Setpoint/Actual: 230.0 / 230.6 °C
 Accuracy: 0.6 °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: 100.0 / 99.9 °C

Accuracy: 0.1 °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: 100.0 / 99.91667 °C
 Stability: 0.1 °C
 Agilent Recommended: <= 0.5 °C

Overall GC Oven Temperature Stability Test Status

Pass

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Log Amp

Tested Combination1 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Overall Log Amp Test Status

Pass

RPPA

Tested Combination1 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Altitude: 1050 mV
 Drift After Five Minutes: 1.1 mV
 RPPA Voltage: 478 mV
 Agilent Recommended: >= -100 mV and <= 100 mV <= 1100 mV

Overall RPPA Test Status

Pass

Tune EI

Tested Combination1 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Filament: 1

Setpoint Status: Pass

Filament: 2

Overall Tune EI Test Status

Pass

Signal to Noise EI

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Tested Combination1 Front SSL / External SQ

Name: 5977B

Source: EI - Extractor Filament: 1

Setpoint Status: Pass

Signal to Noise: 7465

Agilent Recommended: >= 1200

Source: EI - Extractor Filament: 2

Setpoint Status: Pass

Signal to Noise: 2097

Agilent Recommended: >= 1200

This test's 2 comment(s) and 7 deviation(s) are available in the Attachments section.

Overall Signal to Noise EI Test Status

Pass

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Purpose

This section describes the as found system configuration.

Details

System	
System ID	RYG_EN0136
Manufacturer	Agilent Technologies
Name	7890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

Tested Combination 1

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

Misdiagnosis 1

Manufacturer	Agilent Technologies
Name	7890
Model Number	GS442B
Serial Number	CN16453235
Firmware Revision	B.02.04.3
Component ID/Asset No.	061117000236
Oven Type	Standard

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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:	Eskinerin Puengsopa
Logged On User Name:	eaknarin_puengsopa@egte.it.com
Signature Creation Date:	July 7, 2022
Reason for Signature:	Executed protocol and published this original version of document

Regulatory Disclaimer

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Label 1

Manufacturer	Agilent Technologies
Name	7890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Detector 5

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5977B
Serial Number	US1701M008
Firmware Revision	5977 6.00.34
High Vacuum System	Turbo Pump
Scouting Run Standard	OFN Std
Component ID/Asset No.	05117000236

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Extractor
Number of Elements	2

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Time	Transaction Date	Activity Performed	Type of Transaction	Comments/Information
July 6, 2022 11:54 PM	Audit	Session Created	Session	None
July 6, 2022 11:54 PM	Start	Configuration	Session	None
July 6, 2022 11:54 PM	Audit	Enrollment	Learning	User is logging in and does not require an initial role
July 6, 2022 11:17:19 PM	Audit	Exp/Loaded	Session	EDP details for primary healthcare [H4] - File path: [Private\Footer\Global\Config\templates\02_02\04_02_02.asp] EDP File Name: [H4_02_02.asp], EDP Name: [AgilentRecommendive] EDP details for hypertension healthcare [H4M] - File path: [Private\Footer\Global\Config\templates\02_02\04_02_02.asp], EDP File Name: [H4M_02_02.asp], EDP Name: [AgilentRecommendive]
July 6, 2022 11:29 PM	End	Configuration	Session	None
July 6, 2022 11:29 PM	Start	Configuration	Session	GC
July 6, 2022 11:29 PM	Start	Enrollment	CD9 Logon Verification - GC - - Qualitative test	None
July 6, 2022 11:29:43 PM	End	Enrollment	CD9 Logon Verification - GC - - Qualitative test	Run Count: 1
July 6, 2022 11:29:43 PM	Start	Enrollment	System Inspection and Basic Safety and Operation - T940 - Qualitative Test - No software exception	None

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User Name: admin@agilent.com
Host Name: ASRY097002

System ID: RY0_E0136
Print Date: July 7, 2022 11:27:58 AM

ALS_RY0_E0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 6, 2022 1:18:40 PM	End	Execution	System Inspection and Basic Safety and Operation - 7880 - Qualitative Test - No separate associated	Run Count: 1
July 6, 2022 1:20:18 PM	Start	Execution	Test Pressure Accuracy - Front SSJ - Pressure Controlled Inlet - 3: 25.0 psi - L: 1.2 psi	
July 6, 2022 1:21:43 PM	End	Execution	Test Pressure Accuracy - Front SSJ - Pressure Controlled Inlet - 3: 25.0 psi - L: 1.2 psi	Run Count: 1
July 6, 2022 1:21:45 PM	Start	Execution	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	
July 6, 2022 1:25:12 PM	End	Data	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	Manual Data Entry
July 6, 2022 1:25:15 PM	End	Execution	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	Run Count: 1
July 6, 2022 1:29:17 PM	Start	Execution	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	
July 6, 2022 1:29:32 PM	Start	Execution	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	
July 6, 2022 1:33:42 PM	End	Data	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	Manual Data Entry

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User Name: admin@agilent.com
Host Name: ASRY097002

System ID: RY0_E0136
Print Date: July 7, 2022 11:27:58 AM

ALS_RY0_E0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 6, 2022 1:33:43 PM	End	Execution	GC Oven Temperature Accuracy - 7880 - Temperature - Oven - 5: 250.0°C - L: 1.0 AND 1.0 % setpoint in K	Run Count: 1
July 6, 2022 1:33:43 PM	Start	Execution	GC Oven Temperature Stability - 7880 - Temperature - Oven - 5: 100.0°C - L: 0.5°C	
July 6, 2022 1:33:50 PM	End	Data	GC Oven Temperature Stability - 7880 - Temperature - Oven - 5: 100.0°C - L: 0.5°C	Manual Data Entry
July 6, 2022 1:33:57 PM	End	Execution	GC Oven Temperature Stability - 7880 - Temperature - Oven - 5: 100.0°C - L: 0.5°C	Run Count: 1
July 6, 2022 1:33:11 PM	Start	Execution	Log Amp - 56775 SQ - Source - None	
July 6, 2022 1:37:19 PM	End	Execution	Log Amp - 56775 SQ - Source - None	Run Count: 1
July 6, 2022 1:37:24 PM	Start	Execution	BPMA - 56775 SQ - Source - None	
July 6, 2022 1:39:24 PM	End	Execution	BPMA - 56775 SQ - Source - None	Run Count: 1
July 6, 2022 2:09:29 PM	Start	Execution	Type EI - 56775 SQ - Source - None	
July 6, 2022 2:24:48 PM	End	Qualification	Session	OO
July 6, 2022 2:24:48 PM	Start	Reporting	Session	None
July 6, 2022 2:41:39 PM	End	Reporting	Session	None
July 6, 2022 2:41:39 PM	Start	Configuration	Session	None
July 6, 2022 2:41:40 PM	End	Configuration	Session	None

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User Name: admin@agilent.com
Host Name: ASRY097002

System ID: RY0_E0136
Print Date: July 7, 2022 11:27:58 AM

ALS_RY0_E0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 6, 2022 2:41:40 PM	Start	Qualification	Session	OO
July 6, 2022 2:41:40 PM	Start	Execution	Turn EI - 56775 SQ - Source - None	
July 6, 2022 2:41:40 PM	End	Execution	Turn EI - 56775 SQ - Source - None	Run Count: 1
July 6, 2022 2:41:40 PM	End	Execution	Turn EI - 56775 SQ - Source - None	
July 6, 2022 2:41:40 PM	Start	Execution	Turn EI - 56775 SQ - Source - None	
July 6, 2022 2:42:48 PM	End	Qualification	Session	OO
July 6, 2022 2:42:48 PM	Start	Reporting	Session	None
July 6, 2022 2:50:52 PM	End	Reporting	Session	None
July 6, 2022 2:50:52 PM	Start	Qualification	Session	OO
July 6, 2022 2:50:52 PM	Start	Execution	Turn EI - 56775 SQ - Source - None	
July 6, 2022 2:51:12 PM	End	Qualification	Session	OO
July 6, 2022 2:51:12 PM	Start	Reporting	Session	None
July 6, 2022 2:54:39 PM	End	Reporting	Session	None
July 6, 2022 2:54:39 PM	Start	Qualification	Session	OO
July 6, 2022 2:55:29 PM	Start	Execution	Turn EI - 56775 SQ - Source - None	

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User Name: admin@agilent.com
Host Name: ASRY097002

System ID: RY0_E0136
Print Date: July 7, 2022 11:27:58 AM

ALS_RY0_E0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 6, 2022 2:58:10 PM	End	Execution	Turn EI - 56775 SQ - Source - None	Run Count: 1
July 6, 2022 2:58:10 PM	Start	Execution	Signal to Make EI - Liquid Injection, From 5675 SQ - Source: EI - Extractor using Filament 1 - L: 1.0	
July 6, 2022 3:21:02 PM	End	Qualification	Session	OO
July 6, 2022 3:21:02 PM	Start	Reporting	Session	None
July 6, 2022 3:23:04 PM	End	Reporting	Session	None
July 6, 2022 3:25:04 PM	Start	Qualification	Session	OO
July 6, 2022 3:25:04 PM	Start	Execution	Signal to Make EI - Liquid Injection, From 5675 SQ - Source: EI - Extractor using Filament 1 - L: 1.0	
July 6, 2022 4:08:40 PM	End	Qualification	Session	None
July 7, 2022 8:13:47 AM	End	AccRedacted	Session	None
July 7, 2022 8:13:49 AM	End	SessionRedacted	Session	None
July 7, 2022 9:13:54 AM	Start	Qualification	Session	OO
July 7, 2022 9:13:54 AM	Start	Execution	Signal to Make EI - Liquid Injection, From 5675 SQ - Source: EI - Extractor using Filament 1 - L: 1.0	
July 7, 2022 9:32:08 AM	End	Data	Signal to Make EI - Liquid Injection, From 5675 SQ - Source: EI - Extractor using Filament 1 - L: 1.0	Data File Path: D:\000002\DATA\ALS_01.D

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User Name: admin@agilent.com
Host Name: ASRY0W7002
System ID: RYO_EN0136
Print Date: July 7, 2022 11:27:56 AM

ALL_RYO_EN0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 7, 2022 9:58:53 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Run Count: 1
July 7, 2022 10:01:46 AM	Auto	Test/Injected	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Deviation Met for Run Count : 1
July 7, 2022 10:01:46 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	None
July 7, 2022 10:02:00 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D
July 7, 2022 10:04:26 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Run Count: 2
July 7, 2022 10:07:30 AM	Auto	Test/Injected	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Deviation Met for Run Count : 2
July 7, 2022 10:07:30 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	None
July 7, 2022 10:07:44 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D

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System ID: RYO_EN0136

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User Name: admin@agilent.com
Host Name: ASRY0W7002
System ID: RYO_EN0136
Print Date: July 7, 2022 11:27:56 AM

ALL_RYO_EN0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 7, 2022 10:08:16 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Run Count: 3
July 7, 2022 10:10:26 AM	Auto	Test/Injected	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Deviation Met for Run Count : 3
July 7, 2022 10:10:26 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	None
July 7, 2022 10:10:59 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D
July 7, 2022 10:14:03 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Run Count: 4
July 7, 2022 10:14:54 AM	Auto	Test/Injected	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Deviation Met for Run Count : 4
July 7, 2022 10:14:54 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	None
July 7, 2022 10:15:16 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D

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User Name: admin@agilent.com
Host Name: ASRY0W7002
System ID: RYO_EN0136
Print Date: July 7, 2022 11:27:56 AM

ALL_RYO_EN0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 7, 2022 10:15:27 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Run Count: 5
July 7, 2022 10:16:48 AM	Auto	Test/Injected	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Deviation Met for Run Count : 5
July 7, 2022 10:16:48 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	None
July 7, 2022 10:17:36 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D
July 7, 2022 10:17:14 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 1 - L1 => 1200	Run Count: 6
July 7, 2022 10:18:40 AM	End	Qualification	Session	QC
July 7, 2022 10:18:40 AM	Start	Reporting	Session	None
July 7, 2022 10:21:10 AM	End	Reporting	Session	None
July 7, 2022 10:21:10 AM	Start	Qualification	Session	QC
July 7, 2022 10:21:17 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	None
July 7, 2022 10:26:49 AM	End	Qualification	Session	QC
July 7, 2022 10:26:49 AM	Start	Reporting	Session	None
July 7, 2022 10:27:56 AM	End	Reporting	Session	None

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User Name: admin@agilent.com
Host Name: ASRY0W7002
System ID: RYO_EN0136
Print Date: July 7, 2022 11:27:56 AM

ALL_RYO_EN0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 7, 2022 10:27:36 AM	Start	Qualification	Session	QC
July 7, 2022 10:27:39 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	None
July 7, 2022 11:06:10 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D
July 7, 2022 11:11:17 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	None
July 7, 2022 11:12:15 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	Run Count: 1
July 7, 2022 11:14:29 AM	Auto	Test/Injected	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	Deviation Met for Run Count : 1
July 7, 2022 11:14:29 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	None
July 7, 2022 11:14:47 AM	Auto	Data	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	Data File Path: D:\00000000\FI_BH_F01.D
July 7, 2022 11:16:34 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SSI, QC - Source: EI - Extractor using Filament 2 - L1 => 1200	Run Count: 2

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Date: July 7, 2022 11:27:53 AM
System ID: RYO_EN0136

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User Name: calsafe_buagknap
Hostname: ASRYOW002

System Id: RY0_EN0136
Print Date: July 7, 2022 11:27:56 AM

ALS_RY0_EN0136 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
July 7, 2022 11:19:58 AM	Audit	Test Initiated	Signal to Mobile EI - Liquid Injection, Front SBL - SQ - Source: EI - Extractor using Filament 2 - L1 == 1200	Deviation Flag for Run Count : 2
July 7, 2022 11:19:58 AM	Start	Execution	Signal to Mobile EI - Liquid Injection, Front SBL - SQ - Source: EI - Extractor using Filament 2 - L1 == 1200	None
July 7, 2022 11:20:13 AM	Audit	Data	Signal to Mobile EI - Liquid Injection, Front SBL - SQ - Source: EI - Extractor using Filament 2 - L1 == 1200	Data Res Path : D:\002022\CPH_SH_V01.D
July 7, 2022 11:21:59 AM	End	Execution	Signal to Mobile EI - Liquid Injection, Front SBL - SQ - Source: EI - Extractor using Filament 2 - L1 == 1200	Run Count : 3
July 7, 2022 11:22:46 AM	End	Qualification	Equipment	QC
July 7, 2022 11:22:48 AM	Start	Reporting	Session	None
July 7, 2022 11:26:08 AM	Audit	Reporting	Session	Report Generated : Certificate

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Date: July 7, 2022 11:27:53 AM
System ID: RY0_EN0136

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