
เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์

CERTIFICATE OF CALIBRATION

Certificate No.: C0-1608001/24 Page 1 of total 4 pages

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

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

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

Calibration Location: Jayhawk Laboratory (CL&GL)

Received Date: 16 August 2024

Calibration Date: 16 August 2024

Date of Issue: 19 August 2024

Condition of Artifacts: Used conditions but can be calibrated

Checked by:

Act as Technical Manager

Approved by:

Representative of Managing Director

(Dr. Ekachai Puttittong)

() (Krisyol K.) () (Sakda Y.)
() (Pailphan K.) () (Onnape P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

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FE-169

REV.02 02/24/21

Certificate No.: C0-1608001/24

Page 2 of total 4 pages

Reference Method:

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

Reference Standard:

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	150823	Feb. 9, 2025	NIMT
	7.01	180723	Jan. 12, 2025	
	10.01	160823	Jan. 16, 2025	

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

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

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

Measurement Results:

1. Function Simulated pH Meter

Standard Applied (mV)	Nominal Value (pH)	UUC Reading		Uncertainty (± mV)
		pH	mV	
177.48	4.00	4.01	177.3	0.060
0.00	7.00	7.00	-0.1	0.060
-177.48	10.00	10.01	-177.4	0.060

UUC : Unit Under Calibration

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

Calibrated by: Athipat

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Measurement Results (Cont.):

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

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

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

Temperature stability of micro bath : 25 ± 0.2°C

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

Certificate No.: C0-1608001/24

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Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	B7C853	10-0911001/23	Nov. 8, 2024	THC
Platinum Resistance Thermometer	4854	COA30047	Oct. 22, 2025	FLUKE
Liquid Bath	XO111019	10-2405001/23	May 25, 2025	THC

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

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

Measurement Results:

(X) Without Adjustment

Dimension of probe : Diameter 4 mm. Sensor Type : RTD (PT 100)

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

UUC : Unit Under Calibration

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

- End of Certificate -

Calibrated by: Athipat

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Calibrated by: Pongsak

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ภาคผนวก ข-1



THAI HEART CALIBRATION CO., LTD.
112/2 Moo 5, Phrasa Sa, Mueang, Samut Prakan 10180
Tel. 0-294-2142, 0-294-4415, 0-2771-4999 Fax. 0-2771-4147



CERTIFICATE OF CALIBRATION

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

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

Equipment: Conductivity Meter
Manufacturer: EUTECH Model: CON 2700
Serial No.: 2657889 ID No.: WW1.0136
Description:

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

Calibration Location: Jayhawk Laboratory (CL&GL)

Received Date: 16 July 2024

Calibration Date: 18 July 2024

Date of Issue: 18 July 2024

Condition of Artifacts: Used conditions but can be calibrated

Checked by:

Act as Technical Manager

Approved by:

Representative of Managing Director

() (Krisyot K.) () (Sakda Y.)
() (Patiphan K.) (✓) (Onnaso P.)
() (Pongsak H.) () (Nilphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Putitwong)

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REV.02 02/24/21



THAI HEART CALIBRATION CO., LTD.
112/2 Moo 5, Phrasa Sa, Mueang, Samut Prakan 10180
Tel. 0-294-2142, 0-294-4415, 0-2771-4999 Fax. 0-2771-4147



Certificate No.: C0-1607004/24

Page 2 of total 2 pages

Reference Method:

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

Reference Standard:

Material	Batch Value	Lot Number	Due Date	Traceability
Conductivity Standard Solution	147.1 µS/cm	S230330005	Nov. 9, 2024	SCP Science
	1.423 mS/cm	S231129006	May 13, 2025	SCP Science

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

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

Conductivity Standard Solution	Measured Value	Correction	Uncertainty (±)
147.1 µS/cm	149.0 µS/cm	+1.9 µS/cm	2.5 µS/cm
1.423 mS/cm	1.425 mS/cm	-0.002 mS/cm	0.0052 mS/cm

Note: Adjustment points: 147.1 µS/cm 1.423 mS/cm

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

- End of Certificate -

Calibrated by: Athipap
REV 02 03/24/21

FE-169



Inotech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhaphiban 5 Rd., O ngoen,
Salmal, Bangkok 10220, Thailand
Tel. (662) 909-8620 (After 10 lines) www.imcinstrument.com



Certificate of Calibration

Certificate No.: MT24-7016

Page: 1 of 2

Customer: Water Analysis Center Co., Ltd.
Address: 1/54 Moo 5, Rojana Industrial Park, T.Kanham, A.U-Thai, Ayuthaya 13210

Description: Refrigerator
Manufacturer: B.T.Metrology Co., Ltd.
Model: REF 940L
Serial No.: BT-03-06-09
Identification No.: WWL 0043
Calibration Place: Customer Laboratory
Order No.: 2601/24
Received date: Aug 02, 2024
Calibration date: Aug 02, 2024
Environment Condition:
Temperature: (25 ± 10) °C
Humidity: (50 ± 30) %RH

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

Reference Standard Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
LXI Data Acquisition Switch Unit with Sensor	34972A	MY4902006	MT23-7163	Nov 30, 2024

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

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

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



Calibrated by: Mr.Yuttakorn Jamniansan

Approved by: (Mr.Panuwat Phukian)

Issue date: Aug 06, 2024

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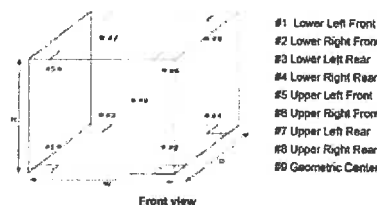
Certificate No.: MT24-7016
Page: 2 of 2

Function: Temperature measurement
Calibration point: 20 °C

Result: Without adjustment
Resolution: 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)								Uncertainty of measurement (± °C)	
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8		
20	20.344	20.058	20.405	20.375	20.193	20.010	20.245	20.090	20.037	0.41

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (± °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	20.0	0.30	0.68	0.66



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



Professional Calibration & Services Co., Ltd.
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10100 Thailand
Tel : +6617150-6641 (Autobank)
Email : info@p-cs.com www.p-cs.com



Certificate of Calibration

Certificate Number : PL61070/24 Page 1 of 3
Control Number : PCAL174170
Customer Control : WWL 0073
Description : Dissolved Oxygen Meter
Manufacturer : YSI
Model : YSI 5000
Serial Number : 14C100917
Customer : Water Analysis Center Co.,Ltd
1/94 Moo 5 T.Kanham A.U-Thai Ayutthaya 13210 Thailand



Date of Receipt : 02-Dec-24
Date of Calibration : 02-Dec-24
Environment : Temperature 20 °C ± 2 °C
Relative Humidity 50 % ± 20 %
Calibration Method : Calibration Procedure Number CP-PL53
Calibration Results : See data attached

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

This certificate is issued in accordance with ISO/IEC 17025 and the conditions of accreditation granted by the Accreditation Body which 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. The results relate only to the item calibrated.

This certificate shall not be reproduced other than in full except without the prior written approval of the Head of Calibration Laboratory of Professional Calibration & Services Co., Ltd.

Calibrated By

Authorized Signature

Ms. Supattina Mungksam

(Mr. Pimpong Junphong)

06-Dec-24

Issued Date

CALIBRATION REPORT

Professional Calibration & Services Co., Ltd.

Certificate No : PL61070/24

Page: 3 of 3

Calibration Results

Dissolved Oxygen Calibration

Description of Meter : Range 0 to 60 mg/L
Resolution 0.01 mg/L
Description of Electrode : Manufacturer YSI
Model 5010
Serial No 13C100067
Type Electrochemical (Membrane)

Calibration Point	Standard Value	UUC Reading	UUC Error	Uncertainty (u)
0 mg/L	0.000 mg/L **	0.00 mg/L	0.00 mg/L	0.00 mg/L
5 mg/L	5.454 mg/L	5.43 mg/L	-0.02 mg/L	0.05 mg/L
9 mg/L	9.029 mg/L	9.02 mg/L	0.00 mg/L	0.05 mg/L

Notes :

- 1) Calibration results that carry the double asterisk (**) are not accredited. Calibrations marked as such on this Certificate have been included for completeness.

...End...

CALIBRATION REPORT

Professional Calibration & Services Co.,Ltd.

Certificate Number : PL61070/24

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Equipment Standards Used

Description	Serial No.	Traceability to	Certificate No.	Cal. Due Date
Zero Oxygen Solution Set	-	NIST	8005023	01-May-28

Condition as received : Normal

Definitions :-

* NIST - National Institute of Standard and Technology



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Certificate of Calibration

Certificate No. : MT25-S161
Page : 1 of 2

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

Description : Hot Air Oven
Manufacturer : Memmert
Model : UP260
Serial No. : B620 0614
Identification No. : WWL 0212
Calibration Place : Customer Laboratory

Order No. : 1011/25
Received date : Mar 23, 2025
Calibration date : Mar 20, 2025
Environment Condition :
Temperature : (25±10) °C
Humidity : (50±50) %RH

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

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
LXI Data Acquisition Switch Unit with Sensor	34972A	MY49028922	MT24-6770	Nov 22, 2025

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

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

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



Calibrated by : Mr.Yuttakorn Jamneansri

Approved by :

Issue date : Mar 28, 2025

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39/1 Soi 82, Sukhaphiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
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Certificate No. : MT25-3161

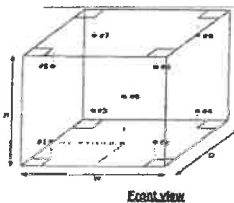
Page : 2 of 2

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

Result : Without adjustment
Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (°C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
104	103.767	103.848	104.174	103.966	104.090	104.047	104.160	103.891	104.264	0.32
180	179.873	179.787	179.762	179.908	179.891	179.615	179.920	179.806	179.752	0.50

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (°C)	Measured uniformity (°C)	Overall variation (°C)
104.0	104.0 to 104.2	0.13	0.75	0.80
180.0	180.0 to 180.3	0.39	0.88	0.81



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

Front view

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.

-000-



Certificate of Calibration

Equipment: Balance
Model: BL210S
Serial No. (or ID.): 15806131 (WWL 0022)
Manufacturer: Sartorius
Condition: In condition

Certificate No.: C01243793
Issued Date: 06 December 2024
Job No.: WO-00053756
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 24 °C ± 0.9 °C
Humidity 53 %RH ± 1.3 %RH

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

Calibration By: Mr. Aphit Chaosap
Calibration Date: 04 December 2024
The Method used: In-house method, CAL-W-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. C02241786

(Mr. Aphit Chaosap)

Person in charge

(Mr. Adisei Maknoi)

Authorized signatory

This certificate is issued under the terms of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national laboratory.
The measurement uncertainty stated as 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. This report shall not be reproduced except in full without approval of DKSH Technology Limited.

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Delivering Growth - In Asia and Beyond.

CAL-FM-C01-14 12 Sep 2022



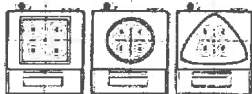
Certificate No.: C01243793

Page: 2 of 2

Calibration Results:

Without Adjustment

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



Nominal Test Value 100 (g)				
Reference Points (g)				
A	B	C	D	E
-	0.0001	0.0000	-0.0002	-0.0001

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

Nominal test value (g)	Standard Deviation
20	0.00005
200	0.00005

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

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
1	1.00001	1.0000	0.0000	0.00011	2.04
2	2.00001	2.0000	0.0000	0.00011	2.04
5	5.00001	5.0000	0.0000	0.00011	2.04
10	10.00001	10.0000	0.0000	0.00011	2.04
20	20.00001	20.0000	0.0000	0.00012	2.03
50	50.00000	50.0000	0.0000	0.00013	2.02
70	70.00001	70.0001	0.0001	0.00016	2.01
100	99.99996	100.0001	0.0001	0.00017	2.01
120	119.99997	120.0001	0.0001	0.00021	2.00
150	149.99996	150.0002	0.0002	0.00024	2.00
200	199.99989	200.0007	0.0008	0.00030	2.00

The End of Certificate



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนปิ่นเกล้าพิเศษ แขวงบางพลัด เขตบางพลัด กรุงเทพฯ 10710
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Phone: +66 2679 7900 Email: info@thaiunique.com Website: www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: 240FS AA & M418P50004

Customer: Water analysis center Co., Ltd.

Date: 25 Apr 2024

Safety

- ☒ Flame, Inspect/replace o-ring nebulizer, spray chamber and burner
- ☒ Flame, Clean nebulizer, spray chamber and burner
- ☒ Flame, Check liquid trap interlock, burner interlock, pressure relief/bang 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 SpectraAA
- ☒ Check 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 = 2.9% (should be ≤ 64% or ≤ 380V)
- ☒ Flame, Check D2 lamp is work



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80-82 ถนนประชาวิทย์ ถนนบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokprum, Pranakorn, Bangkok 10200
Tel: 0-2629-0191-4, 0-2280-1787, Fax: 0-2280-1788, E-mail: dswat@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 from 7.2-10.6 mL per minute = 8.5 mL/min
- ☒ Test Photometric noise, STDV = 0.0001 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
- Air/acetylene Cu 5 ppm = 0.79 Abs, and Precision
- (%RSD) = 0.4 % (should be ≥ 0.55 Abs and $\leq 0.5\%$ RSD)
- or
- N₂O/acetylene Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be ≥ 0.3 Abs and $\leq 0.5\%$ RSD)
- ☐ Furnace, Characteristic mass and sensitivity Cu 25 ppb = _____ Abs, and
- Precision (%RSD) = _____ % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: Suriya Mecharoen

Customer: Water Analysis Center Co., Ltd.

2/2



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

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PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: 2402 AA & MY18230004

Customer: Water Analysis Center Co., Ltd.

Date: 26 Apr 2024

Safety

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

Optics

- ☒ Inspect/replace that external optics surfaces
- ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.7 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 30 % (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 ถนนประชาวิทย์ ถนนบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokprum, Pranakorn, Bangkok 10200
Tel: 0-2629-0191-4, 0-2280-1787, Fax: 0-2280-1788, E-mail: dswat@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 from 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/acetylene Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be ≥ 0.55 Abs and $\leq 0.5\%$ RSD)
- or
- N₂O/acetylene Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be ≥ 0.3 Abs and $\leq 0.5\%$ RSD)
- ☒ Furnace, Characteristic mass and sensitivity Cu 25 ppb = 0.16 Abs, and
- Precision (%RSD) = 3 % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: Suriya Mecharoen

Customer: Water Analysis Center Co., Ltd.

2/2



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ ถนนบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
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PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: AA240FS & AA 09110073

Customer: Water Analysis Center Co., Ltd.

Date: 11 Feb 2025

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 = 324.7 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 54 % (should be $\leq 64\%$ or $\leq 380V$)
- ☒ Flame, Check D2 lamp is work

1/2

Certificate No. : M1439/24

Leak location

Supply HEPA Filter
Back



Exhaust HEPA Filter
Back



Result Summary ☒ Pass ☐ Fail

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

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

4. Airflow smoke patterns test

Measurement Information

1. 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
2. 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.
3. 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.
4. Sash/window seal test : Smoke shall be passed up the inside of the window 2 in (5 cm) from the sides and along the top of the work area.

Certificate No. : M1439/24

Result Summary

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

5. Site Installation

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

Remark / Recommendation

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

585	936	917	514
849	1400	1465	755

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

Remark :

Certificate No. : M1439/24

7. Ultraviolet Lamp Test (UV) : Option

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

mW/m²

630	1450	1480	690
380	920	930	390

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

Remark :

Certificate of Calibration

LIQUID BATH




Page 1 of 3

Certificate No. : MC 2413808

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

Reference Job No.	24-2841	Received Date	16 December 2024
Description	Water Bath	Resolution	0.1 °C
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 2413808) has been attached to the case.		
Method	In-House calibration procedure MWI-T-029 this method is base on ASTM E 715-2007 "Liquid Bath".		
Location of Calibration	Water Analysis Center Co., Ltd. ; Laboratory.		
Environmental Conditions	Ambient Temperature : (25.2 to 25.6) °C Relative Humidity : (49.0 to 51.0) %		
Date of Calibration	16 December 2024	Date of Issue	18 December 2024

Checked by : 
Chalermkit Rakphada
(Calibration Engineer)

Approved by : 
Aittipong Karjaneewat
(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 2413808

Page 2 of 3

Reference Standard Instrument :

Description	Certificate No.	Serial No.	Due date	Traceable thru
Data Acquisition/Switch Unit	MC 2403566	MY44020009	13 Mar 2025	MCAL
With Thermocouple Type "T" ID. No.27/1 to 27/5				

Traceability :

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

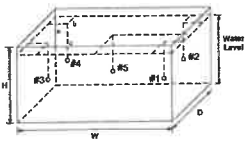
1. Calibration Procedure:

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

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

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

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



- Overall Ambient Temperature around the Chamber variation : 1.1 °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 : *Chalermit*

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

Certificate No.: MC 2413808

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

Indicating Temperature (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty of measurement (±°C)
	#1	#2	#3	#4	Ref. #5	
45.0	44.6	44.6	44.5	44.5	44.4	0.86

Chamber Characterization Result

Desired Temperature (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.5	45.0	45.0	0.85	0.75	1.9

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

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by : *Chalermit*

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

Master Calibration Co.,Ltd.

547 Soi Ratchadani, Kwang Samenok, Khet Huaykwang, Bangkok 10310
Tel.: (02) 274 2978-9, (02) 2742987-8 Fax: (02) 274 2518, (02) 274 2989
Website: www.mastercalibration.com E-mail: calibrate@mastercalibration.com

Certificate of Calibration

**TEMPERATURE
CONTROLLER ENCLOSURES**



Page 1 of 3

Certificate No.: MC 2413810

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

Reference Job No.	24-2841	Received Date	: 16 December 2024
Description	: Incubator	Resolution	: 0.1 °C
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 2413810) has been attached to the case.		
Method	In-house calibration procedure MWI-T-033 this method Base on TLAS G-20-1/02-08 "Temperature Controlled Enclosures".		
Location of Calibration	: Water Analysis Center Co., Ltd. ; Laboratory		
Environmental Conditions	: Ambient Temperature : (23.3 to 24.1) °C Relative Humidity : (54.8 to 64.8) %		
Date of Calibration	: 16 December 2024	Date of Issue	: 18 December 2024

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

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

The uncertainties are for a confidence probability of approximately 95%

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

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

Certificate No.: MC 2413810

Page 2 of 3

Reference Standard Instrument :

Description	Certificate No.	Serial No.	Due date	Traceable thru
Data Acquisition/Switch Unit	MC 2400121	MY59002240	18 Mar 2025	MCAL
With RTD ID. No.10/1 to 10/9				

Traceability :

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

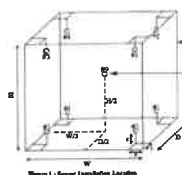
1. Calibration Procedure:

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 : 1.2 °C
- Overall Line Voltage variation : 0.1 V
- Chamber Size (W*H*D) : 65 cm x 80 cm x 50 cm

Checked by : *Chalermit*

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

Certificate No.: MC 2413810

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

Indicating Temperature (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (±°C)	* Uncertainty does not include stability (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. #9		
35.0	35.00	35.20	35.00	35.20	34.90	35.00	34.80	34.90	35.00	0.22	0.16

(*) : Non Accredited

Chamber Characterization Result

Desired Temperature (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	0.08	0.25	0.50

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

This certificate will certify of the calibrated equipment only.

End of Certificate

Certificate No : 25-SLM-062

Request No : Req-2025-0456

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR		Limit	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)	(± dB)	
1000 Hz 114 dB	113.76	113.8	0.04	113.8	+0.04	0.20	0.30	Pass

Note : Absolute accuracy was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN.58079

2. Self-generated noise, Microphone Installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		(± dB)
UUC Weighting		
A	19.3	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		(± dB)
UUC Weighting		
A	16.4	0.10
C	18.4	0.10
Z	22.4	0.10

4. Acoustic signal test of frequency weightings

(Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance Limit	Result
FAST / 30-130	A	C	Z	(± dB)	(± dB)	
STD Setting	(dB)	(dB)	(dB)			
125 Hz	0.9	1.1	1.0	0.60	1.5	Pass
1000 Hz	0.0	0.0	0.0	0.60	1.0	Pass
4000 Hz	-0.1	-0.1	-0.1	0.60	3.0	Pass
8000 Hz	-0.9	-0.9	-0.9	0.70	5.0	Pass

Checked by :

Chalarnat

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

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-01 Rev.04 Issue date 5824

Certificate No : 25-SLM-062

Request No : Req-2025-0456

Page : 3/7

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance Limit	Result
FAST / 30-130	A (dB)	C (dB)	Z (dB)	(± dB)	(± dB)	
STD Setting						
63 Hz	-0.2	0.0	-0.1	0.20	2.0	Pass
125 Hz	-0.1	0.0	0.0	0.20	1.5	Pass
250 Hz	0.0	0.0	0.1	0.20	1.5	Pass
500 Hz	0.0	0.1	0.0	0.20	1.5	Pass
1000 Hz	0.0	0.0	0.0	0.20	1.0	Pass
2000 Hz	0.0	0.1	0.0	0.20	2.0	Pass
4000 Hz	0.0	0.0	0.0	0.20	3.0	Pass
8000 Hz	0.1	0.1	0.0	0.20	5.0	Pass
16000 Hz	-1.3	-1.3	0.1	0.20	+5, -25	Pass

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY	Acceptance Limit	Result
FAST / 30-130	REF	UUC	ERR	(± dB)	(± dB)	
UUC Weighting	(dB)	(dB)	(dB)			
A	114.00	114.0	0.0	0.20	0.20	Pass
C	114.00	114.0	0.0	0.20	0.20	Pass
Z	114.00	114.0	0.0	0.20	0.20	Pass

UUC Setting	STD	Measured		UNCERTAINTY	Acceptance Limit	Result
30-130 / A	REF	UUC	ERR	(± dB)	(± dB)	
UUC Time Response	(dB)	(dB)	(dB)			
Fast	114.00	114.0	0.0	0.10	0.10	Pass
Slow	114.00	114.0	0.0	0.10	0.10	Pass
Log	114.00	114.0	0.0	0.10	0.10	Pass

Certificate No : 25-SLM-062

Request No : Req-2025-0456

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7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 30-130	UUC	(± dB)	(± dB)	
STD Setting	(dB)			
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.30	Pass

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY	Acceptance Limit	Result
FAST / A / 30-130	REF	UUC	ERR	(± dB)	(± dB)	
STD dB	(dB)	(dB)	(dB)			
120.00	120	120.9	-0.1	0.20	1.1	Pass
124.00	124	123.9	-0.1	0.20	1.1	Pass
128.00	128	128.9	-0.1	0.20	1.1	Pass
132.00	132	132.9	-0.1	0.20	1.1	Pass
136.00	136	136.9	-0.1	0.20	1.1	Pass
140.00	140	140.9	-0.1	0.20	1.1	Pass
144.00	144	144.9	-0.1	0.20	1.1	Pass
148.00	148	148.9	-0.1	0.20	1.1	Pass
152.00	152	152.9	-0.1	0.20	1.1	Pass
156.00	156	156.9	-0.1	0.20	1.1	Pass
160.00	160	160.9	-0.1	0.20	1.1	Pass
164.00	164	164.9	-0.1	0.20	1.1	Pass
168.00	168	168.9	-0.1	0.20	1.1	Pass
172.00	172	172.9	-0.1	0.20	1.1	Pass
176.00	176	176.9	-0.1	0.20	1.1	Pass
180.00	180	180.9	-0.1	0.20	1.1	Pass
184.00	184	184.9	-0.1	0.20	1.1	Pass
188.00	188	188.9	-0.1	0.20	1.1	Pass
192.00	192	192.9	-0.1	0.20	1.1	Pass
196.00	196	196.9	-0.1	0.20	1.1	Pass
200.00	200	200.9	-0.1	0.20	1.1	Pass
204.00	204	204.9	-0.1	0.20	1.1	Pass
208.00	208	208.9	-0.1	0.20	1.1	Pass
212.00	212	212.9	-0.1	0.20	1.1	Pass
216.00	216	216.9	-0.1	0.20	1.1	Pass
220.00	220	220.9	-0.1	0.20	1.1	Pass
224.00	224	224.9	-0.1	0.20	1.1	Pass
228.00	228	228.9	-0.1	0.20	1.1	Pass
232.00	232	232.9	-0.1	0.20	1.1	Pass
236.00	236	236.9	-0.1	0.20	1.1	Pass
240.00	240	240.9	-0.1	0.20	1.1	Pass

Certificate No : 25-SLM-063
Request No : Req-2025-0456

9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance	Result
FAST / A	REF	UUC	ERR	Limit	
UUC Range	(dB)	(dB)	(dB)	(± dB)	
30-130	30.50	30.6	0.1	1.1	Pass
	114	114.0	0.0	1.1	Pass

10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance	Result
A / 30-130	Timeburst	Ref	UUC	ERR	Limit	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)	
Fast	200	126.0	126.0	0.0	1.0	Pass
	2	109.0	109.0	0.0	+1.0, -2.5	Pass
	0.25	100.0	99.9	-0.1	+1.5, -5.0	Pass
Slow	200	119.6	119.6	0.0	1.0	Pass
	2	100.0	100.0	0.0	+1.0, -5.0	Pass
	0.25	91.0	90.9	-0.1	+1.5, -5.0	Pass

11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance	Result
FAST / C / 55-141	REF	UUC	ERR	Limit	
STD Setting	(dB)	(dB)	(dB)	(± dB)	
Complete cycle	135.4	135.4	0.0	2.0	Pass
Positive half cycle	135.4	135.1	-0.30	2.0	Pass
Negative half cycle	135.4	135.1	-0.30	2.0	Pass

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

P16-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-062
Request No : Req-2025-0456

12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	UUC	(± dB)	Limit	
STD Setting	(dB)	(± dB)	(± dB)	
Positive one-half cycle	139.6			
Negative one-half cycle	139.5			
Deviated	0.1	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	UUC	(± dB)	Limit	
STD Setting	(dB)	(± dB)	(± dB)	
Initial	129.0			
Final	129.0			
Deviated	0.0	0.10	0.30	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
4. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz	0.70 dB
5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
6. Frequency and time weightings at 1 kHz	0.20 dB
7. Long Term Stability	0.10 dB
8. Level linearity on the reference level range	0.30 dB
9. Level linearity including the level range control	0.30 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.35 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.10 dB

- Acceptance Limit and Maximum-permitted Uncertainty was IEC 61672-1:2013

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P16-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-062
Request No : Req-2025-0456

Decision Rule for Statements of Conformity

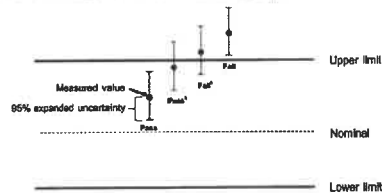
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-08-09/2019: Guidelines on the Reporting of Compliance with Specification as following P16 and statements

Pass - The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Fail - The measurement result was outside the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail - The measurement result was outside the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail - The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

P16-708-SLM-01 Rev.04 Issue date 5/6/24

W	FO.LAB 6.4-1/28	แก้ไขครั้งที่: 0	วันที่จัดทำ: 1 มี.ค. 2562	หน้า: 1 ของ 1
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แบบบันทึกการตรวจสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 รหัสเครื่องเมื่อ SR004 เกณฑ์การยอมรับ 93.73 ± 0.3, 113.82 ± 0.3
วันที่สอบเทียบ 16/05/68 วันที่สอบเทียบครั้งต่อไป 15/05/69
เครื่อง Digital Thermohygrometer S/N 385011742 รหัสเครื่องเมื่อ PWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 00396801 รหัสเครื่องเมื่อ PWL 0159
วันที่สอบเทียบ 24/02/68 วันที่สอบเทียบครั้งต่อไป 23/02/70

การตรวจสอบก่อนออกปฏิบัติงาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 2/05/68

การทวนสอบหลังจากออกปฏิบัติงาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
ความชื้นสัมพัทธ์ (%) 60 เกณฑ์การยอมรับ 50.0±15.0
วันที่ทวนสอบ 28/05/68

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
หมายเหตุ	ผ่าน	ผ่าน	หมายเหตุ	ผ่าน	ผ่าน

ผู้บันทึก 9/กน.จ
ผู้ตรวจสอบ

ผู้บันทึก 2/กน.จ
ผู้ตรวจสอบ

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7/139 MOO 13, SOI SINTHAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHU SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL. 0660-2116-5660-1 FAX: 0660-2116-7140



Certificate of Calibration

Customer : WATER ANALYSIS CENTER CO., LTD.
Name : 194 Moo 5, T.Kanhan, A.U-Thai, Ayutthaya 13120.
Certificate No : 25-SLM-063
Request No : Req-2025-0457

Unit Under Calibration Details

Measurement Item : Sound Level Meter
Manufacturer : KJON
Model : NL-42
Serial Number : 0036923
ID : WWL 0161
Resolution : 0.1 dB
Microphone Class : 2
Microphone Model : UC-52
Microphone S/N : 180447
Preamplifier Model : NHT-24
Preamplifier S/N : 87812
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 10 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 19 February 2025
Calibrated Date : 24 February 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	Briel & Kjaer	4192	2294985	25 June 2025	NMT
Audio Generator	Svanitec	Svan401	121	15 October 2023	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : Mr. Noppadol Luangert
Service Calibration Engineer

Approved By : Mr. Paet Mahavorn
Calibration Engineer Supervisor
Issue Date : 24 February 2025

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
P46-708-01-M-01 Rev.04 Issue date 5/6/24

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TEL. 0660-2116-5660-1 FAX: 0660-2116-7140



Certificate No : 25-SLM-063
Request No : Req-2025-0457

1. Indication at the calibration check frequency

UUC Setting	Normal	Before Adjust	After Adjust	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 114 dB	113.76	113.9	0.14	113.8	+0.04	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN.58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		
UUC Weighting	(dB)	(± dB)
A	21.7	0.19

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		
UUC Weighting	(dB)	(± dB)
A	19.7	0.10
C	19.6	0.10
Z	23.7	0.10

4. Acoustic signal test of frequency weightings

(Without Windscreen)

UUC Setting	Deviation from various Frequency	UNCERTAINTY	Acceptance	Result
FAST / 30-130	Weighting Response curve		Limit	
STD Setting	A C Z	(± dB)	(± dB)	
125 Hz	-0.3	0.1	0.5	0.60
1000 Hz	0.0	0.0	0.0	0.40
4000 Hz	0.4	0.4	0.7	0.60
8000 Hz	0.0	0.0	0.2	0.70

INNOVATIVE INSTRUMENT CALIBRATION LAB
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TEL. 0660-2116-5660-1 FAX: 0660-2116-7140



Certificate No : 25-SLM-063
Request No : Req-2025-0457

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency	UNCERTAINTY	Acceptance	Result
FAST / 30-130	Weighting Response curve		Limit	
STD Setting	A (dB) C (dB) Z (dB)	(± dB)	(± dB)	
63 Hz	-0.2	0.0	0.0	2.0
125 Hz	-0.1	0.0	0.0	1.3
250 Hz	-0.1	0.0	0.0	1.3
500 Hz	0.0	0.1	0.0	1.3
1000 Hz	0.0	0.0	0.0	1.0
2000 Hz	0.0	0.1	0.0	2.0
4000 Hz	0.0	0.0	0.0	3.0
8000 Hz	0.1	0.1	0.0	5.0
16000 Hz	-1.3	-1.3	0.0	+5, -DNF

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance	Result
FAST / 30-130	REF	UUC	ERR	Limit	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)	
A	114.00	114.0	0.0	0.20	Pass
C	114.00	114.0	0.0	0.20	Pass
Z	114.00	114.0	0.0	0.20	Pass

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance	Result
30-130 / A	REF	UUC	ERR	Limit	
UUC Time Response	(dB)	(dB)	(dB)	(± dB)	
Fast	114.00	114.0	0.0	0.10	Pass
Slow	114.00	114.0	0.0	0.10	Pass
Log	114.00	114.0	0.0	0.10	Pass

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P46-708-01-M-01 Rev.04 Issue date 5/6/24

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P46-708-01-M-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-063
Request No : Req-2025-0457

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	UUC	(± dB)	Limit (± dB)	
STD Setting	(dB)			
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.30	Pass

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	REF	UUC	ERR	(± dB)	(± dB)
STD dB	(dB)	(dB)	(dB)		
135.00	135	135.0	0.0	1.1	Pass
134.00	134	134.0	0.0	1.1	Pass
129.00	129	129.0	0.0	1.1	Pass
124.00	124	124.0	0.0	1.1	Pass
119.00	119	119.0	0.0	1.1	Pass
114.00	114	114.0	0.0	1.1	Pass
109.00	109	109.1	0.1	1.1	Pass
104.00	104	104.1	0.1	1.1	Pass
99.00	99	99.1	0.1	1.1	Pass
94.00	94	94.1	0.1	1.1	Pass
89.00	89	89.1	0.1	1.1	Pass
84.00	84	84.1	0.1	1.1	Pass
79.00	79	79.1	0.1	1.1	Pass
74.00	74	74.1	0.1	1.1	Pass
69.00	69	69.1	0.1	1.1	Pass
64.00	64	64.1	0.1	1.1	Pass
59.00	59	59.1	0.1	1.1	Pass
54.00	54	54.1	0.1	1.1	Pass
49.00	49	49.1	0.1	1.1	Pass
44.00	44	44.1	0.1	1.1	Pass
39.00	39	39.1	0.1	1.1	Pass
34.00	34	34.3	0.3	1.1	Pass
29.00	29	29.8	0.8	1.1	Pass
24.00	24	25.0	1.0	1.1	Pass
21.00	21	24.0	1.0	1.1	Pass
22.00	22	23.0	1.0	1.1	Pass

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PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-063
Request No : Req-2025-0457

9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance	Result
FAST / A	REF	UUC	ERR	(± dB)	(± dB)
UUC Range	(dB)	(dB)	(dB)		
30-130	27.60	28.5	0.9	0.30	1.1
	114	114.0	0.0		1.1

10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance	Result
A / 30-130	Touchstart	Ref	UUC	ERR	(± dB)	(± dB)
UUC Time Response	(ms)	(dB)	(dB)	(dB)		
Fam	200	126.0	126.0	0.0	1.0	Pass
	2	109.0	108.9	-0.1	+1.0, -2.5	Pass
	0.25	100.0	99.8	-0.2	+1.5, -5.0	Pass
S30%	200	119.6	119.5	-0.1	1.0	Pass
	2	100.0	99.9	-0.1	+1.0, -5.0	Pass
	200	120.0	120.0	0.0	1.0	Pass
S43	2	100.0	99.9	-0.1	+1.0, -2.5	Pass
	0.25	91.0	90.8	-0.2	+1.5, -5.0	Pass

11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance	Result
FAST / C / 55-141	REF	UUC	ERR	(± dB)	(± dB)
STD Setting	(dB)	(dB)	(dB)		
Complete cycle	136.4	136.0	-0.40	2.0	Pass
Positive half cycle	135.4	135.1	-0.30	2.0	Pass
Negative half cycle	135.4	135.1	-0.30	2.0	Pass

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PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-063
Request No : Req-2025-0457

12. Overload Indication

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	UUC	(± dB)	Limit (± dB)	
STD Setting	(dB)			
Positive one-half cycle	139.3			
Negative one-half cycle	139.3			
Deviated	0.0	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 30-130	UUC	(± dB)	Limit (± dB)	
STD Setting	(dB)			
Initial	129.0			
Final	129.0			
Deviated	0.0	0.10	0.30	Pass

Nete :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone handled	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
5. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz	0.70 dB
6. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
7. Frequency and time weightings at 1 kHz	0.20 dB
8. Long Term Stability	0.10 dB
9. Level linearity on the reference level range	0.30 dB
10. Level linearity including the level range control	0.30 dB
11. Tone burst response	0.30 dB
12. Peak C Sound level	0.35 dB
13. Overload Indication	0.25 dB
14. High Level Stability	0.10 dB

- Acceptance limit and Maximum-permitted Uncertainty was IEC 61672-1:2013

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PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-063
Request No : Req-2025-0457

Decision Rule for Statements of Conformity

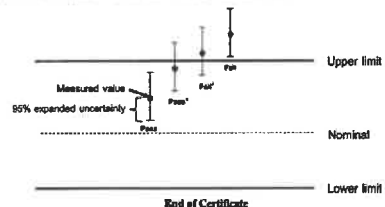
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019: Guidelines on the Reporting of Compliance with Specification as following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-065
Request No : Req-2025-0459

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 46-141	UUC	(± dB)	(± dB)	
STD Setting	(dB)			
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.10	Pass

8. Level linearity on the reference level range

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 46-141	REF	UUC	ERR	(± dB)	(± dB)
STD dB	(dB)	(dB)	(dB)		
141.00	141	141.0	0.0	0.8	Pass
140.00	140	140.0	0.0	0.8	Pass
139.00	139	139.0	0.0	0.8	Pass
138.00	138	138.1	0.1	0.8	Pass
137.00	137	137.1	0.1	0.8	Pass
136.00	136	136.1	0.1	0.8	Pass
135.00	135	135.1	0.1	0.8	Pass
134.00	134	134.1	0.1	0.8	Pass
133.00	133	133.1	0.1	0.8	Pass
132.00	132	132.1	0.1	0.8	Pass
131.00	131	131.1	0.1	0.8	Pass
130.00	130	130.1	0.1	0.8	Pass
129.00	129	129.1	0.1	0.8	Pass
128.00	128	128.1	0.1	0.8	Pass
127.00	127	127.1	0.1	0.8	Pass
126.00	126	126.1	0.1	0.8	Pass
125.00	125	125.1	0.1	0.8	Pass
124.00	124	124.1	0.1	0.8	Pass
123.00	123	123.1	0.1	0.8	Pass
122.00	122	122.1	0.1	0.8	Pass
121.00	121	121.1	0.1	0.8	Pass
120.00	120	120.1	0.1	0.8	Pass
119.00	119	119.1	0.1	0.8	Pass
118.00	118	118.1	0.1	0.8	Pass
117.00	117	117.1	0.1	0.8	Pass
116.00	116	116.1	0.1	0.8	Pass
115.00	115	115.1	0.1	0.8	Pass
114.00	114	114.0	0.0	0.8	Pass
113.00	113	113.0	0.0	0.8	Pass
112.00	112	112.0	0.0	0.8	Pass
111.00	111	111.0	0.0	0.8	Pass
110.00	110	110.0	0.0	0.8	Pass
109.00	109	109.0	0.0	0.8	Pass
108.00	108	108.0	0.0	0.8	Pass
107.00	107	107.0	0.0	0.8	Pass
106.00	106	106.0	0.0	0.8	Pass
105.00	105	105.0	0.0	0.8	Pass
104.00	104	104.0	0.0	0.8	Pass
103.00	103	103.0	0.0	0.8	Pass
102.00	102	102.0	0.0	0.8	Pass
101.00	101	101.0	0.0	0.8	Pass
100.00	100	100.0	0.0	0.8	Pass
99.00	99	99.0	0.0	0.8	Pass
98.00	98	98.0	0.0	0.8	Pass
97.00	97	97.0	0.0	0.8	Pass
96.00	96	96.0	0.0	0.8	Pass
95.00	95	95.0	0.0	0.8	Pass
94.00	94	94.1	0.1	0.8	Pass
93.00	93	93.1	0.1	0.8	Pass
92.00	92	92.1	0.1	0.8	Pass
91.00	91	91.1	0.1	0.8	Pass
90.00	90	90.1	0.1	0.8	Pass
89.00	89	89.1	0.1	0.8	Pass
88.00	88	88.1	0.1	0.8	Pass
87.00	87	87.1	0.1	0.8	Pass
86.00	86	86.1	0.1	0.8	Pass
85.00	85	85.1	0.1	0.8	Pass
84.00	84	84.1	0.1	0.8	Pass
83.00	83	83.1	0.1	0.8	Pass
82.00	82	82.1	0.1	0.8	Pass
81.00	81	81.1	0.1	0.8	Pass
80.00	80	80.1	0.1	0.8	Pass
79.00	79	79.1	0.1	0.8	Pass
78.00	78	78.1	0.1	0.8	Pass
77.00	77	77.1	0.1	0.8	Pass
76.00	76	76.1	0.1	0.8	Pass
75.00	75	75.1	0.1	0.8	Pass
74.00	74	74.1	0.1	0.8	Pass
73.00	73	73.1	0.1	0.8	Pass
72.00	72	72.1	0.1	0.8	Pass
71.00	71	71.1	0.1	0.8	Pass
70.00	70	70.1	0.1	0.8	Pass
69.00	69	69.1	0.1	0.8	Pass
68.00	68	68.1	0.1	0.8	Pass
67.00	67	67.1	0.1	0.8	Pass
66.00	66	66.1	0.1	0.8	Pass
65.00	65	65.1	0.1	0.8	Pass
64.00	64	64.1	0.1	0.8	Pass
63.00	63	63.1	0.1	0.8	Pass
62.00	62	62.1	0.1	0.8	Pass
61.00	61	61.1	0.1	0.8	Pass
60.00	60	60.1	0.1	0.8	Pass
59.00	59	59.1	0.1	0.8	Pass
58.00	58	58.1	0.1	0.8	Pass
57.00	57	57.1	0.1	0.8	Pass
56.00	56	56.1	0.1	0.8	Pass
55.00	55	55.1	0.1	0.8	Pass
54.00	54	54.1	0.1	0.8	Pass
53.00	53	53.1	0.1	0.8	Pass
52.00	52	52.1	0.1	0.8	Pass
51.00	51	51.1	0.1	0.8	Pass
50.00	50	50.1	0.1	0.8	Pass
49.00	49	49.1	0.1	0.8	Pass
48.00	48	48.1	0.1	0.8	Pass
47.00	47	47.1	0.1	0.8	Pass
46.00	46	46.1	0.1	0.8	Pass
45.00	45	45.3	0.3	0.8	Pass

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FM-708-SLM-01 Rev.04 Issue date 24/24

Certificate No : 25-SLM-065
Request No : Req-2025-0459

9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A	REF	UUC	ERR	(± dB)	(± dB)
UUC Range	(dB)	(dB)	(dB)		
46-141	50.7	50.5	0.2	0.8	Pass
	114.0	114.0	0.0	0.8	Pass

10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance Limit	Result
A / 45-141	Toneburst	Ref	UUC	ERR	(± dB)	(± dB)
UUC Time Response	(ms)	(dB)	(dB)	(dB)		
Fast	200	137.0	137.0	0.0	0.5	Pass
	2	120.0	119.9	-0.1	+1.0, -1.5	Pass
	0.25	111.0	110.9	-0.1	+1.0, -3.0	Pass
Slow	200	130.6	130.7	+0.1	0.5	Pass
	2	111.0	111.1	+0.1	+1.0, -3.0	Pass
SEL	200	131.0	131.1	+0.1	0.5	Pass
	2	111.0	111.1	+0.1	+1.0, -1.5	Pass
	0.25	102.0	102.0	0.0	+1.0, -3.0	Pass

11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / C / 46-141	REF	UUC	ERR	(± dB)	(± dB)
STD Setting	(dB)	(dB)	(dB)		
Complete cycle	135.4	135.1	-0.30	2.0	Pass
Positive half cycle	135.4	135.3	-0.10	1.0	Pass
Negative half cycle	135.4	135.3	-0.10	1.0	Pass

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-SLM-01 Rev.04 Issue date 24/24

Certificate No : 25-SLM-065
Request No : Req-2025-0459

12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 46-141	UUC	(± dB)	(± dB)	
STD Setting	(dB)			
Positive one-half cycle	143.3			
Negative one-half cycle	143.6			
Deviated	-0.3	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 46-141	UUC	(± dB)	(± dB)	
STD Setting	(dB)			
Initial	140.0			
Final	140.0			
Deviated	0.0	0.10	0.10	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
5. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz	0.70 dB
6. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.30 dB
7. Frequency and time weightings at 1 kHz	0.20 dB
8. Long Term Stability	0.10 dB
9. Level linearity on the reference level range	0.30 dB
10. Level linearity including the level range control	0.30 dB
11. Tone burst response	0.30 dB
12. Peak C Sound level	0.35 dB
13. Overload indication	0.25 dB
14. High Level Stability	0.10 dB

- Acceptance Limit and Maximum-permitted Uncertainty was REC 61677-1:2013

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-SLM-01 Rev.04 Issue date 24/24

Certificate No : 25-SLM-065
Request No : Req-2025-0459

Decision Rule for Statements of Conformity

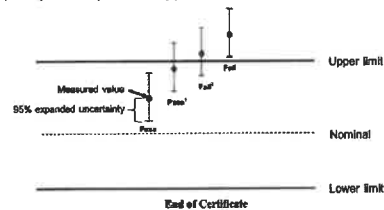
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-OR-05:2019: Guidelines on the Reporting of Compliance with Specifications as following Fig and statement.

Pass - The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ - The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ - The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail - The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-SLM-01 Rev.04 Issue date 24/24

แบบบันทึกการตรวจสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 รหัสเครื่อง SR004 เกจการสอบรับ 93.73 ± 0.3, 113.82 ± 0.3
วันที่สอบเทียบ 16/05/68 วันที่สอบเทียบครั้งต่อไป 15/05/69
เครื่อง Digital Thermohygro Meter S/N 385011742 รหัสเครื่อง PWL 0185
วันที่สอบเทียบ 27/09/67 วันที่สอบเทียบครั้งต่อไป 26/09/68
เครื่อง Sound Level Meter S/N 820957 รหัสเครื่อง PWL 0226
วันที่สอบเทียบ 25/02/68 วันที่สอบเทียบครั้งต่อไป 24/02/70

การตรวจสอบก่อนออกใช้งาน การตรวจสอบหลังจากออกใช้งาน

อุณหภูมิ (°C) 25 เกจการสอบรับ 23.0 ± 0.3 อุณหภูมิ (°C) 25 เกจการสอบรับ 23.0 ± 0.3
ความชื้นสัมพัทธ์ (%) 58 เกจการสอบรับ 50.0 ± 1.0 ความชื้นสัมพัทธ์ (%) 60 เกจการสอบรับ 50.0 ± 1.0
วันที่ทวนสอบ 21/05/68 วันที่ทวนสอบ 29/05/68

Item	ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 114.0dB)	Item	ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 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 ทวนสอบ	ผ่าน	ผ่าน	ผลการ ทวนสอบ	ผ่าน	ผ่าน

ผู้บันทึก จ.ก.ก. ผู้ตรวจสอบ จ.ก.ก.
ผู้ตรวจสอบ จ.ก.ก. ผู้ตรวจสอบ จ.ก.ก.

Certificate of Calibration

Customer : WATER ANALYSIS CENTER CO.,LTD.
Name : WATER ANALYSIS CENTER CO.,LTD.
Address : 1/94 Moo.5, T.Kashan, A.U-Thai, Ayutthaya 13120

Certificate No : 25-SLM-066 Rev.1
Request No : Req-2025-0460

Unit Under Calibration Details

Measurement item : Sound Level Meter
Manufacturer : ACU
Model : 6226
Serial Number : 200051
Resolution : 0.1 dB

Microphone Class : 2
Microphone Model : 7052
Microphone S/N : 75988
Preamplifier Model : -
Preamplifier S/N : -
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C
Humidity : 50 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 19 February 2025
Calibrated Date : 25 February 2025
Calibration Procedure : In-house method QP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	GRAS	40AN	18273	20 August 2024	GRAS
Multifrequency Calibrator	Quest	Quest-cal	EPA000234	26 July 2024	TSI
Audio Generator	Swenik	Svan401	131	8 October 2024	WK Electric

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k = 2, providing a level of confidence approximately 95 %.

Calibrated By : Mr. Noppadol Laangart
Service Calibration Engineer

Approved By : Mr. Puch Mathavorn
Calibration Engineer Supervisor
Issue Date : 23 May 2025

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-066 Rev.1
Request No : Req-2025-0460

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)	Acceptance Limit (± dB)	Result
FAST / A 140-130	Level	UUC (dB)	ERR (dB)	UUC (dB)	ERR (dB)			
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)			
1000 Hz 114 dB	113.76	113.6	-0.16	113.8	+0.04	0.20	0.30	Pass

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTER, Model SV 35A, SN. 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 20-80	(dB)	(dB)
UUC Weighting	(dB)	(dB)
A	19.5	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 20-80	(dB)	(dB)
UUC Weighting	(dB)	(dB)
A	16.3	0.10
C	25.4	0.10
Z	28.6	0.10

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve	UNCERTAINTY	Acceptance Limit	Result
FAST / 40-130	A C Z	(dB)	(dB)	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1 0.1 0.0	0.50	1.5	Pass
1000 Hz	0.0 0.0 0.0	0.50	1.0	Pass
4000 Hz	0.1 0.1 0.3	0.50	3.0	Pass
8000 Hz	0.3 0.3 0.4	0.70	5.0	Pass

Certificate No : 25-SLM-066 Rev.1
Request No : Req-2025-0460

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Response curve	UNCERTAINTY	Acceptance Limit	Result
FAST / 40-130	A C Z	(dB)	(dB)	
STD Setting	(dB)	(dB)	(dB)	
63 Hz	-0.1 0.0 0.0	0.20	2.0	Pass
125 Hz	-0.1 0.1 0.1	0.20	1.5	Pass
250 Hz	0.0 0.1 0.1	0.20	1.5	Pass
500 Hz	0.0 0.0 0.1	0.20	1.5	Pass
1000 Hz	0.0 0.0 0.1	0.20	1.0	Pass
2000 Hz	-0.1 -0.1 0.0	0.20	2.0	Pass
4000 Hz	-0.3 -0.3 0.0	0.20	3.0	Pass
8000 Hz	-0.3 -0.3 -0.2	0.20	5.0	Pass
16000 Hz	0.8 0.8 -0.6	0.20	+5,-INF.	Pass

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / 40-130	REF	UUC ERR	(dB)	(dB)	
UUC Weighting	(dB)	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20	Pass
C	114.00	114.0	0.0	0.20	Pass
Z	114.00	114.1	0.1	0.20	Pass

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance Limit	Result
40-130 / A	REF	UUC ERR	(dB)	(dB)	
UUC Time Response	(dB)	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.10	Pass
Slow	114.00	114.0	0.0	0.10	Pass
Log	114.00	114.0	0.0	0.10	Pass

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PM-708-SLM-01 Rev.04 Issue date 5/6/24

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-066 Rev.1

Request No : Req-2025-0460

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 40-130	UUC	(± dB)	Limit (± dB)	
STD Setting	(dB)			
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.30	Pass

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation	UNCERTAINTY	Acceptance	Result
FAST / A / 40-130	REF (dB)	UUC (dB) ERR (dB)	(± dB)	Limit (± dB)	
STD dB					
133.00	133	133.0	0.0	0.5	
132.00	132	132.1	0.1	1.1	Pass
131.00	131	131.1	0.1	1.1	Pass
130.00	130	130.1	0.1	1.1	Pass
129.00	129	129.1	0.1	1.1	Pass
128.00	128	128.0	0.0	1.1	Pass
119.00	119	119.0	0.0	1.1	Pass
114.00	114	114.0	0.0	1.1	Pass
109.00	109	109.1	0.1	1.1	Pass
104.00	104	104.0	0.0	1.1	Pass
99.00	99	99.0	-0.1	1.1	Pass
94.00	94	94.1	0.1	1.1	Pass
89.00	89	89.0	0.0	1.1	Pass
84.00	84	84.1	0.1	1.1	Pass
79.00	79	79.1	0.1	1.1	Pass
74.00	74	74.0	0.0	1.1	Pass
69.00	69	69.0	0.0	1.1	Pass
64.00	64	64.0	0.0	1.1	Pass
59.00	59	59.1	0.1	1.1	Pass
54.00	54	54.1	0.1	1.1	Pass
49.00	49	49.0	0.0	1.1	Pass
44.00	44	44.1	-0.1	1.1	Pass
39.00	39	39.4	0.4	1.1	Pass

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FM-708-SLM-01 Rev.04 Issue date: 5/6/24

Certificate No : 25-SLM-066 Rev.1

Request No : Req-2025-0460

12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 40-130	UUC	(± dB)	Limit (± dB)	
STD Setting	(dB)			
Positive one-half cycle	146.5			
Negative one-half cycle	146.5			
Deviated	0.0	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance	Result
FAST / A / 40-130	UUC	(± dB)	Limit (± dB)	
STD Setting	(dB)			
Initial	139.0			
Final	139.0			
Deviated	0.0	0.10	0.30	Pass

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
4. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz	0.70 dB
5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
6. Frequency and time weightings at 1 kHz	0.20 dB
7. Long Term Stability	0.10 dB
8. Level linearity on the reference level range	0.30 dB
9. Level linearity including the level range control	0.30 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.25 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.10 dB

* Acceptance Limit and Maximum-permitted Uncertainty was IEC 61672-1:2013

The results related only to the items calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-SLM-01 Rev.04 Issue date: 5/6/24

ภาคผนวก ข-16

Certificate No : 25-SLM-066 Rev.1

Request No : Req-2025-0460

9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance	Result
FAST / A	REF (dB)	UUC (dB) ERR (dB)	(± dB)	Limit (± dB)	
UUC Range					
40-130	44.70	44.9	0.2	1.1	Pass
	114	114.0	0.0	1.1	Pass
30-120	34.60	34.8	0.2	1.1	Pass
	114	113.9	-0.1	1.1	Pass

10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance	Result
A / 40-130	Timeburst (ms)	Ref (dB)	UUC (dB) ERR (dB)	(± dB)	Limit (± dB)	
UUC Time Response						
Fast	200	126.0	125.3	-0.7	1.0	Pass
	2	109.0	107.3	-1.7	+1.0, -2.5	Pass
	0.25	100.0	98.2	-1.8	+1.5, -5.0	Pass
Slow	200	119.6	119.4	-0.2	1.0	Pass
	2	100.0	99.9	-0.1	+1.0, -5.0	Pass
SEL	200	120.0	119.2	-0.8	1.0	Pass
	2	100.0	100.2	+0.2	+1.0, -2.5	Pass
	0.25	91.0	91.2	+0.2	+1.5, -5.0	Pass

11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance	Result
FAST / C / 55-138	REF	UUC (dB) ERR (dB)	(± dB)	Limit (± dB)	
STD Setting	(dB)				
Complete cycle	133.4	133.1	-0.30	3.0	Pass
Positive half cycle	132.4	132.1	-0.30	2.0	Pass
Negative half cycle	132.4	132.1	-0.30	2.0	Pass

The results related only to the items calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-SLM-01 Rev.04 Issue date: 5/6/24

Certificate No : 25-SLM-066 Rev.1

Request No : Req-2025-0460

Decision Rule for Statements of Conformity

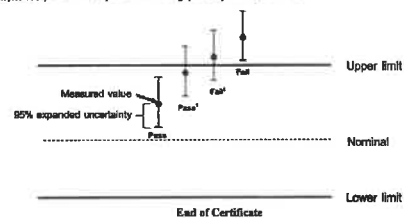
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:99/2019; Guidelines on the Reporting of Compliance with Specification as following Fig. and statements

Pass = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement is 95% exceeds the limit.

Fail¹ = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement is 95% is within the limit.

Fail = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



FM-708-SLM-01 Rev.04 Issue date: 5/6/24

แบบบันทึกการตรวจสอบเครื่อง Sound Level Meter

เครื่อง CA111 Sound Calibrator S/N 520272 วันที่สอบเทียบ SR004 เกณฑ์การยอมรับ 95.73 ± 0.3, 113.82 ± 0.3
 วันที่สอบเทียบ 16/05/68 วันที่สอบเทียบครั้งที่ต่อไป 15/05/69
 เครื่อง Digital Thermohygrometer S/N 105091609 วันที่สอบเทียบ WWL0055
 วันที่สอบเทียบ 29/11/66 วันที่สอบเทียบครั้งที่ต่อไป 28/11/67
 เครื่อง Sound Level Meter S/N 200051 วันที่สอบเทียบ WWL0206
 วันที่สอบเทียบ 25/02/68 วันที่สอบเทียบครั้งที่ต่อไป 24/02/70

การตรวจสอบก่อนออกใช้งาน การตรวจสอบหลังจากออกใช้งาน

อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0 อุณหภูมิ (°C) 25 เกณฑ์การยอมรับ 23.0±3.0
 ความชื้นสัมพัทธ์ (%) 58 เกณฑ์การยอมรับ 50.0±15.0 ความชื้นสัมพัทธ์ (%) 60 เกณฑ์การยอมรับ 50.0±15.0
 วันที่ตรวจสอบ 21/05/68 วันที่ตรวจสอบ 29/05/68

Item	ระดับเสียงที่วัดได้ (dB) (ความถี่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความถี่ 114.0dB)	Item	ระดับเสียงที่วัดได้ (dB) (ความถี่ 94.0dB)	ระดับเสียงที่วัดได้ (dB) (ความถี่ 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	RD	0.00	0.00
%RSD (≤ 10)	0.00	0.00	%RSD (≤ 10)	0.00	0.00
ผลการ ตรวจสอบ	ผ่าน	ผ่าน	ผลการ ตรวจสอบ	ผ่าน	ผ่าน

ผู้บันทึก: จุฬาลักษณ์
 ผู้ตรวจสอบ: จุฬาลักษณ์

ผู้บันทึก: จุฬาลักษณ์
 ผู้ตรวจสอบ: จุฬาลักษณ์

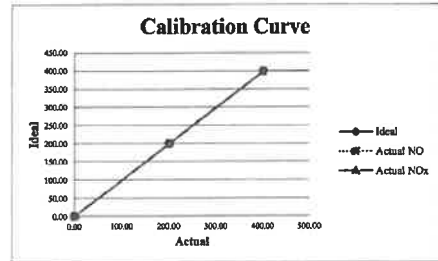
Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site: สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
 Location: วัดบ้านช้าง
 Date of measurement: 21 May 2025
 Worksheet No.: C-210525-WWL 0114
 Ambient NOx Analyzer ID: WWL 0114
 Manufacturer: HORIBA
 Ambient NOx Analyzer Model: APNA-370
 Ambient NOx Analyzer S/N: P1E99ES

Multi Gas Calibrator
 Calibrator ID: WWL0124
 Calibrator Model: Series 6100
 Calibrator S/N: S/N 7462
 Calibrate Date: 06 March 2025

Cylinder Std. Gas
 Std. Gas Concentration (PPM): \$0.90
 Cylinder Pressure (psi): 2000
 Certified Date: 07 December 2021
 Expired Date: 07 December 2025
 Serial No.: CC241587

Point	CALIBRATION RESULTS					
	Ideal	Actual NO	Error NO	%Error NO	Actual NO _x	%Error NO _x
ZERO	0.00	0.10	0.10	-	0.10	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.20	0.10
SPAN 400 ppb	400.00	400.20	0.20	0.05	400.20	0.05
AVERAGE (%)				0.05		0.07



Calibrated by: จุฬาลักษณ์ (Miss SUTHIDA SINGHAPHEN) Chemist
 Approved by: (Mr. RUNGSASIKORN KOSUM) Technical Management

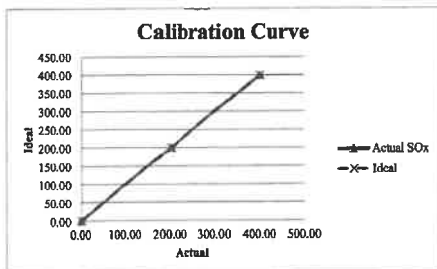
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site: สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
 Location: วัดบ้านช้าง
 Date of measurement: 21 May 2025
 Worksheet No.: C-210525-WWL 0109
 Ambient SO_x Analyzer ID: WWL 0109
 Manufacturer: HORIBA
 Ambient SO_x Analyzer Model: APSA-370
 Ambient SO_x Analyzer S/N: YDL839W0

Multi Gas Calibrator
 Calibrator ID: WWL0124
 Calibrator Model: Series 6100
 Calibrator S/N: S/N 7462
 Calibrate Date: 06 March 2025

Cylinder Std. Gas
 Std. Gas Concentration (PPM): \$0.90
 Cylinder Pressure (psi): 2000
 Certified Date: 07 December 2021
 Expired Date: 07 December 2025
 Serial No.: CC241587

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



Calibrated by: จุฬาลักษณ์ (Miss SUTHIDA SINGHAPHEN) Chemist
 Approved by: (Mr. RUNGSASIKORN KOSUM) Technical Management

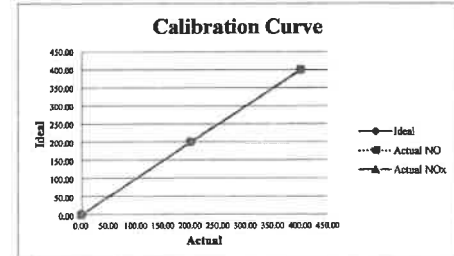
Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site: สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
 Location: โรงเรียนอนุบาลเทศบาลตำบลบ้านช้าง
 Date of measurement: 21 May 2025
 Worksheet No.: C-210525-WWL 0222
 Ambient NO_x Analyzer ID: WWL 0222
 Manufacturer: Thermo Environmental Instruments Inc
 Ambient NO_x Analyzer Model: 43C
 Ambient NO_x Analyzer S/N: 42C-70968-367

Multi Gas Calibrator
 Calibrator ID: WWL0124
 Calibrator Model: Series 6100
 Calibrator S/N: S/N 7462
 Calibrate Date: 06 March 2025

Cylinder Std. Gas
 Std. Gas Concentration (PPM): \$0.90
 Cylinder Pressure (psi): 2000
 Certified Date: 07 December 2021
 Expired Date: 07 December 2025
 Serial No.: CC241587

Point	CALIBRATION RESULTS					
	Ideal	Actual NO	Error NO	%Error NO	Actual NO _x	%Error NO _x
ZERO	0.00	0.10	0.10	-	0.10	-
SPAN 200 ppb	200.00	200.10	0.10	0.05	200.20	0.10
SPAN 400 ppb	400.00	400.20	0.20	0.05	400.20	0.05
AVERAGE (%)				0.05		0.07



Calibrated by: จุฬาลักษณ์ (Miss SUTHIDA SINGHAPHEN) Chemist
 Approved by: (Mr. RUNGSASIKORN KOSUM) Technical Management



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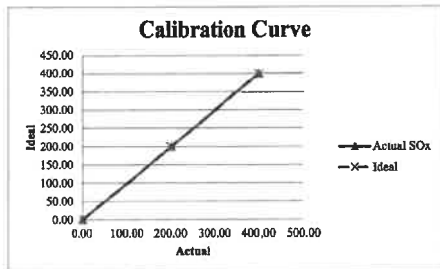
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : กรมศุลกากรกรมโรงงานอุตสาหกรรม (โครงการ 5)
Location : โรงเรือนอบแห้งสมุนไพรสมุนไพร
Date of measurement : 21 May 2025
Worksheet No. : C-210525WWL 0221
Ambient SO₂ Analyzer ID : WWL 0221
Manufacturer : Thermo Environmental Instruments Inc
Ambient SO₂ Analyzer Model : 43C
Ambient SO₂ Analyzer S/N : 43C-58282-317

Multi Gas Calibrator
Calibrator ID : WWL0124
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 06 March 2025

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



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



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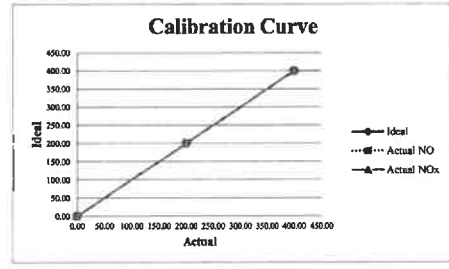
Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : กรมศุลกากรกรมโรงงานอุตสาหกรรม (โครงการ 5)
Location : โรงเรือนอบแห้งสมุนไพรสมุนไพร
Date of measurement : 21 May 2025
Worksheet No. : C-210525-WWL 0115
Ambient NO₂ Analyzer ID : WWL 0115
Manufacturer : HORIBA
Ambient NO₂ Analyzer Model : APNA-370
Ambient NO₂ Analyzer S/N : 705KA9JJ

Multi Gas Calibrator
Calibrator ID : WWL0124
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 06 March 2025

Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.90
Cylinder Pressure (psi) : 2000
Certified Date : 07 December 2021
Expired Date : 07 December 2025
Serial No. : CC241587

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NO ₂	Error NO ₂	%Error NO ₂
ZERO	0.00	0.10	0.10	-	0.10	0.10	-
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)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



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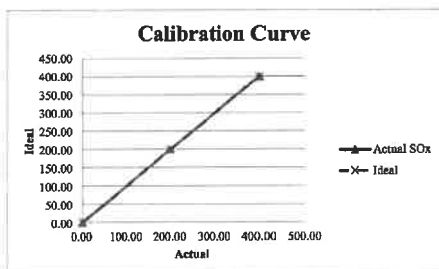
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : กรมศุลกากรกรมโรงงานอุตสาหกรรม (โครงการ 5)
Location : โรงเรือนอบแห้งสมุนไพรสมุนไพร
Date of measurement : 21 May 2025
Worksheet No. : C-210525WWL 0110
Ambient SO₂ Analyzer ID : WWL 0110
Manufacturer : HORIBA
Ambient SO₂ Analyzer Model : APNA-370
Ambient SO₂ Analyzer S/N : Y8SW7T00

Multi Gas Calibrator
Calibrator ID : WWL0124
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 06 March 2025

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 ₂	Error SO ₂	%Error SO ₂
ZERO	0.00	0.10	0.10	-
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. RUNGSASIKORN KOSUM)
Technical Management



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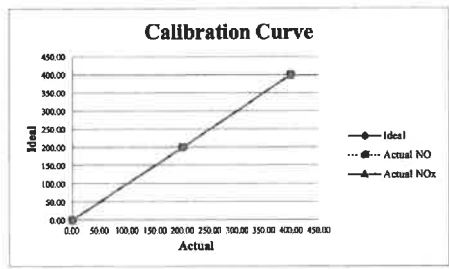
Nitrogen Dioxide Analyzer Calibration Worksheet

Project Site : กรมศุลกากรกรมโรงงานอุตสาหกรรม (โครงการ 5)
Location : โรงเรือนอบแห้งสมุนไพรสมุนไพร
Date of measurement : 21 May 2025
Worksheet No. : C-210525-WWL 0117
Ambient NO₂ Analyzer ID : WWL 0117
Manufacturer : HORIBA
Ambient NO₂ Analyzer Model : APNA-370
Ambient NO₂ Analyzer S/N : VKLYC3KD

Multi Gas Calibrator
Calibrator ID : WWL0124
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 06 March 2025

Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.90
Cylinder Pressure (psi) : 2000
Certified Date : 07 December 2021
Expired Date : 07 December 2025
Serial No. : CC241587

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NO ₂	Error NO ₂	%Error NO ₂
ZERO	0.00	0.10	0.10	-	0.10	0.10	-
SPAN 200 ppb	200.00	200.20	0.20	0.10	200.10	0.10	0.05
SPAN 400 ppb	400.00	400.10	0.10	0.03	400.20	0.20	0.05
AVERAGE (%)				0.06			0.05



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



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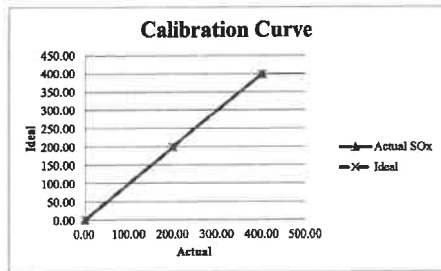
Sulfur Dioxide Analyzer Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
Location : อู่ทหารเรือ
Date of measurement : 21 May 2025
Worksheet No. : C-210525WWL0111
Ambient SO₂ Analyzer ID : WWL0111
Manufacturer : HORIBA
Ambient SO₂ Analyzer Model : APSA-370
Ambient SO₂ Analyzer S/N : PGRKTBDX

Multi Gas Calibrator
Calibrator ID : WWL0124
Calibrator Model : Series 6100
Calibrator S/N : S/N 7462
Calibrate Date : 06 March 2025

Cylinder Std. Gas
Std. Gas Concentration (PPM) : 50.98
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	200.20	0.20	0.10
SPAN 400 ppb	400.00	400.10	0.10	0.03
AVERAGE (%)				0.06



Calibrated by :
(Miss SUTHIDA SINGHAPHEN)
Chemist

Approved by :
(Mr. RUNGSASIKORN KOSUM)
Technical Management



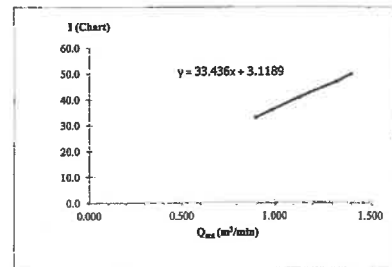
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Tel: 0-35224-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
Location : อู่ทหารเรือ
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0093
High Volume ID : WWL0093
High Volume Model : TE-5170 (TSP)
High Volume S/N : 2729
Ambient Condition
Temperature (°C) : 26
Barometric Pressure (mmHg) : 756

Calibration Office
Calibrator ID : WWL0103
Calibrator Model : TE-5028A
Calibrator S/N : 3271
Calibrate Date : 26/03/2025
Quality Standard Slope : 1.59569
Quality Standard Intercept : -0.02154

Test No.	delta H ₂ O (inch)	Q _{air} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.395	50.0	49.80	Slope : 33.30 Intercept : 3.106 Correlation Coefficient : 0.9995
2	4.40	1.323	47.0	46.81	
3	3.20	1.130	41.0	40.83	
4	2.40	0.980	36.0	35.85	
5	2.00	0.896	33.0	32.87	



Calibrated by :
Mr. JITTAWEE WONGMAKHEB

Approved by :
Mr. RUNGSASIKORN KOSUM

POLAB 55-125

แก้ไขครั้งที่ : วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 จาก 1



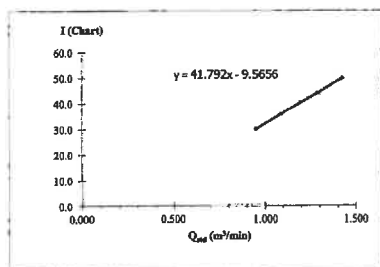
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Tel: 0-35224-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
Location : อู่ทหารเรือ
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0098
High Volume ID : WWL0098
High Volume Model : TE-6070 (PM10)
High Volume S/N : 2734
Ambient Condition
Temperature (°C) : 26
Barometric Pressure (mmHg) : 756

Calibration Office
Calibrator ID : WWL0103
Calibrator Model : TE-5028A
Calibrator S/N : 3271
Calibrate Date : 26/03/2025
Quality Standard Slope : 0.99945
Quality Standard Intercept : -0.01346

Test No.	delta H ₂ O (inch)	Q _{air} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.420	50.0	31.44	Slope : 26.28 Intercept : -6.015 Correlation Coefficient : 0.9996
2	4.10	1.287	44.0	27.67	
3	3.50	1.191	40.0	25.15	
4	2.90	1.085	36.0	22.64	
5	2.20	0.947	30.0	18.87	



Calibrated by :
Mr. JITTAWEE WONGMAKHEB

Approved by :
Mr. RUNGSASIKORN KOSUM

POLAB 55-125

แก้ไขครั้งที่ : วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 จาก 1



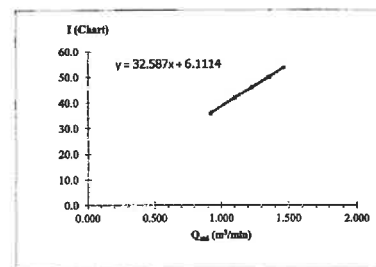
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Tel: 0-35224-383, 0-35800-593 Fax: 0-35800-594

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะ อุตสาหกรรม (โครงการ 5)
Location : โรงเรือนปลูกผักปลอดสารพิษบ้านท่าเรือ
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0223
High Volume ID : WWL0223
High Volume Model : TE-5170 (TSP)
High Volume S/N : 2738
Ambient Condition
Temperature (°C) : 26
Barometric Pressure (mmHg) : 756

Calibration Office
Calibrator ID : WWL0103
Calibrator Model : TE-5028A
Calibrator S/N : 3271
Calibrate Date : 26/03/2025
Quality Standard Slope : 1.59569
Quality Standard Intercept : -0.02154

Test No.	delta H ₂ O (inch)	Q _{air} (m ³ /min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.40	1.464	54.0	53.78	Slope : 32.46 Intercept : 6.087 Correlation Coefficient : 0.9997
2	4.60	1.352	50.0	49.80	
3	3.80	1.230	46.0	45.81	
4	3.00	1.095	42.0	41.83	
5	2.10	0.918	36.0	35.85	



Calibrated by :
Mr. JITTAWEE WONGMAKHEB

Approved by :
Mr. RUNGSASIKORN KOSUM

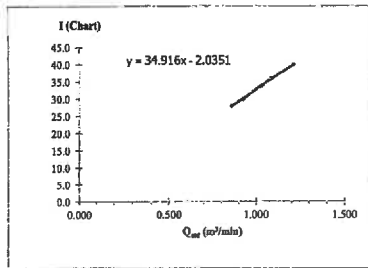
POLAB 55-125

แก้ไขครั้งที่ : วันที่รับใช้ : 1 ต.ค. 2560 หน้า : 1 จาก 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 5) Page 1 of 1
Location : วัดโสมนัส
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0101 Calibration Office : WWL0103
High Volume ID : WWL0101 Calibrator ID : TE-5028A
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2733 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 0.99945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01346

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	3.60	1.207	40.0	25.15	Slope : 21.96 Intercept : -1.280 Correlation Coefficient : 0.9998
2	2.90	1.085	36.0	22.64	
3	2.60	1.028	34.0	21.38	
4	2.10	0.925	30.0	18.87	
5	1.80	0.858	28.0	17.61	

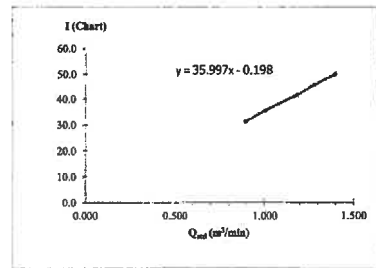


Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
FO.LAB 5.5-1025 ปฏิบัติวันที่ : วันที่ 21/05/2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 5) Page 1 of 1
Location : วัดโสมนัส
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0097 Calibration Office : WWL0103
High Volume ID : WWL0097 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2726 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 1.59569
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.02154

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.395	50.0	49.80	Slope : 35.85 Intercept : -0.197 Correlation Coefficient : 0.9996
2	4.10	1.277	46.0	45.81	
3	3.50	1.181	42.0	41.83	
4	2.50	1.000	36.0	35.85	
5	2.00	0.896	32.0	31.87	

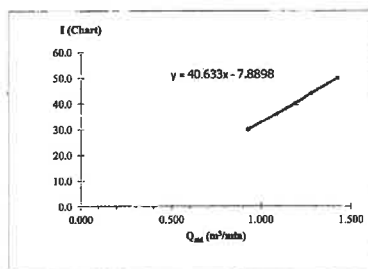


Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
FO.LAB 5.5-1025 ปฏิบัติวันที่ : วันที่ 21/05/2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 5) Page 1 of 1
Location : วัดโสมนัส
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0102 Calibration Office : WWL0103
High Volume ID : WWL0102 Calibrator ID : TE-5028A
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2731 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 0.99945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01346

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.420	50.0	31.64	Slope : 25.55 Intercept : -4.961 Correlation Coefficient : 0.9991
2	4.00	1.272	44.0	27.67	
3	3.50	1.191	40.0	25.15	
4	2.90	1.085	36.0	22.64	
5	2.10	0.925	30.0	18.87	

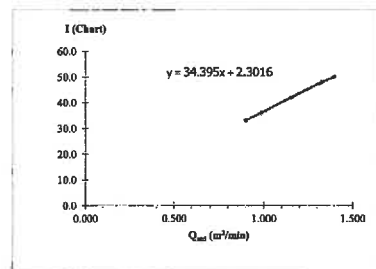


Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
FO.LAB 5.5-1025 ปฏิบัติวันที่ : วันที่ 21/05/2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุตสาหกรรม (โครงการ 5) Page 1 of 1
Location : วัดโสมนัส
Date of measurement : 21/05/2025
Worksheet No. : C-210525-WWL0095 Calibration Office : WWL0103
High Volume ID : WWL0095 Calibrator ID : TE-5028A
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2727 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 1.59569
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.02154

Test No.	delta H ₂ O (inch)	Q _{std} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	4.90	1.395	50.0	49.80	Slope : 34.26 Intercept : 2.292 Correlation Coefficient : 0.9995
2	4.40	1.323	48.0	47.81	
3	3.30	1.147	42.0	41.83	
4	2.40	0.980	36.0	35.85	
5	2.00	0.896	33.0	32.87	

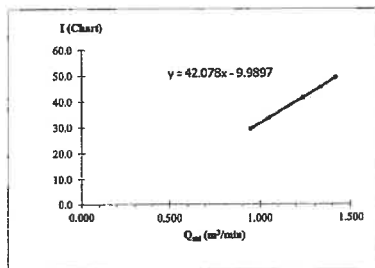


Calibrated by : [Signature] Approved by : [Signature]
Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
FO.LAB 5.5-1025 ปฏิบัติวันที่ : วันที่ 21/05/2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Project Site : **สถานีควบคุมการจราจรทางอากาศ (สนามบิน)** Page 1 of 1
Location : **วัดหนองบัว**
Date of measurement : **21/05/2025**
Worksheet No. : **C-210525-WWL0100** Calibration Office
High Volume ID : **WWL0100** Calibrator ID : **WWL0103**
High Volume Model : **TE-6070 (PM10)** Calibrator Model : **TE-5028A**
High Volume S/N : **2735** Calibrator S/N : **3271**
Ambient Condition : **26** Calibration Date : **26/03/2025**
Temperature (°C) : **26** Quality Standard Slope : **0.99945**
Barometric Pressure (mmHg) : **756** Quality Standard Intercept : **-0.01346**

Test No.	delta H ₂ O (inch)	Q _{del} (m³/min)	I (Chart)	IC (Corrected)	Linear Regression
1	5.00	1.420	50.0	31.44	Slope : 26.46 Intercept : -6.282 Correlation Coefficient : 0.9998
2	4.40	1.333	46.0	28.93	
3	3.80	1.240	42.0	26.41	
4	2.70	1.047	34.0	21.38	
5	2.20	0.947	30.0	18.87	



Calibrated by : **Mr. JITTAWEE WONGMAKHREB** Approved by : **Mr. RUNGSASIKORN KOSUM**
FO.LAB 5.5-1025 วันที่ใช้ : 1 วันที่รับคืน : 1 วันที่ : 2560 วันที่ : 1 พย 1



Certificate of Calibration

WL-21 Wireless Anemometer

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

Client: Water Analysis Center Co., Ltd.
Serial: 2302DR0081 Sensor 2302DT0081
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

Velocity				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
1.0	1.0	0.0	0.5-1.1	Pass
1.9	1.9	0.0	1.8-2.3	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	19.9	0.3	19.0-21.0	Pass

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

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

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

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

Performed by: **Mr. JITTAWEE WONGMAKHREB**



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Certificate of Calibration

WL-21 Wireless Anemometer

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

Client: Water Analysis Center Co., Ltd.
Serial: 2302DR0083 Sensor 2302DT0083
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

Velocity				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
1.0	1.0	0.1	0.5-1.1	Pass
1.9	1.9	0.1	1.8-2.3	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	20.0	0.4	19.0-21.0	Pass

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

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

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

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

Performed by: **Mr. JITTAWEE WONGMAKHREB**



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Certificate of Calibration

WL-21 Wireless Anemometer

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

Client: Water Analysis Center Co., Ltd.
Serial: 2302DR0090 Sensor 2302DT0090
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

Velocity				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
1.0	1.0	0.0	0.5-1.1	Pass
1.9	1.9	0.0	1.8-2.3	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	9.5-10.5	Pass
19.6	19.9	0.3	19.0-21.0	Pass

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

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

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

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

Performed by: **Mr. JITTAWEE WONGMAKHREB**



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Certificate of Calibration

WL-21 Wireless Anemometer

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

Client: Water Analysis Center Co., Ltd.
Serial: 2311DR0044 Sensor 23110T0044
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

Velocity				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
1.0	1.0	0.0	0.0-1.1	Pass
1.9	1.9	0.0	1.0-2.2	Pass
4.9	5.0	0.1	4.7-5.3	Pass
7.0	7.1	0.1	6.0-8.0	Pass
10.0	10.0	0.0	8.5-10.5	Pass
19.6	19.9	0.3	19.0-21.0	Pass

Wind Direction				
Measured Value (m/s)	Actual Value (m/s)	Deviation	Tolerance	Result
49°	47°	2	45-49	Pass
135°	135°	0	115-138	Pass
226°	226°	0	222-228	Pass
316°	316°	0	312-318	Pass
359°	0°	1	357-3	Pass

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

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

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

Performed by:



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